Feedback/Balancing Loops and Limits to Mass Production

Overview of Lecture

• Recap Craft Production – Mass Production Activity

• Feedback Loops in Mass Production

• Balancing Loops and Limits to Mass Production
  - Role of Production in MP
  - Role of R&D in MP
  - Role of Marketing in MP
  - Role of Finance/Accounting in MP

• Today’s Landscape

Recall: Craft Production

• Craft production is characterized by:
  - Highly skilled work force; knowledge of design, machining, and fitting learned through apprenticeship.
  - Artisans with the skills and know-how to turn raw materials into finished goods; not only an art, but a source of pride.
  - Lack of economies of scale: cost to make 200,000 cars only slightly less than cost to make 10 cars.
  - Very low production volume: 1000 or fewer automobiles a year; maybe 50 of the same design, but no two exactly alike because of fitting process.
  - Fitting problems resulting from “dimensional creep” caused by lack of standard gauge systems.

Recall: Principles of Mass Production

• From ASM, mass production utilized principles:
  1. Interchangeable parts
  2. Specialized machines
  4. Focus on production process
  5. Division of labor

• Additional principles needed for mass production:
  - Flow
  - Focus on low cost and low prices
  - Economies of scale
  - Product standardization
  - Degree of specialization
  - Focus on operational efficiency
  - Hierarchical organization with professional managers
  - Vertical integration

In-Class Activity #1: Output Summary

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<th>WRP</th>
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<td>16</td>
<td>1.60</td>
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How do we make these again?
What’s this line?

What are they doing again?

It’s all about technique…

Others take notice…

and rejoice!

Feedback on CP Run

What did you observe about the process?
1. No communication; planes different among different craftsmen; each step was of the same quality throughout process; dependent on individual skills
2. Diverse product even given the same template; one person expert in all steps; had to learn and master each step of process, which could be time consuming
3. High learning curve; low production level; low WIP; time consuming; high transportation time; need to know whole process; no division of labor
4. Quality was good; one person did all steps; takes more time but quality was better than in mass production

Did all aircraft take the same time to produce and test? Why not?
1. No: each person had same time to make plane, but varied (1-4 planes/min) due to skill level; variation in individual craftsmen, not process
2. No: speed of skill at person; quality; level of understanding; some people faster than others; experience; some people had trouble with certain steps
3. No: first one took longer; people had different learning rates; different quality of product; no standardization; different skill levels; no specialization
4. No: depends on worker – experienced workers did well; different perceptions on quality; some people had more practice; some people waiting for testing

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<td>2.20 (+83.3%)</td>
<td>19 (+280%)</td>
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<tr>
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<td>13</td>
<td>1.40 (-44.4%)</td>
<td>32 (+300%)</td>
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<td>26</td>
<td>2.10 (+320%)</td>
<td>11 (+120%)</td>
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Everyone’s happy at the start…

Or waiting for the work to arrive…

Workflow: U-formation

S-formation

Notice anything?

Can you say: bottleneck?
Nearing the end of Run 1…

Test pilot sure has a long way to go…

…and some tough planes to fly!

The secret to Group 4’s success: QC…

…proper form…

…and the no-look pass!
Feedback on MP - Run #1

How did assembly line process differ from CP process?
1. One step/person; very mechanized; specific task = repetitive but experience ↑
2. Repetitive, specialized task; no knowledge of entire process
3. More finished goods; more WIP; standard quality; specialization; division of labor; teamwork supervision of process; times slower; but skills developed
4. Did own task as part of process; single step performed repeatedly

What were implications for the workers?
1. Limited skill set needed; monotonous and boring, but quicker; stress level ↑
2. Specialized in single process; only had to master one step, which was a motivating factor so that you did not let your team down
3. More stressed; hand cramping; workers in later stages had to correct defects
4. Less skill needed; bottlenecks; stress levels; some workers fast/others slow; not much time to think; very little prep time

What were the implications for the process as a whole?
1. Slightly higher production rate; also more unfinished goods due to bottlenecks; quality decreased; more planes produced at a time
2. Quality ↓; throughput ↑; bottleneck (at harder steps) constrained process
3. Bottlenecks increased; screw-up at one workstation slowed entire line
4. Faster moving; sequential; poor quality but more uniformity

Ditto for Group 1

Group 2 prefers an X-formation

Group 3 tightens their U

…and pays more careful attention to their folds…
…and their neighbor’s folds…

…but still runs into problems!

