
*E&C Industry:
A Changing Business Environment*

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The Construction Industry is currently in a transition state. Forces from both the demand as well as the supply side have made it necessary to re-examine the strategies for growth and competitiveness.

Construction Markets

Country	Population Millions	GDP Billions	Const. Spending Billions	As % GDP
US	270	11,712	1,244.0	10.6
Japan	127.8	4,623	587.4	12.7
Germany	82.5	2,741	282.2	10.2
China	1,313.3	1,932	388.4	20
UK	59.4	2,124	201.4	9
Brazil	180.7	604	61.4	10
Australia	19.9	637	55.9	8
India	1,081.2	691.2	92.2	13.3
Russia	142.4	16,752	56.2	3
Mexico	104.9	677	72.8	10.75

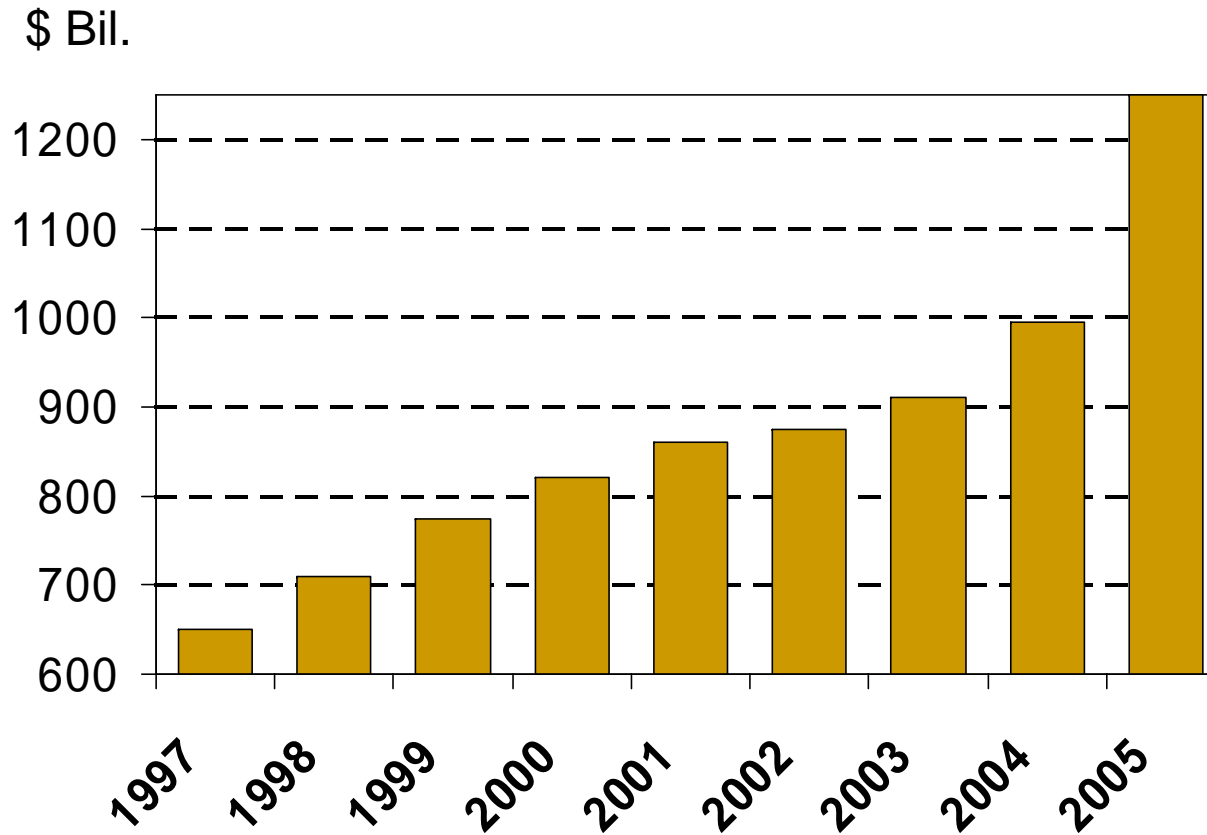
Construction Market

	U.S.	China	India	Worldwide
Volume	\$1.2 Billion	\$750	92.2	\$3.2 Trillion
% GNP	8%	15.7%	13.3	10%
% Labor Force	6%	?	?	8%
% GFCF	50%	60%	?	60%
Total Value of Built Facilities	\$12-15 Trillion	?	?	\$30-40 Trillion
Need for Repair and Maintenance	\$50-200 Billion	?	?	N/A

World Market Construction Spending 2005

Region	Spending \$Billions
Asia	1,124
Europe	995.6
North America	723.6
Latin America	238.6
Middle East	59.4
Caribbean Islands	5.87
Others	Balance
TOTAL	3,224

Total Construction in u.s.



