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***Productivity
Improvement in the
Egyptian
Automotive Feeder
Industries***

Volume I

**Productivity Improvement in the
Egyptian Automotive Feeder Industries**

Final Report

July 1984

Kearney: Management Consultants

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VEHICLE ASSEMBLY FEEDER INDUSTRY IN EGYPT

PROJECT NO. 263-0090.r

EXECUTIVE SUMMARY

A. T. Kearney, with assistance from Rockwell International, Automotive Division, submits herewith the report required by Section VII 2 and 3 of the Scope of Work. This work was performed under the leadership of Dr. Adel Gazarin, Chairman, Engineering Industries Corporation and with the invaluable assistance of personnel from El Nasr Automotive Company. This report consists of three volumes:

I. PRODUCTIVITY IMPROVEMENT IN THE EGYPTIAN AUTOMOTIVE FEEDER INDUSTRIES

This volume analyzes:

- Worldwide Trends and Opportunities
- Egyptian Trends and Opportunities
- Goals of the Industry
- Obstacles to Growth and Productivity
- Recommendations to the Industry

It identifies opportunities and presents recommendations to improve productivity throughout the automotive sector of Egypt.

II. PRODUCTIVITY ISSUES AND RECOMMENDATIONS

This volume presents an analysis of opportunities for improving productivity in each of five feeder industry companies. Many of the conclusions in Volume I are based in part on these analyses. However, to maintain the confidential nature of the data, distribution of this volume is limited.

III. STRATEGY FOR THE USE OF AID RESOURCES

In this volume we recommend specific actions USAID might take to assist the Egyptian automotive industry. A three-phase program is suggested:

- Phase 1) Industry Diagnosis and Planning. This phase, to be complete by the end of 1984, should outline development of the industry over the next decade.
- Phase 2) Structural Development, a set of eight interventions from mid-1984 to mid-1985, programming the expansion of six private sector companies with U.S. technical partners, and creating the necessary industrial focus in Egypt for their success.
- Phase 3) Investment and Production Growth, with interventions in late 1985-1988 of capital and technical operations assistance patterned on AID's successful aid to a public sector company in the automotive feeder industry (TRENCO, a tyre manufacturer).

Foreword

This report presents the findings, conclusions, and recommendations of A. T. Kearney on productivity in the automotive feeder industries in Egypt. The work was conducted under a contract with USAID.

Much of this analysis was presented at a meeting of the Higher Commiteee Working Group under the chairmanship of Dr. Adel Gazarin held in Cairo on February 22, 1984. Their comments and discussion have been incorporated. In addition, we have had a high level of input and assistance from chairmen and managers throughout the study. Their participation was essential. A list of people who were especially helpful is presented in the Acknowledgments section.

As part of this work, detailed investigations were made of productivity in five feeder companies. The findings, conclusions, and recommendations specific to each of the five companies have been furnished separately and confidentially to each of them.

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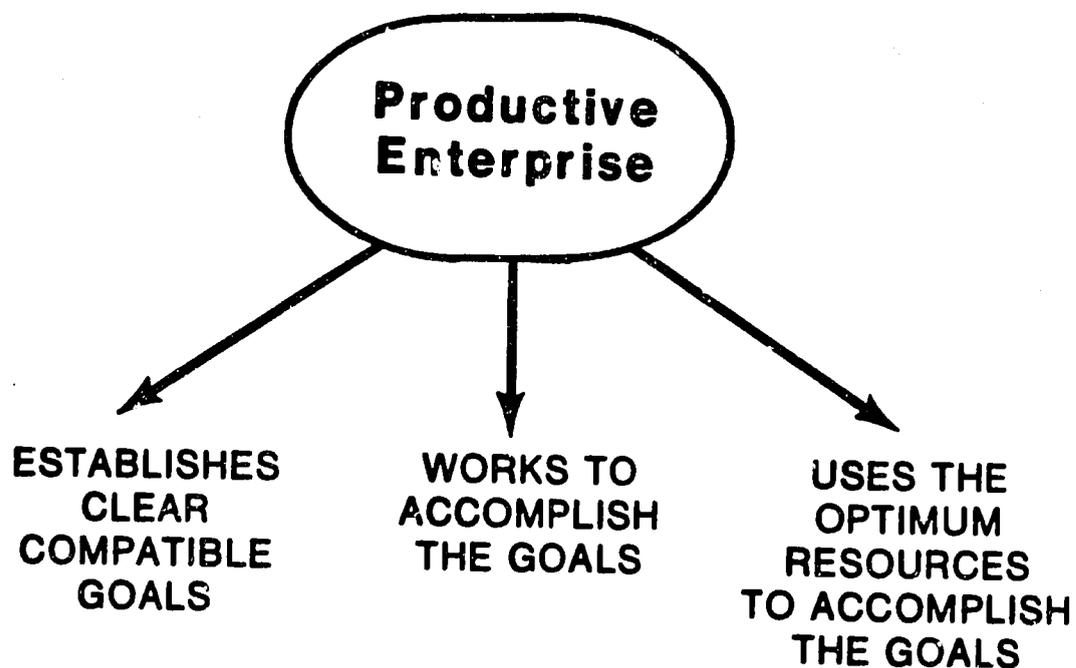
Introduction

- **Definition of Productivity**
 - **Objectives**
 - **Methodology**
-

What is Productivity?

Being productive means...

Achieving Goals Efficiently



**Improvement of Productivity
Requires Attention to All
Company Activities
- Not Just Direct Labor**

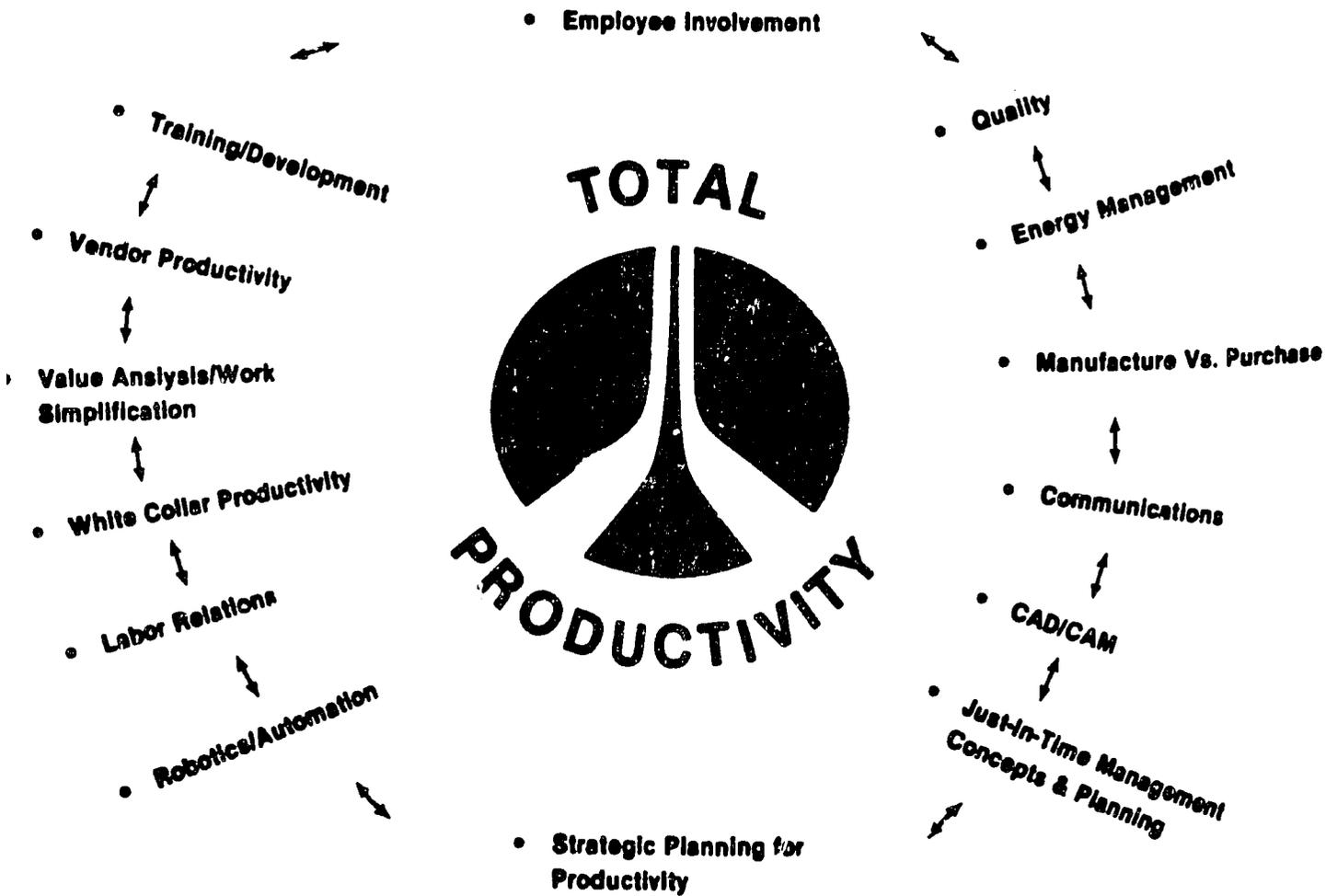
These resources. . .