All’s calm with Group 2…

…but maybe they shouldn’t be…

Group 4 – no major bottlenecks…

…ditto for Group 1…
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First Run: Craft Production

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Third Run: Mass Production (Trial 2)

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<tr>
<td>1</td>
<td>36</td>
<td>3.60 (+112%)</td>
<td>3 (-80.0%)</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>1.60 (-27.3%)</td>
<td>22 (+15.5%)</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>1.40 (+189%)</td>
<td>42 (+31.3%)</td>
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<td>4</td>
<td>37</td>
<td>3.70 (+76.2%)</td>
<td>10 (-9.1%)</td>
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Summary of Survey Responses

- Histograms of survey responses

Analysis of Survey Responses

- Summary of survey:

<table>
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<tr>
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<th>Average</th>
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  * Difference in ratings between before and after is statistically significant.

- Correlation between stress levels:

  - During CP & MP1: -0.40 (p-value < 0.025)
  - During MP1 & MP2: 0.43 (p-value < 0.001)
  - During CP & MP2: -0.43 (p-value < 0.001)

Stress Levels: CP vs. MP Run 1

- Those who reported CP to be easy (low stress) also reported higher stress levels during MP Run 1 – and vice versa
- The change (Δ) in reported stress level was also higher for those who found CP to be easy (i.e., low stress)

Stress Levels: MP Run 1 vs. MP Run 2

- Stress levels during MP runs were positively correlated: if they were high in Run 1, they tended to stay high in Run 2
- Changes between Run 1 and Run 2 either increased stress (if low) or decreased stress (if high) in Run 1

Feedback on MP - Run #2

What recommendations did your group make and why?

1. Joined similar processes to reduce transition time/bottlenecks; formed two parallel lines for smooth production; increased workers at bottlenecks; simple tasks given fewer workers; two symmetric folds/person
2. Two parallel assembly lines but common worker making Fold 3, also for testing
3. Sitting closer; consistent folds; improved on first run; changed workers’ tasks
4. Made two lines; symmetric fold/worker; exploit symmetry in production

Did recommendations improve the line? Why or why not?

1. Doubled production; decreased WIP by factor of 5; better utilized workers; streamlined process; stopped production early to reduce WIP; better seating
2. No because of quality issue; low yield; one line tried to be too precise
3. Two parallel assembly lines but common worker making Fold 3, also for testing
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What effect did recommendations have on process as a whole?

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Mass production became a paradigm for doing business. The key to MP is efficiency through stability and control.

Mass production has the goal of developing, producing, marketing, and delivering goods and services at prices low enough that nearly everyone can afford them.

Recall: Paradigm of Mass Production

Recall: Paradigm of Mass Production

Economies of Scale:
- Beginnings of a reinforcing cycle: As prices were lowered, people could buy more product, resulting in greater sales and greater production, even lower prices, and so on.

Production Standardization:
- Reinforcing cycle: Low costs of standardized products → low prices → maintained market homogeneity because the gap between the cost of MP goods and customized goods grew as prices fell → people clustered around homogeneous products.

Degree of Specialization and Professional Managers:
- Managers focused on planning the work of their workers, increasing their specialization, decreasing their skills, and eventually replacing many of them with machinery.

Mass Production’s Reinforcing Loop

- MP creates a feedback loop that reinforces standardized products, mass production techniques, and large homogeneous markets.
- MP dictates the view of the world and the decisions that must be made in order to achieve success.
- Company must make a profit to stay in business. The more profit, the more successful the business. Selling lots of products at a low cost yields highest profit.
- More products can be sold in a large homogeneous market.

Note: MP loop and its derivation is adapted from (Pine, 1993).

MP Reinforcing Loop (cont.)

- High production volumes reduce manufacturing costs through economies of scale.
- Lowering prices increases demand and therefore volume, yielding higher profits.
- As prices drop, markets expand. Customers in niche market on the “fringe” of an MP market are lured into by lower prices.