Source: U.S. Department of Commerce Annual Value of Construction
Put-in-place in current dollars

Major Developments of the Past Decade

- Globalization and Market Economy
 - World Trade Organization
 - Financial Markets and Privatization
 - Information Technology and Telecommunications
 - World Wide Web and E-Commerce
 - Environment and Sustainability
 - Security and Natural Disaster
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Consequences

- Increased demand for movement of goods and information
 - Increased demand for Human Resource Development
 - Need for Increased Transparency in Government's Regulatory Systems
 - Importance of a Private Sector in Provision of Infrastructure
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Consensus:

Three Sets of Infrastructure Systems are needed to meet the challenge:

1. Physical Infrastructure
 2. Institutional Infrastructure
 3. Information Infrastructure
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Physical Infrastructure

- Transport
 - Shelter
 - Power and Energy
 - Telecom
 - Water
 - Waste (water, solid,
hazardous and airborne pollutants)
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Institutional Infrastructure

- Political
 - Financial
 - Regulatory Systems
 - Health and Welfare
 - Education
 - R&D
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Information Infrastructure

- Hardware
 - Software
 - Content
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Engineering and Construction Industry is Concerned with Two Sets of Issues:

1. How demand for its output is generated and affected by modern societies.
 2. How supply system is shaped to cope with changing demand.
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Change

On Demand Side

- Client
- Markets

On Supply Side

- Technology
 - Organization
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Changing Nature of Demand

1. Trade
 2. Economic Blocs
 3. Finance
 4. Environment
 5. Type of Work
-

Changing Nature of Demand

1. TRADE

- International trade in services.
- International trade in construction services and products.
- International trade in construction labor.

TREND

- Is toward further relaxation of barriers to entry into large construction markets.

IMPLICATIONS

- *Increasing need to remain competitive on global basis.*
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Changing Nature of Demand

2. Economic Blocs:

1. North American (U.S., Canada, Mexico)
2. European Economic Community
3. Far East Centered in Japan and China
4. Mercusor

Trends:

1. Potential Future Bloc:

Latin America
Middle East
Indian Sub Continent

2. Realignment of Firms Within Each Bloc via:

Merger and Acquisition
Joint venturing
Strategic Alliances

3. Need to Expand Globally

Implications:

Further Erosion of Control over Domestic Market

Changing Nature of Demand

3. Finance

- Financial market is fully global
- New financial packaging and instruments
- Increased risk due to fluctuation in exchange rate

Trends

- Greater involvement by construction in financial packaging
- Greater equity participation
- Greater involvement in operation and management

Implications

- *A close relationship between financial firms and construction firms*
 - *Financial engineering and financial packaging services*
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Changing Nature of Demand

4. Environment

- Prevention of further damage to environment
- Correction of damaged environment
- Infrastructure

Trends

- New specialization
- Increased construction opportunity
- Substantial sensitivity to sociopolitical concerns

Implications

- *Niche market strategy*
 - *New technological development*
 - *New risk mitigation and allocation*
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Changing Nature of Demand

5. Type of Work

- A. Energy & Environment
 - B. Infrastructure
 - C. Buildings & Housing
 - D. High-Technology and Industrial Construction
 - E. Security
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Changing Nature of Supply

- I. Globalization**
 - II. Manpower**
 - III. Technological Changes**
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Changing Nature of Supply

I. Globalization

- Geographic
- Internal
- External

Trends

- Organizational Readjustment
- Development of Brand Name Identity
- Niche Strategy
- Out Sourcing

Implications

- *Reorganization, Global Perspective*
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Changing Nature of Supply

II. Manpower

- Demographic Characteristics
- Mature Labor Force
- Less Tolerant of Physical and Manual Chores
- Better Educated
- More Mobility

Trends

- Teamwork, Labor-Management Cooperation
- Commitment to Skill Development

Implication

- *More Reliance on Technology*
 - *A Better Image for the Industry*
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Changing Nature of Supply

III. Technological Changes

- Advanced Materials
- Automation and Robotics
- Information Technology
 - Sensor Technology, Communication Technology

Trends

- Transfer from On-Site to Off-Site Production
- Flexible Manufacturing
- Computer Control Production
- Smart Sensors, Smart Agents, Smart Buildings

Implications

- *Capital Intensity*
 - *Proprietary Technology*
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E&C Firms Differentiation:

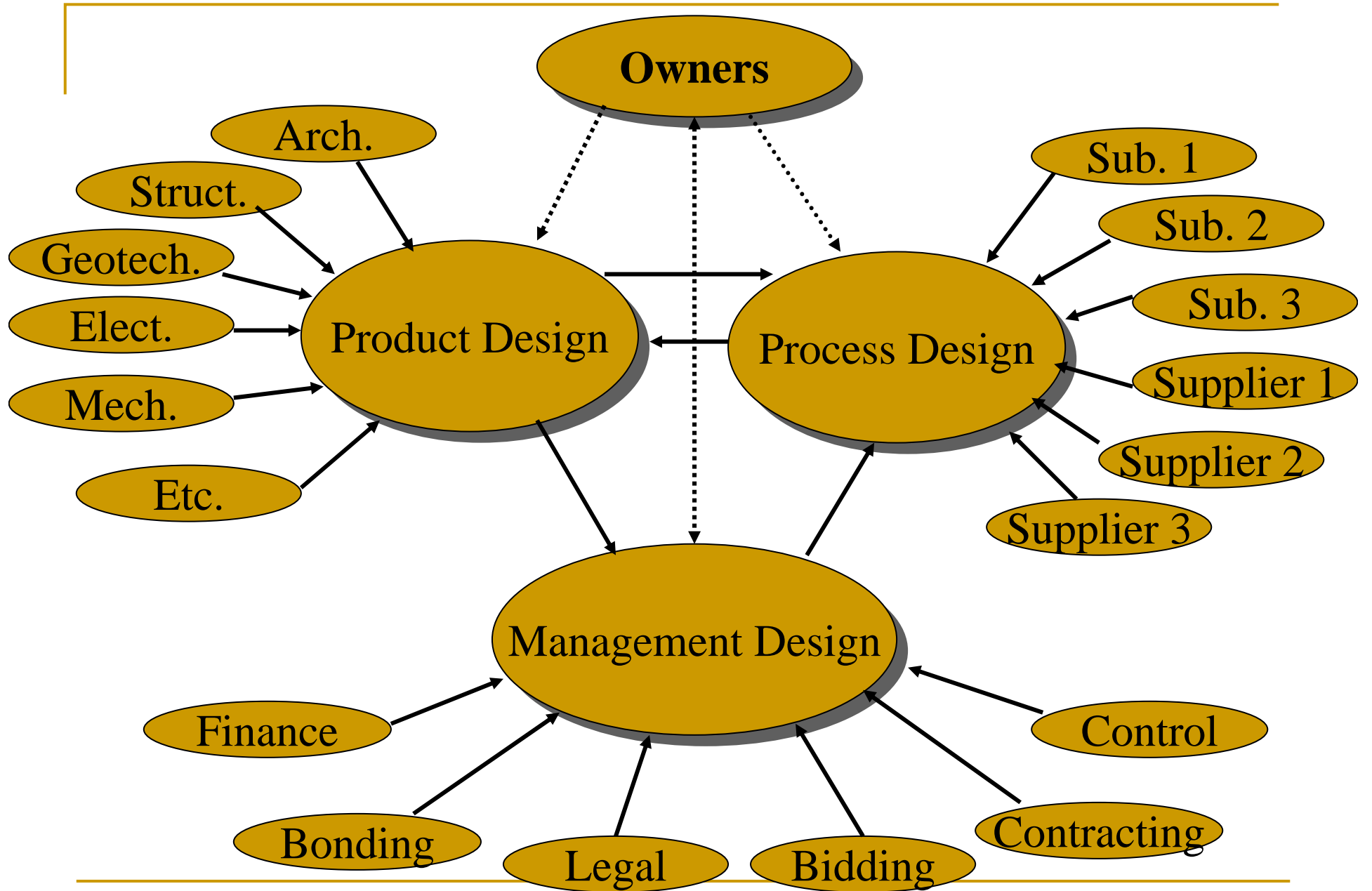
Four Thrust Areas

1. Technology of Assembly
 - Design
 - Construct
 2. Management of Assembly on Site
 - Project Management
 3. Management of Organizations Specializing in Assembly
 4. Interaction of Assembled Systems with Socio-Economic Development and Environmental Protection
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Product Design

Process Design

Management Design



Management of Organization

- Vertical Integration
 - Horizontal Networking
 - Franchising
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Vertical Integration

Technological Stratification

- Niche Strategy
 - Brand Name Identification
 - Market Aggregation
 - Market Making
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Horizontal Networking

Market Aggregation

- **Suppliers**
 - **Clients**
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Franchising

- **Marketing**
 - **Technological Know-how**
 - **Suppliers**
 - **Flattened Organizations**
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- **Large Firms**

- Global
- Vertical Integration
- Proprietary Knowledge

- **Medium Firms**

- Regional Independence
- Networking
- Proprietary Knowledge of Markets and Suppliers

- **Small Firms**

- Franchising
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