- People
- Equipment
- Facilities
- Technology
- Information
- Raw materials
- Inventories
- Finance/credit
- Image

**Must be optimally managed for maximum
productivity**

The Rockwell Example

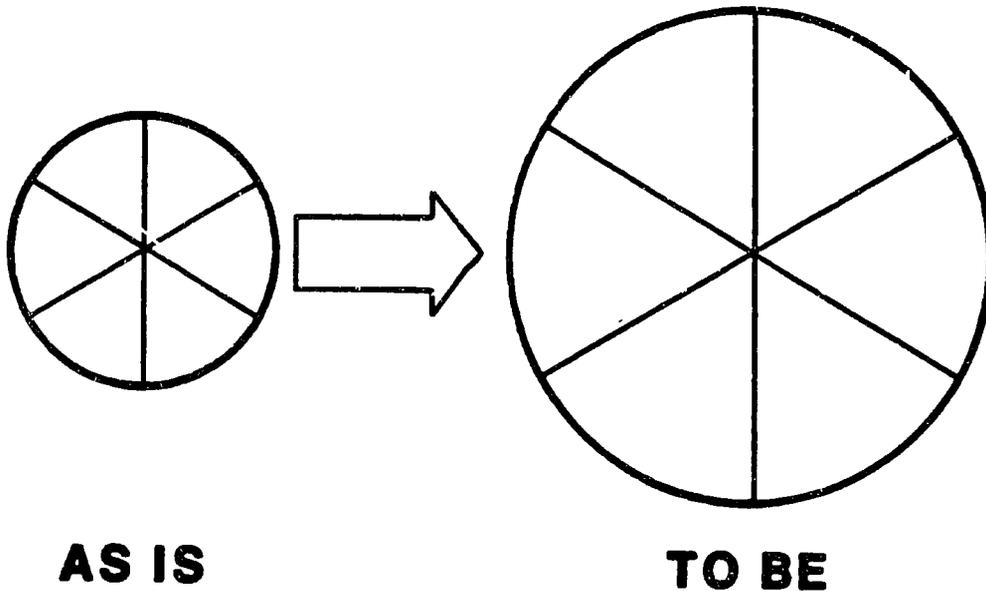
THESE AREAS OF EMPHASIS, OR THRUSTS, REPRESENT THE MAJOR ACTIVITIES TO IMPROVE PRODUCTIVITY WITHIN ROCKWELL AUTOMOTIVE BUSINESSES.



Why be Concerned about Productivity?

- To increase revenues through offering lower cost, higher quality products

Egyptian Industry



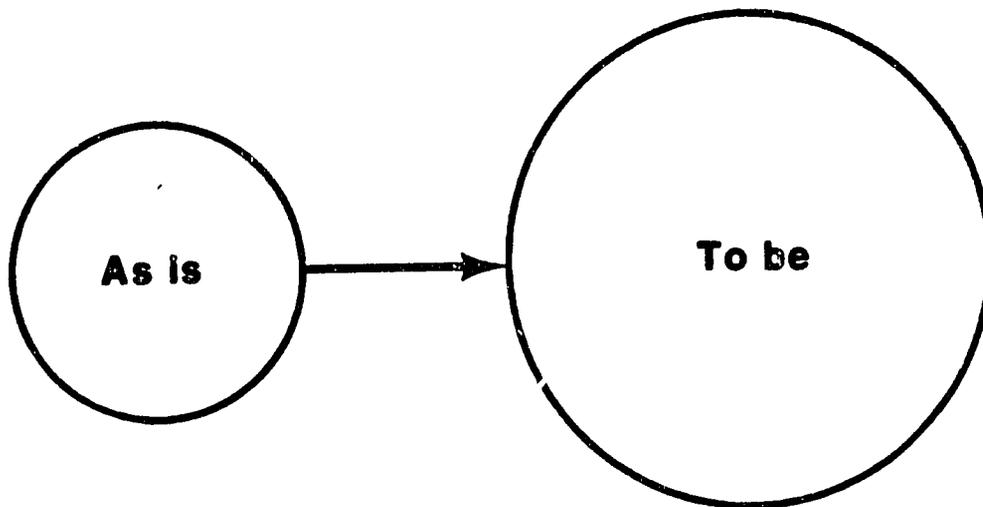
- To provide greater resources for growth in the industry
 - To reduce resources diverted from other segments of the economy
-

Why This Project?

- Opportunity exists for improvement in productivity in the automotive sector
- USAID is currently sponsoring 5 projects designed to improve productivity:
 - Management Development for Productivity
 - Industrial Technology Application Program
 - Vocational Training for Productivity
 - MIT Technology Application Program
 - Industrial Productivity Program
- None of these have focused on the automotive feeder industries, a current concern of the Egyptian government
- Greater leverage can be obtained through an integrated, sectorwide approach
- The sector offers considerable opportunity for private sector participation
- Therefore, this study was commissioned to:
 - Provide a systemic review of the sector
 - Suggest measures to maximize the return on investment