MP Reinforcing Loop (cont.)

- Efficiency of production must be maintained at all times: Stability, no delays, no interruptions, no surprises!
- How is stability ensured?

1. Inputs must be stabilized (wages and supplier prices):
   - fight Unions which cannot be allowed to control labor market
   - vertically integrate as much as possible
   - play suppliers off one another to reduce their prices
   - ignore niche markets, leaving them for the “little guys”
   - adjust inventory levels to respond to changes in demand
   - if demand falls below a level that adversely affects profits, lay off workers

2. Stabilize production process:
   - introduce buffers and queues
   - standardize as much as possible
   - break down manufacturing into small specified tasks
   - specialize workers also

3. Outputs must be stabilized (control demand levels):
   - adjust inventory levels to respond to changes in demand
   - if demand falls below a level that adversely affects profits, lay off workers

How is stability ensured?
MP Reinforcing Loop (cont.)

- For even better stability → lengthen product life cycle
  - This reduces per unit development costs and investments in product and process technology and allows experience (learning) curve to operate at its fullest
  - Minor changes only add cost and should be avoided

Stable Demand → Low-cost, Consistent Quality, Standardized Products → Mass Production Processes → Long Product Life Cycles

MP Reinforcing Loop (cont.)

- Long product life cycles enable long product development cycles to develop product extensions and new products for the masses

Long Product Development Cycles → Mass Production Processes → Low-cost, Consistent Quality, Standardized Products → Stable Demand → Homogeneous Market

MP Reinforcing Loop (cont.)

- R&D should only focus on product developments that can be easily mass produced.

New Products → Long Product Development Cycles → Mass Production Processes → Low-cost, Consistent Quality, Standardized Products → Stable Demand → Homogeneous Market

“New products manufactured by a mass production process yield low-cost, consistent quality, standardized goods for large, homogenous markets; this results in stable demand, causing long product life cycles, which allows for long product development cycles from which new products are created”

Secondary Reinforcing Loops in MP

- Automate the process as much as possible to realize lowest costs and largest volumes (high fixed costs, but low unit costs).
- Pursue new process technology to improve throughout further and reduce prices further through added volume.

New Products → Mass Production Processes → Long Product Development Cycles → Low-cost, Consistent Quality, Standardized Products → R

Secondary Reinforcing Loops in MP (cont.)

- R&D should focus on product developments that can be mass produced; marketing should push current product out the door.
- A steady stream of products can provide stable base of products needed to maintain profits over the long run.

Process Technology

New Products → Mass Production Processes → Long Product Development Cycles → Low-cost, Consistent Quality, Standardized Products → R

Process Technology
Recall that outputs must be stabilized (control demand levels):
- ignore niche markets, leaving them for the “little guys”
- adjust inventory levels to respond to changes in demand

### Growth of Mass Production

- MP has been remarkably successful for many American industries.
- Those who embraced it first and managed it best became the giants of the industry:
  - IBM, Ford, Procter & Gamble, DuPont, U.S. Steel, Texas Instruments, GM

- These and thousands of other firms, large and small, made the U.S. the world’s dominant economic power.

### Limits to Mass Production

- By 1950s, MP was commonplace around the world.
- Climax was in 1955 in automobile industry.
  - First year in which 7 million cars were sold in U.S.
  - Ford, GM, and Chrysler had 95% of all sales.
  - Six (6) models accounted for 80% of all cars sold. A more complete picture of the MP paradigm includes balancing loops which shed light on why shift to mass customization has occurred.

- A more complete picture of the MP paradigm includes balancing loops which shed light on why shift to mass customization has occurred.

- Mass production is efficiency through stability and control
  - Where do reinforcing feedback loops start to break down?

### Input Stability and Market Homogeneity

- MP requires input stability.
  - E.g., labor costs much keep falling in order for MP loop to keep reinforcing itself or productivity must continue to increase.