General Objective

- To improve growth and productivity in the automotive feeder industries



Small

Underutilized

Subsidized

Efficient Scale

Productive

Competitive in

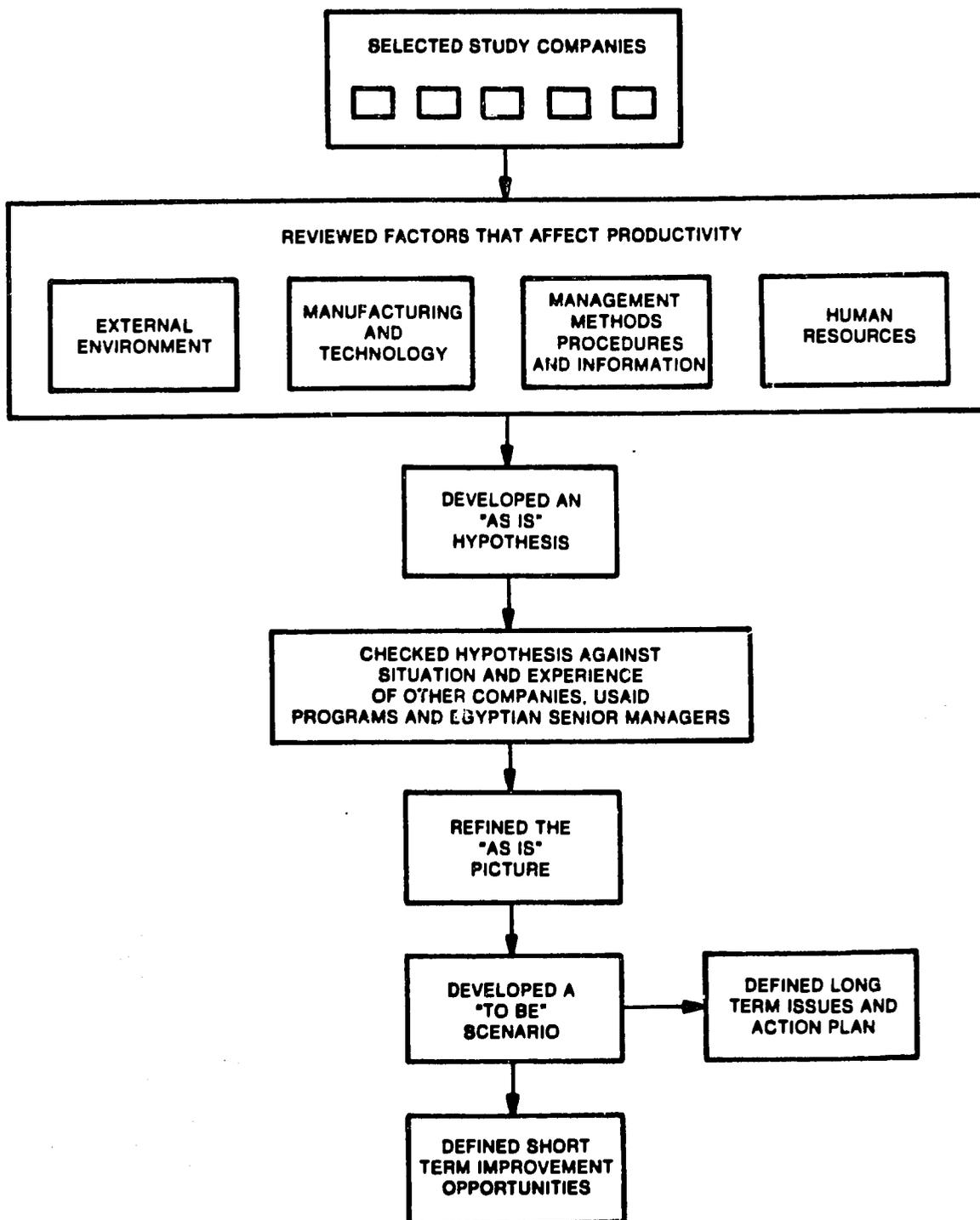
– Price

– Quality

Six Specific Objectives of the Study

- Estimate the potential for productivity improvements
 - Identify and assess management impediments to improved productivity
 - Identify and assess the influence of human resources on the productivity of labor
 - Identify and assess technological impediments to improved productivity
 - Identify and assess other significant influences on productivity
 - Develop and assess an optimal intervention strategy to improve productivity
-

Method of Analysis



Kearney Reviewed Operations in Twenty Automotive Companies

ASSEMBLY COMPANIES

- El Nasr Automotive
- Arab American Motors
- General Motors

PRINCIPAL AUTOMOTIVE PRODUCTS

Cars, trucks, buses, tractors
Jeeps, "Ritmo" cars
Light trucks (planned)

FEEDER COMPANIES

- El Nasr Forgings*
- General Metals*
- Military Factory 9
- Military Factory 135
- Springs and Transport
- Paint and Chemical Ind.
- Alhadra Glass
- Trengo
- Egyptian Plastics

Forgings
Die castings
Iron castings
Gears (potential)
Springs
Paint
Safety glass
Tires
Seat coverings

PRIVATE SECTOR FEEDER COMPANIES

- Iron-Works*
- Giza Rubber*
- IAMCO*
- SEFCA
- Hebisch Machining Co.
- Abu Yusef
- MIDO
- Arab Union for Trade

Die casting
Compression molded rubber parts
Horns, lights, pulleys
Rubber parts
Machines parts (potential)
Air filters, wheels, hoods
Gaskets
Mufflers

*Study companies

Other Automotive Studies Were Reviewed

- **“Automotive Industry in Egypt” by NASCO**
- **“The Present Status of Automotive Feeder Industries in Egypt” by Eng. George Abdel Malak**
- **“Study of Potential Sources in Egypt” by General Motors**
- **“The Automotive Components, Parts, and Accessories Industry in Egypt” by Chase World Advisory Group for the Investment and Free Zones Authority**
- **“Egypt, Issues of Trade Strategy and Investment Planning” by the World Bank**
- **“Analysis of the Japanese Landed Cost Advantage for the Manufacture of Subcompact Cars” by Harbour and Associates**
- **Selected papers from “the Future of the Automobile Program” by Massachusetts Institute of Technology**
- ***Industrial Renaissance* by Abernathy, Clark and Kantrow**

***Kearney Reviewed Goals
and Activities of Other
Productivity Programs***

- Management Development for Productivity
 - Industrial Technology Application Program
 - Vocational Training for Productivity Project (briefly)
 - Engineering and Industrial Design Development Center
 - International Executive Service Corps
 - MIT Technology Application Program
-

Perspective On The Worldwide Automotive Industry

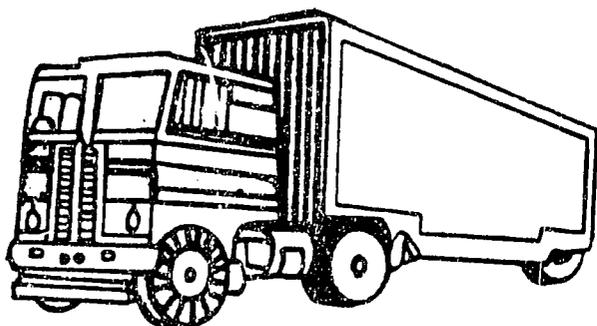
- Trends
 - Opportunities
-

Worldwide Competition is Driving Costs Down and Quality Up for All Vehicles

KEY BUYING FACTORS



PURCHASE PRICE
FUEL CONSUMPTION
REPAIR RECORD
RELIABILITY



FUEL CONSUMPTION
REPAIR COST
RELIABILITY
PURCHASE PRICE

- In Egypt, fuel consumption is not yet so important due to the hidden subsidy
 - Reliability and repair costs will become more important factors to Egyptian buyers after they gain experience
-

Fixed Costs per Vehicle will be Reduced

- Fixed costs are being reduced by:
 - Reducing inventories and idle machine capacity
 - Contracting out more parts and subassemblies
 - Standardizing parts across models and markets
 - Establishing joint ventures to reduce development and introduction costs

 - These trends will continue
-

Production Costs per Vehicle are Being Reduced

- Production costs per vehicle are being reduced by:
 - Reducing number of defects
 - Improving methods
 - Reducing managerial and white collar labor force
 - Replacing labor with automated equipment
 - Producing high labor cost parts in low labor cost areas
 - Simplifying and lightening parts

 - By using better management practices, Japanese save \$1,700/car and 42% of labor hours compared to U.S. manufacturers of small cars. American and European manufacturers are now copying them
-

Why Must Egypt be Competitive with the Worldwide Cost Structure?

- High costs will be passed on to other industries which will limit their ability to compete worldwide
 - Costs which exceed international norms feed inflation
 - Exports, which should be an important goal, require low cost manufacture
-

Great Attention is Being Given to Improving Quality

- Past efforts at improving quality which focused on inspection offered little opportunity for improvement

 - New approaches offer great opportunities for improving quality:
 - Utilizing improved, new, or different materials (e.g. galvanized steel for bodies, ceramics for engines)

 - Implementing a quality control system that predicts defects before they occur and suggests action

 - Offering long-term contracts to suppliers in return for improvement in quality

 - Automating, where machines are more accurate than humans

 - Obtaining commitment to quality by employees through better management and incentives
-

Rate of Technical Change is Increasing

Major changes in product include

- Integrated electronic control systems
- Extensive use of new or different materials
 - Ceramics for engines
 - Aluminum for mechanical parts
 - Corrosion resistant steels for bodies
 - Composites for structural members
- Fuel efficiency is expected to improve 5%/year for at least the next 6 years

Major changes in process include

- Computer aided design
 - Computer controlled manufacture
 - New methods, e.g. near net shape forging
-

Automotive Industry will become More International in Scope

- **Automotive world trade will increase:**
 - Among developed countries
 - Between developed and developing countries
 - Among developing countries

- **World scale automotive companies will show much more interest in developing countries:**
 - Greatest growth opportunities for vehicles
 - Potential sources of low cost parts

- **International associations will continue to develop (e.g. Renault-American Motors, General Motors-Toyota) leading eventually to fewer world-scale producers**

- **Political obstacles to internationalization will increase concurrently:**
 - Tariffs
 - Local content rules
 - Tax laws
 - Labor regulations

Developing Countries, Including Egypt, are Potential Parts Suppliers to World-Scale Auto Companies

- Interest in developing countries is based on two factors:
 - Low cost production chiefly due to low cost labor
 - Political demands for offsetting trade

 - Criteria for parts of interest include:
 - High labor content
 - Not proprietary
 - Long lead times
 - Do not require close monitoring during manufacture (i.e. tested subassemblies preferred)
 - Aftermarket spares that are no longer produced in the developed countries but for which there is still a small demand
-

Success in Developing an Automotive Industry may Depend as Much on Politics and Government Policy as on Economics

- Some developing countries have already seized the opportunity
 - Mexico
 - Brazil
 - Yugoslavia
 - Turkey
 - Korea

 - Characteristics of developing countries who have successfully developed a competitive automotive market include:
 - High level of protection for complete vehicles
 - Governmental support during negotiations for technology
 - High level of private sector participation in actual manufacture
-

Conclusions

- **Now is an opportune time for Egypt to expand its automotive industry**
 - Egyptian market is attractive to major automotive companies
 - Egypt's combination of low wage rates, trained work force and proximity to Europe make manufacture attractive and feasible

- **However, action is needed now to realize the opportunity**
 - Entry costs will increase
 - Labor cost advantage will decline as Egypt's costs go up and labor content is cut
 - Trade patterns will be more difficult to alter in the future
 - Government support is required

- **Egyptian industry must be concerned with cost and quality as well as production**

- **Egypt must strengthen its ties to the worldwide automotive industry to remain competitive**

Perspective on the Egyptian Automotive industry

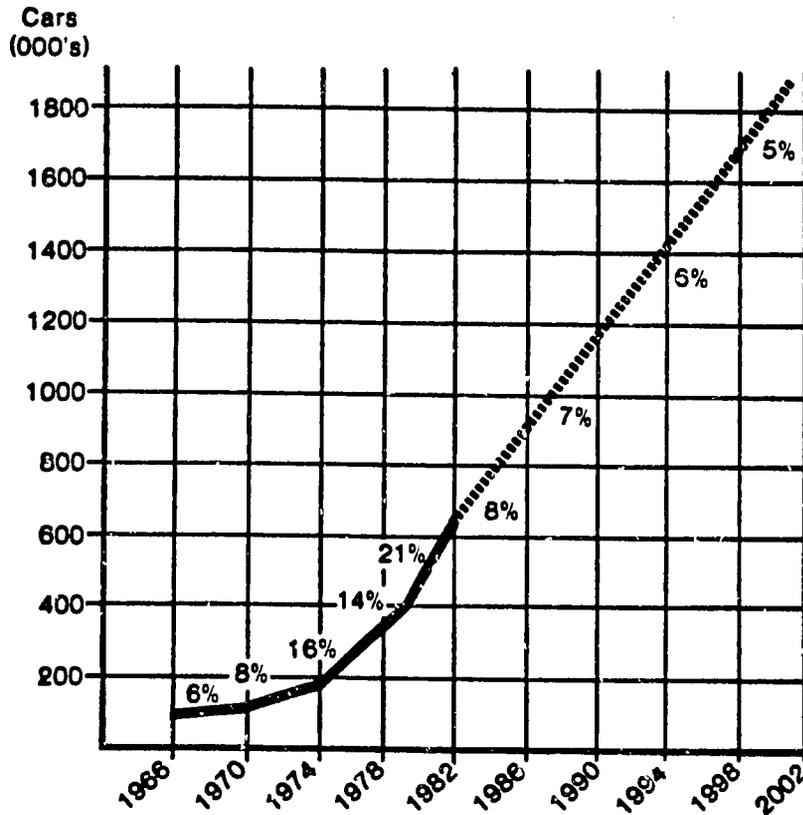
- Vehicle market
 - Feeder industry market
 - Impact of feeder industry
-

***There are Many Name Plates
on the Roads in Egypt***

NASR
FIAT
SEAT
PEUGEOT MAZDA VOLKSWAGEN MERCEDES BUICK HONDA TOYOTA CHEVROLET DATSUN OTHERS

**SUCH VARIETY SEVERELY
RESTRICTS PROFITABLE LOCAL
MANUFACTURE OF PARTS**

Car Registrations Should Triple by the Year 2000



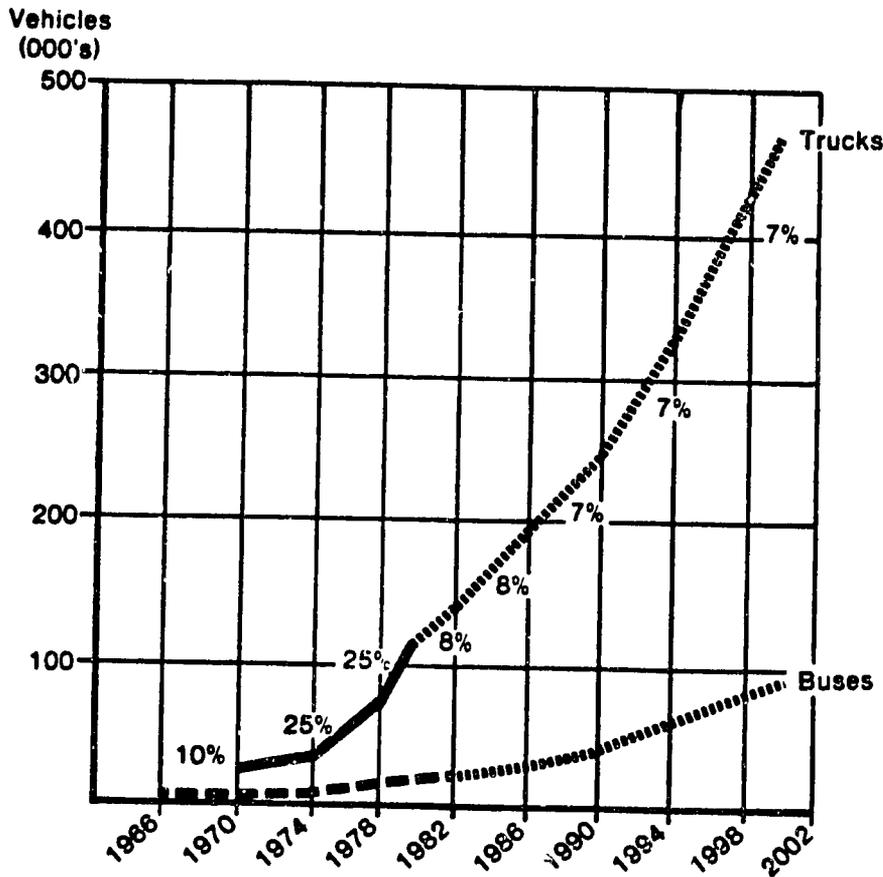
Source: NASCO Data and Projections

ASSUMPTIONS

- Economy grows at 8%/year
- Road and automotive facilities are developed
- Foreign exchange is available
- Government policy favors private car ownership