- MP requires homogenous markets; as we near the end of the 20th century, we find:
  - American society is much less homogenous with regard to class, race, gender, lifestyles, national origin.
  - Income distribution is less equal, creating differences in disposable income and disparities in needs and wants.
  - American market is no longer new and is not growing much faster than the rest of the industrialized world.
  - Demand for new products frequently has to be diverted from older ones; therefore, new products must meet the needs of customers more completely, be of higher quality, and simply be different from what is already available.
**Demand Stability and Growth**

- Demand must be stable and grow steadily. Such was the case until 1970s but since then:
  - Many industries have matured, been saturated, and buffered by recessions, e.g., oil crises.
  - Seller’s market has become a buyer’s market.
  - Forecasting and production planning is problematic making it difficult to justify production of high volume, low cost products when markets are unpredictable.
  - Technological shocks such as digital equipment.
  - Process technology shocks, e.g.,
    - Lean Production and JIT in automobile industry was designed to compete against MP, allowing Japanese to produce smaller volumes at lower cost with higher quality.
    - CIM, FMS, etc. have made it economically viable to produce greater variety of high quality products.

**Balancing Loops in Mass Production**

**MP Paradigm Lost**

- As a result, efficiency, stability, and control are lost.

- What other factors have given rise to mass customization and the "downfall" of MP?
  - Shortening of product life cycles and development times.
  - Customer expectations: if Company X can't satisfy my every need, I know someone else can.
  - Globalization of markets: companies compete globally and must satisfy wider variety of customers than ever before.
  - Pervasiveness of computers in design and manufacturing process, e.g., CAD, CAM, CIM, along with:
    - Digital - fax it, print it, copy it, tape it, beam it, email it ... digital makes it easy.
    - Internet - ease of acquiring and disseminating information.
    - Databases - it is cheap and easy to store individual customer information.

**Limits to Mass Production Process**

- Smaller, more flexible (and usually foreign) companies have exploited the opportunities provided by the inability of mass producers to adapt to market turbulence by providing more variety and customization.

  - This fuels market turbulence which makes mass customizers even more competitive.

- As a result of increase in market turbulence and shifts in society, mass producers:
  - could not maintain stability of demand due to high levels of (market) saturation, and
  - economic shocks and uncertainties of the time;

**Limits to Mass Production Process (cont.)**

- could not control their vast, homogeneous markets when changing demographics, social unrest, and a host of other trends splintered these markets into smaller fragments; and

  - could not maintain efficiency of their production processes when the price and availability of energy, materials, and labor could no longer be forecast with adequate certainty.

  - Hence, the stability, efficiency, and control needed for MP to be successful were lost.

- To understand better the limits of MP paradigm, we will examine the positive and detrimental effects of the four most influential functions of the modern corporation: production, R&D, marketing, and finance/accounting.

**Role of Production in MP**

**Focus:**

- Production or operation efficiency: the amount of materials processed or parts manufactured per labor or machine input time.

  - The average cost per unit can be driven down by increasing the scale of operations—as long as they are efficient.

  - Mass producers focused on reducing the amount of time required for direct labor or machine operations.

**Primary Benefit:**

- Low variable costs with low prices in quantity (economies of scale).
Detrimental Effects of Production in MP

Detrimental Effects:
- Growth in overhead, bureaucracy, and real costs
  - Indirect labor and machinery often added to ensure production efficiency and increase operational efficiency, e.g.,
    - IEs to monitor lines
    - WIP buffers to ensure uninterrupted production
  - Managers and supervisors to coordinate vast network of machines and labor
- Production inflexibility
  - Disruptions to production process had to be eliminated
  - Long runs with only infrequent changeovers were necessary to maintain economies of scale
  - Further reduced flexibility to produce non-standard products or to respond to special orders

Detrimental Effects of Production in MP (cont.)
- High inventory costs
  - Driven higher as components for products not currently running were placed in inventory after being assembled
  - As demand for more variety increased, inventory costs increased further since long production runs needed to maintain economies of scale
  - More finished goods inventory
- High costs of variety
  - Resulted from increased inventory costs resulting from increased variety
- Separation of thinking from doing
  - Followed from “Scientific Management” since workers were treated as mere components of the production process
  - Each worker was another machine that had to be planned, coordinated, and told what to do

Detrimental Effects of Production in MP (cont.)
- Lack of investment in worker skills
  - Workers were managed like machinery as responsibility of improving the production process shifted to managers, IEs, and supervisors who coordinated efforts and machines.
  - Working smarter had no place in this mechanistic system!
    - “The ideal organization was designed to free itself from human error or human intervention, running automatically to turn out predictable products and predictable profits.”
- Poor management/employee relations
  - As a result of management’s attempts to eliminate human error for efficiency’s sake, workers did not cooperate, resulting in a tug-of-war for control of shop floor:
    - Unions formed, machinery sabotaged
    - Poor relations.