**THE AFTERMARKET FOR PARTS
OFFERS GOOD OPPORTUNITIES FOR
GROWTH**

Truck and Bus Registrations Are Also Likely To Triple By 2000



Source: NASCO Data and Projections

ASSUMPTIONS

- Economy grows at 8%/year
 - Continuing shift to highway transport
 - Availability of foreign exchange
-

Growth Projections May Be Optimistic

- A number of factors will slow the high growth rates of the past few years:
 - Parking space is limited
 - Traffic congestion has greatly slowed travel times in major urban areas
 - Mass transit lines are under construction
 - Foreign exchange is not likely to be so readily available as in the past
 - Investment emphasis, though currently favorable is changeable

 - Nevertheless, projected volumes are conservative in light of recent growth
-

**Imports Satisfied Most
of the Egyptian Market in
1982/1983**

	<u>EGYPTIAN PRODUCTION(1)</u>	<u>IMPORTS(2)</u>
CARS AND JEEPS	25,460	78,679
TRUCKS		
Light	0	32,115
Medium	2,668	
Heavy	<u>203</u>	
Total	2,871	32,692
BUSES	701(4)	2,550
TRACTORS	3,294	(3)

- Notes: (1) See Exhibit III-1 at the end of this section for details
(2) 1982 data as published in the official Egyptian import statistics
(3) Import statistics recorded 160,936 tractors with a value of LE 31.2 million which is obviously incorrect. The reverse (31,200 tractors valued at LE 160 million) is more likely
(4) NASCO only. Others assemble on imported chassis
-

**A Large Increase is Expected
in Domestic Production**

	<u>1982/83</u>	<u>1990(2)</u>	
	<u>DOMESTIC PRODUCTION(1)</u>	<u>DOMESTIC PRODUCTION</u>	<u>IMPORTS</u>
CARS			
Cars	23,134	89,000	10,000
Jeeps	2,326	8,000	—
Total	<u>25,460</u>	<u>97,000</u>	<u>10,000</u>
TRUCKS			
Light	0	18,000	—
Medium	2,668	9,000	2,000
Heavy	203	4,000	2,000
Total	<u>2,871</u>	<u>31,000</u>	<u>4,000</u>
BUSES	701(3)	6,000	1,000
TRACTORS	3,294	3,000	4,000

Notes: (1) 1982/83: See Exhibit III-1

(2) 1990: Projections by NASCO with adjustments
by A. T. Kearney

(3) Includes only production by NASCO

A Large Number of Projects Have Been Proposed

AUTOMOBILES	STATUS	CAPACITY
NASCO	In Operation	22,000(1)
AAV	In Operation	8,000
Proposed New Venture	Proposed	100,000
TRUCKS		
NASCO	In Operation	5,000
General Motors	Under Construction	14,000
Ford	Approved Project	10,000(2)
Mercedes	Approved Project	4,000
BUSES		
NASCO	In Operation	1,000
EL TRAMCO	In Operation	1,000
Steelcc	In Operation	50
General Nile Co.	In Operation	120
Misr Car Bodies	In Operation	50
Fakhry Company	In Operation	160
Mercedes	Approved Project	600
General Motors	Under Construction	4,000(3)

Notes: (1) Proposed to be raised to 40,000

(2) Project is not yet underway

(3) Chassis only. Bodies to be manufactured by others

**LARGE NUMBER OF PROJECTS (ESPECIALLY
IN TRUCKS) MAY LEAD TO UNDESIRABLE,
UNECONOMIC VARIATION IN PARTS
REQUIREMENTS**

Existing Assemblers Will Dominate the Market in 1990

DOMESTIC PRODUCTION (000's)

	NASCO	NEW VENTURE	AAV	GM	OTHERS	IMPORTS	TOTAL
CARS							
Cars	24	65	—	—	—	10	99
Jeeps	—	—	8	—	—	—	8
Total	24	65	8	—	—	10	107
TRUCKS							
Light	—	—	—	10	8	—	18
Medium	5	—	—	4	—	2	11
Heavy	2	—	—	—	2	2	6
Total	7	—	—	14	10	4	35
BUSES	1	—	—	4(1)	1	1	7
TRACTORS	3	—	—	—	—	4	7

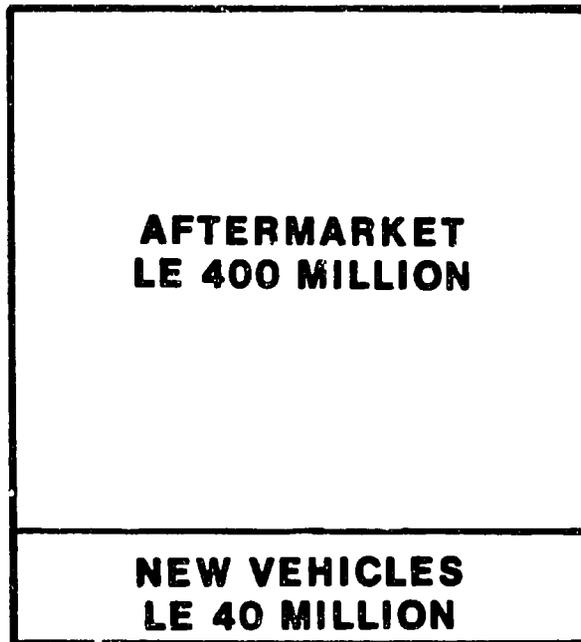
Note: (1) Chassis only. Others will complete the bus

Source: NASCO projections with adjustments by A. T. Kearney

- Dominance by a few suppliers will reduce the variety of cars served in the aftermarket
- As a result, the number of parts that can be economically produced in Egypt will increase

For the Feeder Industry, the Aftermarket is Potentially Larger Than New Vehicle Manufacture

■ **Relative size of markets:**



■ **However, the aftermarket presents difficulties:**

- **Poor distribution**
- **Very diverse needs**
- **Varying sensitivity to price and quality**
- **Strong competition from imports**

■ **Policies that will reduce the variety of cars and trucks on the roads of Egypt would strongly encourage the feeder industries**

For New Vehicles the Feeder Industry Primarily Produces Parts for Trucks

- Domestic content is claimed to be significant only for trucks and buses:

	<u>NASCO(1)</u>		<u>AAV</u>	
	BUSES AND TRUCKS	CARS	JEEPS(2)	CARS(3)
FOREIGN	31%	80%	63%	93%
DOMESTIC	69%	20%	37%	7%
TOTAL	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

- The public sector is the primary domestic manufacturer of parts and subassemblies:

	<u>NASCO(3)</u>		<u>AAV(2)</u>	
	BUSES AND TRUCKS	CARS	JEEPS	CARS
PUBLIC SECTOR	90-95%	N/A	100%	100%
PRIVATE SECTOR	5-10%	N/A	-	-
DOMESTIC	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

Notes: (1) Estimates by NASCO for selected models
 (2) Data from AAV
 (3) Estimates by A. T. Kearney

Aftermarket Sales of the Feeder Industry Are Not Large

■ **Principal products made for the aftermarket include:**

- Tires
- Batteries
- Springs
- Gaskets
- Mufflers and exhausts
- Spark plugs
- Filters
- Brake linings
- Glass
- Pistons