Role of R&D in MP

Recall:
- A key characteristic of ASM was continuous technological improvements

Focus:
- Breakthrough innovations
  - The focus on operational efficiency stripped the workers of their ability to contribute their ideas to development of innovations.
  - Inventions and innovations moved out of hands of workers and entrepreneurs and into specialized hands and minds of scientists and engineers in R&D → establishment of R&D labs within major industries, e.g., General Research Laboratory of GE, Xerox’s Palo Alto Research Center.

Role of R&D in MP (cont.)
- Need for standardized products and lengthened production runs meant that changeovers and retooling had to be done as infrequently as possible, e.g., Ford → throw out machines whenever specifications changed.
- If tremendous costs of shutting down and retooling a line were going to be incurred, than it had better be for something major—a breakthrough—not an incremental innovation.

Primary Benefit:
- Great technological advances
**Detrimental Effects of R&D in MP**

**Detrimental Effects:**
- Lack of incremental innovation
  - Balance between continual and radical (breakthrough) innovations tilted too far to the one side, arresting the regular, ongoing development of many products and MP itself.
- Separation of innovation and production
  - R&D labs were typically removed from actual manufacturing facilities.
  - Furthermore, they were modeled after assembly line where one group “threw them over the wall” to the next:
    - R&D → product development → manufacturers → marketing

**Detrimental Effects (cont.)**
- Fewer process innovations
  - Breakthrough innovations usually oriented toward product, not process
  - Did not understand the value of process innovations and how they could contribute to improve operational efficiency (only saw the downside of having to stop production and retool)
  - Also, R&D was separated from production and did not understand problems they were encountering.
- Relative technological decline
  - Incremental innovations were not available to push product and process technology along.
  - Production ill equipped to keep up with product innovations.
  - High costs and long cycle times reduced number of technologies that could be affordably investigated and brought to market.

**Detrimental Effects of Marketing in MP**

**Detrimental Effects:**
- Disregard for many customers needs and wants
  - Customer desires for anything beyond what was provided in the standardized set of products were disregarded, not sought out, or assumed not to exist.
  - E.g., Japanese automobile market considered to be “intractable”.
    - Japanese drive on left side of road; hence, the steering wheel is on the right.
    - Japanese companies produce automobiles with steering on right hand side for their market and left hand side for exports to U.S. and elsewhere.

**Marketing’s Disregard for Customer Needs**

**Why doesn’t U.S. do the same?**

- CEO of Ford quoted as saying:
  “You have a market of 7.8 million units in Japan, and imports total 2.9%. That says something about the Japanese market. All the manufacturers in the world can’t be that bad... The cars we sell from the U.S. have left-hand drive. But would right-hand drive really make a big difference? A lot of manufacturers have right-hand drive capability, but look at those total imports into Japan. Right-hand drive alone won’t make that much difference.”

**Role of Marketing in MP**

**Focus:**
- Selling low cost, standardized products to large, homogenous markets.
- (Marketing was the servant of production, not the consumer.)

**Primary Benefit:**
- Stable and predictable demand.
**Marketing’s Disregard for Customer Needs (cont.)**

- Furthermore, when low costs alone are not enough to keep markets stable, mass producers typically resorted to pure selling, i.e., “unloading” their merchandise
  - Mass producers must maintain sales in order to maintain operational efficiency.
  - Produce large inventories and force dealers to sell only what was on the lot.
  - Dealers pushed customers to forgo desired options that were not on the floor model and to accept options on the floor model that they would have preferred to do without.
  - This led to hard sell tactics and disgruntled customers.