■ **Data on value of domestic production for the aftermarket are not published**

Sources: Kearney field interviews and
Investment and Free Zones Authority Sector Survey

The Number of Domestic Automotive Suppliers is Small

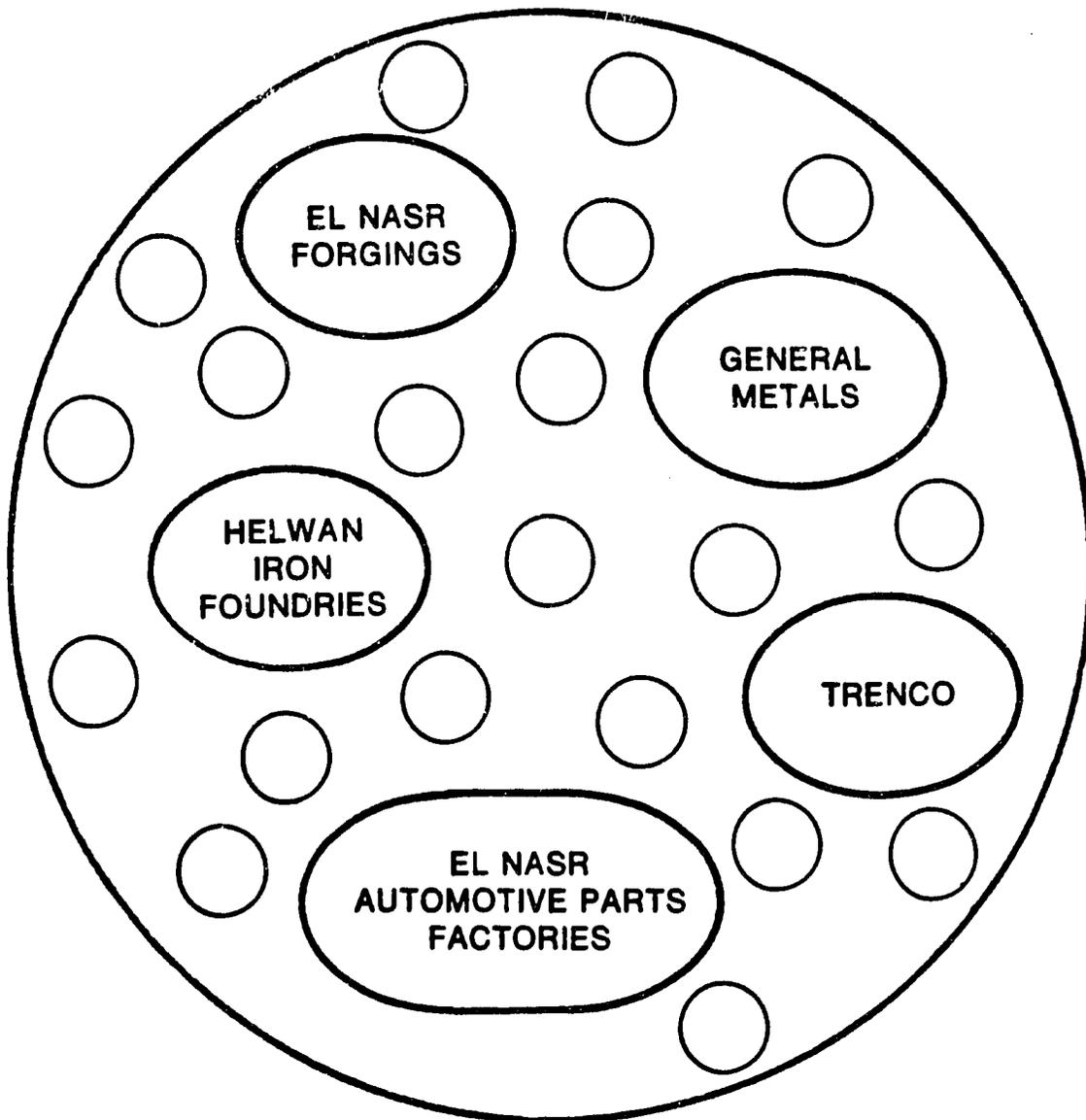
- Number of domestic suppliers for new vehicles

	NASCO		AAV
	PRODUCTION PARTS	TOTAL SUPPLIERS	
PUBLIC	19	96	11
PRIVATE	35	155	1
TOTAL	54	251	12

- Analysis of top 15 suppliers to NASCO:
 - Total volume of the 15: LE 19.3 million
 - Percent of NASCO domestic purchases: 70%
 - Range of sales: LE 319,000 to LE 6,200,000
 - Number of private sector firms: 1
- Analysis of top 10 private sector suppliers to NASCO:
 - Total volume: LE 1.5 million
 - Percent of NASCO domestic purchases: 5.5%
 - Range of sales: LE 78,000 to LE 382,000

FUTURE EXPANSION WILL REQUIRE SUBSTANTIAL EXPANSION OF THESE COMPANIES PLUS NEW COMPANIES

**Participants Include a Few
Large Public Sector Firms and
a Number of Private Sector Firms**

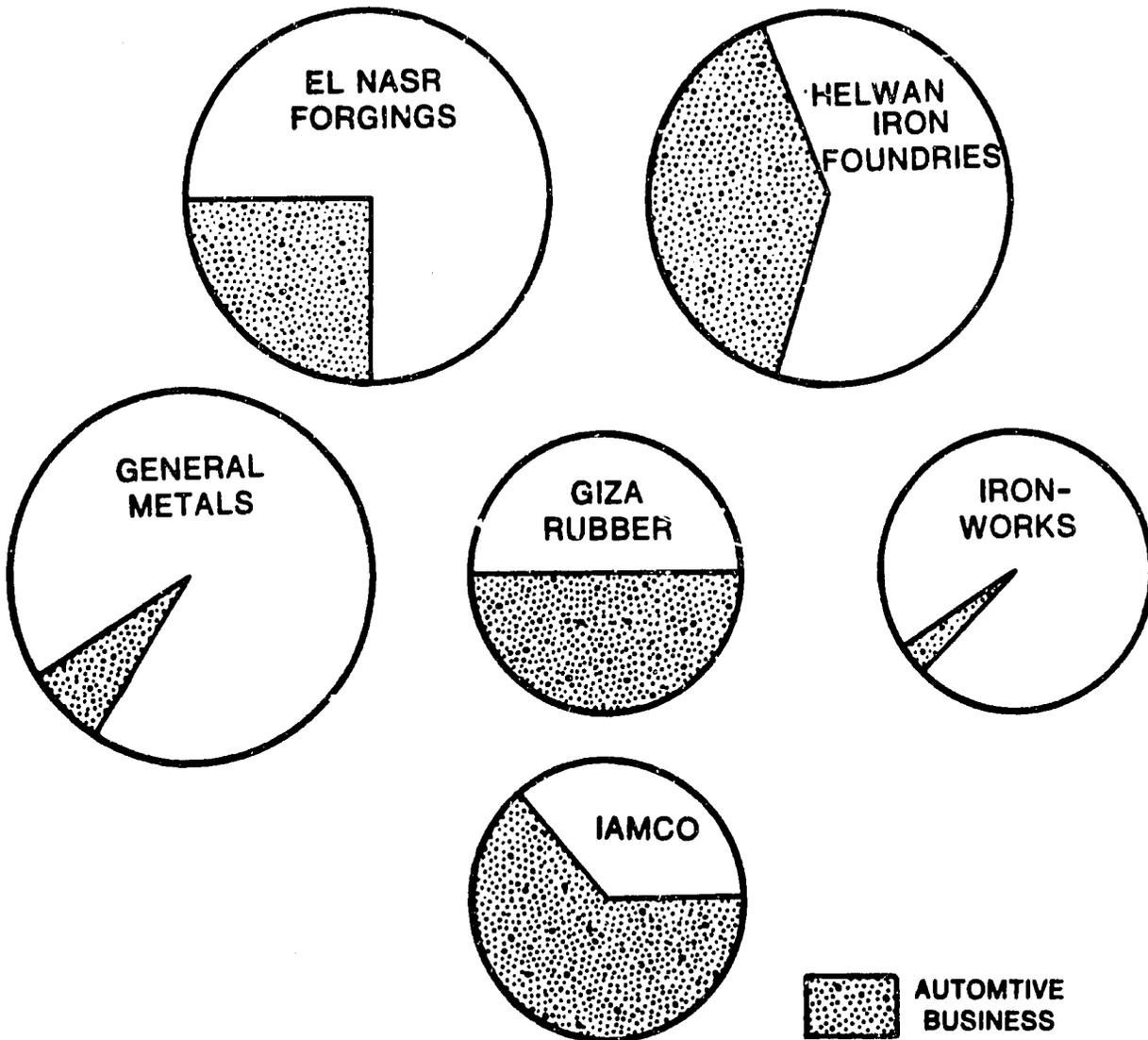


**The Public and Private Sector
Companies Are Very Different**

PUBLIC	PRIVATE
Large - 500+ Employees	Small, 10 to 50 Employees
Multi-Level Management	Single Level Management
Modern Imported Equipment	Mix of Local and Imported Equipment
Quantity Oriented	Profit Oriented
Conservative	Innovative
Regulated Prices	Unregulated Prices
Audit Oversight	No Audit Oversight
Internally Sensitive	Customer Sensitive

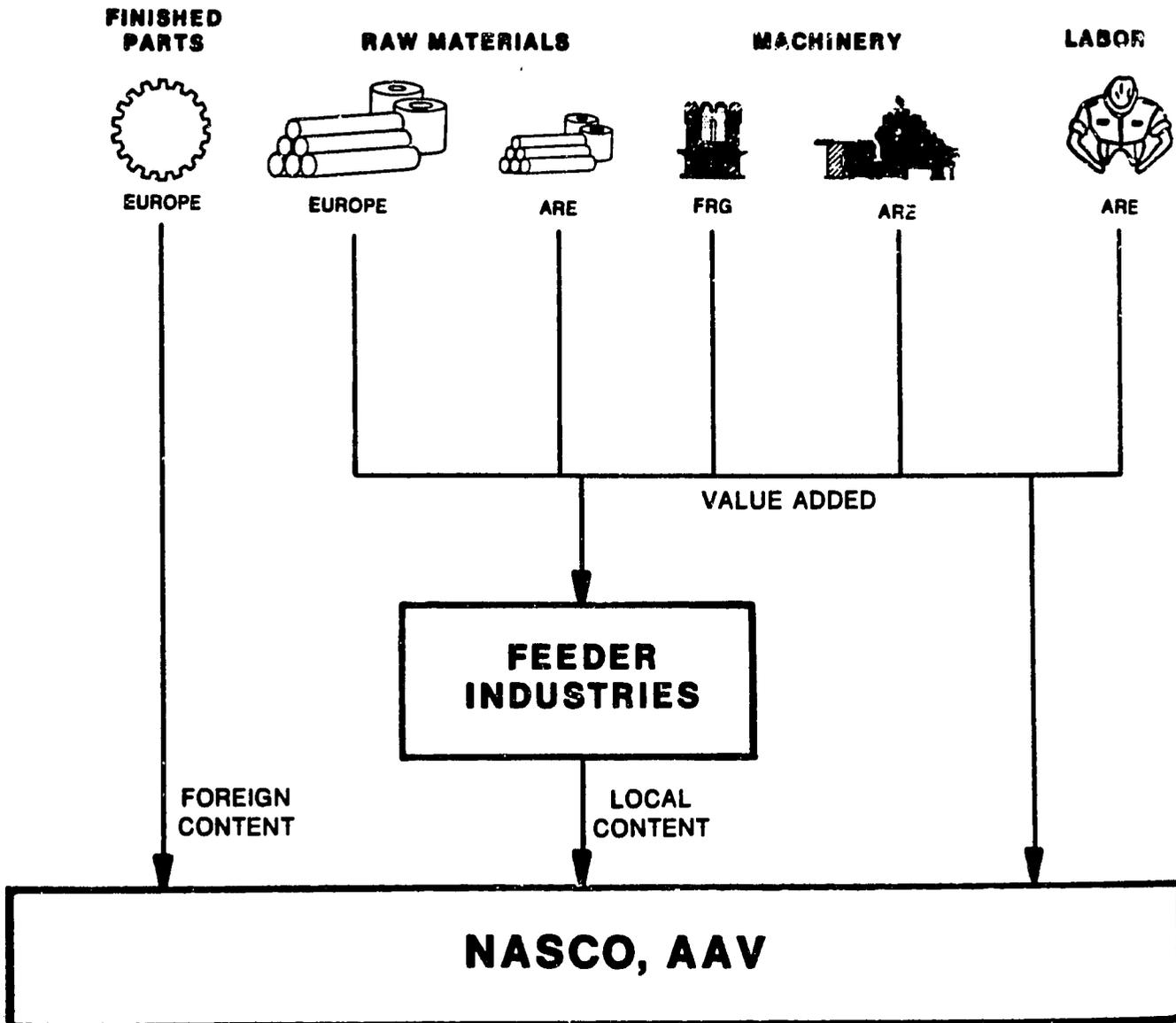
**THEY HAVE DIFFERENT NEEDS FOR
ASSISTANCE**

**Automotive Parts are
Generally not the Largest
Part of Participants' Business**



**THEREFORE AUTOMOTIVE PARTS OFTEN
DO NOT HAVE FIRST CLAIM ON MANAGEMENT
ATTENTION OR INVESTMENT**

80% Local Content Does Not Mean 80% Local Value Added



- Typically, most of the raw materials and machinery are imported
- Egypt's advantage has been skilled, low cost labor