**Detrimental Effects of Marketing in MP (cont.)**

- Disgruntled and disloyal customers
  - Hard sell tactics used to sell goods of lower quality that were less innovative gave rise to disgruntled and disloyal customers.
  - If the purchase was not quite what the customer wanted, dissatisfaction of the product was magnified by dissatisfaction of the sales tactics.
  - Customers “duped” by ads and promotions into buying poor quality merchandise would think twice before buying from the same manufacturer or retailer again.
  - “Word of mouth” is the cheapest and most effective form of advertising.

**Detrimental Effects of Marketing in MP (cont.)**

- Opening of market niches
  - The focus of mass producers on selling standardized goods to homogenous markets made it difficult for them to practice true marketing and understand and fulfill customer needs.
    - This led to the opening of market niches that smaller, more flexible competitors were happy to fill.
    - Customers “at the edges” of homogenous markets were finding higher quality, more innovative products that more fully met their needs and wants.
    - This allowed markets to be further re-segmented into more and more niches as the competitors won over the “leftovers” that mass producers would not touch.
    - Competition would eventually have enough of the market to attach mass producers directly.

**Local Markets**

**Expansion of Mass Market**

**Expansion of Mass Market**
Expansion of Mass Market

Expansion of Mass Market

Expansion of Mass Market

Expansion of Mass Market

Expansion of Mass Market

Expansion of Mass Market
Expansion of Mass Market

The Mass Market

Example: Mass Automobile Market

Truck Market Niche

Van Market Niche

Market Niches Grow into Market Segments
Market Segments Grow

Luxury Cars
Sports Cars
Convertibles
Midsize Cars
Vans & Minivans
Wagons
Small Cars
Trucks
SUVs

Market Segment Consolidates

Super Duty Trucks
Luxury Cars
Convertibles
Midsize Cars
Vans & Minivans
Wagons
Small Cars
Trucks
SUVs

Enter Super Duty Truck Niche Market

Luxury Cars
Sports Cars
Convertibles
Midsize Cars
Vans & Minivans
Wagons
Small Cars
Trucks
SUVs

SUV Market Segment Grows

Luxury Cars
Sports Cars
Convertibles
Midsize Cars
Vans & Minivans
Wagons
Small Cars
Trucks
SUVs

Ford’s Market Segmentation

Luxury Cars
Sports Cars
Convertibles
Midsize Cars
Vans & Minivans
Wagons
Small Cars
Trucks
SUVs
Detrimental Effects of Marketing in MP (cont.)

• Segment retreat and avoidance
  - Segment retreat and avoidance was the typical response of mass producers to any new competition.
  - Initially, new competitors went after low end of the total market, filling small niches which offered little profit margins.
  - Niches expanded and markets further re-segmented.
  - New innovations and product variety was introduced at lower costs than mass producers could offer.
  - Mass producers typically retreated from those market segments, avoiding direct competition.
  - Lose larger and larger market segments and sometimes even the whole market.

Example of “Segment Retreat and Avoidance”

Japan entered U.S. television market in 1960s with small B&W models, a segment ignored by U.S. producers.
- GE, et al., first avoided confrontation because they did not consider this market segment to be profitable.
- Japanese slowly progressed into larger B&W market segments until the U.S. eventually retreated from the entire B&W marketplace altogether to avoid confrontation and because they believed that color TVs where the future and beyond capability of foreign producers.
- Over 25 year period, Japanese crept into color TV market as well and all TV sets today are manufactured by either Asian or European producers (although many are manufactured here in U.S.).

Detrimental Effects of “Lack of Exports”

• Why is lack of exports bad for U.S. mass producers?
  - Being totally dependent on the U.S. marketplace, companies are more susceptible to demand instability in that marketplace.
  - Lack of exports leaves free reign for other companies to use their home markets as a base for high profits to subsidize low profits when first breaking into U.S. markets.
  - U.S. mass producers gain little experience in understanding the needs of diverse sets of customers, being creative and innovative to meet those needs, or in providing increased variety and customization to meet those needs.
- Mass producers are poorly positioned for today’s rapidly changing, global environment.

Lack of exports
- Because of focus on low cost, standardized products for homogenous markets, few U.S. companies sought to export their products to foreign markets with varied tastes.
- In early 1990’s, it was estimated that less than 10% of U.S. manufacturing firms export goods.

Why are there so few exports?
- Because U.S. market is largest, most homogenous market in the world and exporting goods would mean modifying the standardized product which would drive up costs and take attention away from where profits could really be made.
**Role of Finance/Accounting in MP**

**Note:**
- Finance/accounting systems were developed from the needs of owners for cost information to make production decisions and were developed by entrepreneurs and engineers for whom it created value (not by MBAs since there were none).

**Focus:**
- External financial reporting (required for IRS, government regulators, and Wall Street)

**Primary Benefit:**
- Profit

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**Detrimental Effects of Finance/Accounting in MP**

**Detrimental Effects:**
- **Short-term managerial focus**
  - In the early, more stable years when MP was flourishing, mass producers had low costs and could out-compete everyone else
    - tendency toward short-term focus
  - learned “tricks of the trade” to make short-term financial numbers look better.
- **Lack of long-term investment in capital, people, and technology**
  - cuts in long-term investment to maintain good short-term numbers
  - decreased competitiveness in the long run as mass producers lost technical superiority

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**Detrimental Effects of Finance/Accounting (cont.)**

- **Poor supplier relations**
  - Suppliers were pitted against one another to drive costs down and squeeze out every penny they could.
  - When recessions hit, suppliers squeezed even harder.
    - Forced suppliers to lower their own quality and long-term investments in order to maintain profit
    - This haunts mass producers in today’s environment.
- **Misleading information**
  - Accounting systems geared toward needs of external financial community, not needs of decision makers within the firm due to:
    - lack of innovations in accounting field,
    - lack of perceived value of having two systems for two different needs, and
    - cost of maintaining two systems.

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**Other Problems in Accounting Systems**

- Inventories are often viewed as assets rather than materials that generate carrying costs; however, they may or may not produce revenues in uncertain markets.
- Timing of monthly and quarterly reports is out of sync with production problems which occur daily or weekly.
- Costs of sales and administration not included as part of product costs; variability in these costs across products is missed.
- Sunk costs—those already committed and unaffected by short-term decisions, e.g., pensions—are arbitrarily allocated to product costs even though they are not relevant.
- Long-term investments—employee education, R&D, process improvements—are treated as costs in the period in which they are incurred rather than spread out over the time period in which they will bear fruit.
  - Companies often eliminate or delay long-term investments.

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**Detrimental Effects of Finance/Accounting (cont.)**

- **Diverted attention of management toward diversification and conglomeration**
  - Management was led to search for other avenues by which to achieve the financial gains expected by Wall Street and stockholders.
    - A “wave” of mergers that occurred between 1965 and 1975, 80% were conglomerations—companies merged with totally unrelated businesses.
    - In 1980s, a “wave” of leveraged buyouts occurred in response to threat of Japanese and Asian producers.
    - NOTE: a “wave” mergers occurred in late 1990s as well, e.g., in 1998 big companies (e.g., banks) merged to improve their global responsiveness and competitiveness.

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**Paradigm Shift from MP to MC**

- The breakdown of MP began in the 1960s, accelerated in the 1970s, and finally burst fully into management consciousness in the 1980s.
- Companies are undergoing a paradigm shift, i.e., “a change to a new game, a new set of rules.”
- A “paradigm crisis” has occurred.
  - The old paradigm of MP can no longer explain anomalies or provide solutions for new problems
  - By 1990s, it is no longer easy to ignore the changes that have occurred over the past decades and no hopes of a return of the good old days.
Today’s Competitive Landscape

• What are some of the features of the competitive landscape in the past decade?
  - Time-based competition
  - Proliferation of variety
  - JIT production
  - Regional marketing
  - Continual improvement
  - Shortening product life cycles
  - Market driven quality
  - Globalization
  - Network organizations
  - Micro-marketing
  - Increased customization
  - Database marketing
  - Lean production
  - Cycle time reduction
  - Total quality management
  - Flattened hierarchies
  - Computer-integrated manufacturing
  - Process re-engineering
  - Heightened importance of service
  - Fragmented markets
  - Quick response
  - Flexible manufacturing systems
  - Flattened hierarchies
  - Computer-integrated manufacturing
  - Process re-engineering
  - Heightened importance of service
  - Fragmented markets
  - Quick response
  - Flexible manufacturing systems