Capacity for Increased Production of Automotive Parts Varies Significantly

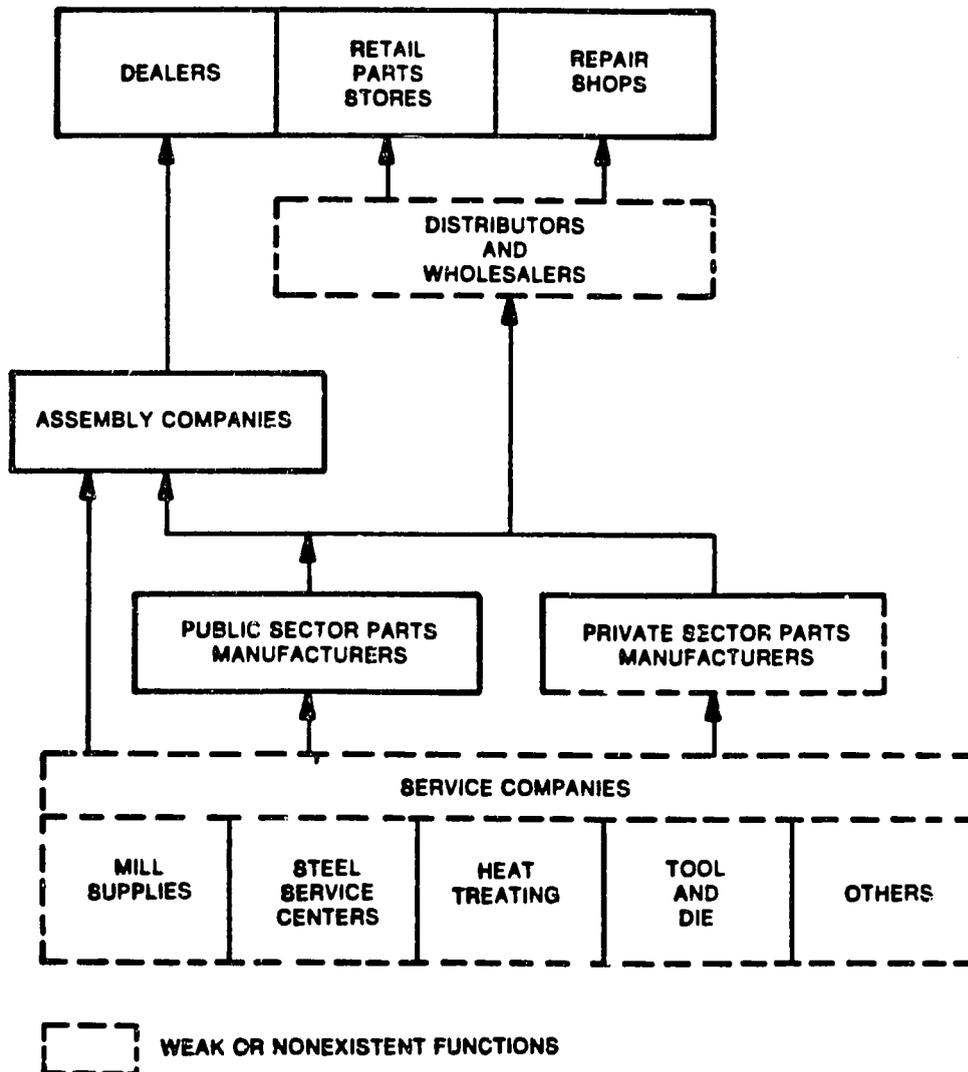
- Capacity utilization using current systems and methods:

COMPANY	PRODUCT	UTILIZATION
TRENCO	TIRES	100%
EL NASR FORGINGS	FORGINGS	50%(1)
HELWAN CASTINGS	IRON CASTINGS	25%
GENERAL METALS	NONFERROUS	100%(2)
ALEXANDRIA PLASTICS	SEAT COVERINGS	N/A
MILITARY FACTORY 135	GEARS	LOW
EL NASR GLASS	GLASS	30%
PAINT CHEMICAL INDUSTRIES	PAINT	50%(1)
MICAR	TRUCKBEDS	LOW
SPRING AND TRANSPORT	SPRINGS	100%(3)
ABU YUSEF	FABRICATED METAL	0-50%
IRON-WORKS	FUEL FILTERS	50-75%(4)
IAMCO	FABRICATED METAL	20%
GIZA RUBBER	RUBBER PARTS	50%

Notes: (1) 2 shift basis
(2) 100% at current practices.
Improvement in yields could increase production 20% to 30%
(3) Current facilities for leaf springs. An expansion is underway.
(4) After automotive production begins

- Current study suggests capacity could be expanded 20%-40% more using better systems and methods

The Industry Structure is Weak



- Lack of distributors makes marketing expensive and difficult and inhibits entry of new manufacturers
- Lack of service companies causes lost production and increases manufacturing costs

Quality Performance of Feeder Companies is a Major Problem for the Assembly Companies

- Percent of goods accepted by NASCO for selected suppliers:

	<u>PERCENT ACCEPTED</u>	
	<u>WITHOUT CONCESSIONS</u>	<u>WITH CONCESSIONS</u>
PRIVATE SECTOR		
ABU YUSEF	91.5%	93.1%
IAMCO	88.6	99.9
DESOUKI	94.2	94.2
GIZA RUBBER	93.0	99.9
PUBLIC SECTOR		
YAYAT	74.3%	98.9%
IRON AND STEEL	81.8	85.7
EL NASR FORGING IND.	69.0	96.6
NASR RUBBER	67.9	85.6

- In some cases concessions are automatically given because standards or test procedures have changed
- Such high levels of rejects would be unacceptable in a U.S. or European factory
- Rejects stop production when they are higher than expected. Combination of rejects and slow deliveries reduce output of NASCO 20-40%

On Time Delivery of Feeder Companies is Also a Problem for the Assembly Companies

- Data for two batches of trucks manufactured in 1982 suggest late delivery has an enormous impact on NASCO:

	<u>IMPORTED</u>	<u>LOCAL SUPPLIERS</u>	<u>INTERNAL MANUFACTURE</u>
Number of different parts	988	294	984
Missing 2 months before build date	5.4%	13.1%	33.2%
Missing at build date	2.0%	10.4%	26.7%

Source: NASCO data

- Data for batches manufactured in 1983 suggest that the rates have declined but are still unacceptably high
 - As a result NASCO:
 - Resorts to ad hoc, month to month scheduling
 - Experiences continual disruption of parts manufacturing schedules
 - Produces at less than 50% of capacity
 - Problem is reportedly less significant at AAV due to vigorous follow-up with suppliers and better systems for monitoring order status
-

Conclusions

- **Egypt is an attractive market for finished vehicles**
 - Substantial population
 - High growth rate in vehicles
 - Favorable political climate
 - Image leader for Africa and the Middle East

- **The size and growth of the market for parts justify substantial investment and development in the automotive feeder industries**

- **Improvements in distribution systems would improve market opportunities for the feeder industries**

- **Performance of the feeder industries severely limits productivity of the assembly companies**

- **Feeder industries could produce 30% to 50% more using existing facilities, were orders in hand**

- **The planned investments in assembly companies will require new investment equal to three to seven times the existing feeder industry investment just to maintain the current level of local content**

Egyptian Production

	<u>NASCO(1)</u>	<u>AAV(2)</u>	<u>OTHERS</u>
CARS			
Cars	20,896(3)	2,238(3)	
Jeeps	0	2,326(4)	—
Total	<u>20,896(2)</u>	<u>4,564</u>	<u>0</u>
TRUCKS			
Light	0	—	
Medium	2,668(6)	—	
Heavy	203(3)	—	
Total	<u>2,871</u>	<u>—</u>	<u>0</u>
BUSES	701(5)	—	N/A
TRACTORS	3,294(4)	—	0

Notes: (1) 1982/83 fiscal year NASCO also manufactured an additional 1,121 truck and bus engines

(2) 1983 calendar year

(3) Assembled

(4) Partly manufactured

(5) Manufactured

(6) Manufactured: 1,688 Assembled: 980

Conclusions On Productivity In The Feeder Industry

- **Goals of the industry**
 - **Identification of obstacles**
-

Goals of the Egyptian Automotive Industry are not Clear

- Few explicit goals have been set in the past

 - Policies of the past have lead to an industry characterized by:
 - Widely available, affordable cars
 - High local content for trucks
 - Imported, assembled cars
 - An open market
 - Low investment in the automotive industry
 - Little R&D investment
 - Vertically integrated production within companies
 - Excess employment in public sector companies
 - High security for workers
 - Low levels of profitability

 - New, explicit goals are now being formulated
-

Many Characteristics are not Mutually Supportive

		Develop high local content in trucks cars	Import CKD cars	Maintain excess employment	Integrate production	Operate profitably	Provide open market	Minimize R&D investment	Give low investment priority	Provide high labor security
Import CKD cars										
Maintain excess employment	C	C								
Integrate production	C	S	S							
Operate profitably	S	C	C	C						
Provide open market	C	S	S		C					
Minimize R&D investment	C	S	C	C	C	S				
Give low investment priority	C	S	C	C	C	S	S			
Provide high labor security	S	S	C	S	C	S	C	C		
Do not make goals explicit	C	S	C	C	C	C	C	S	C	

Conflicting goals 27

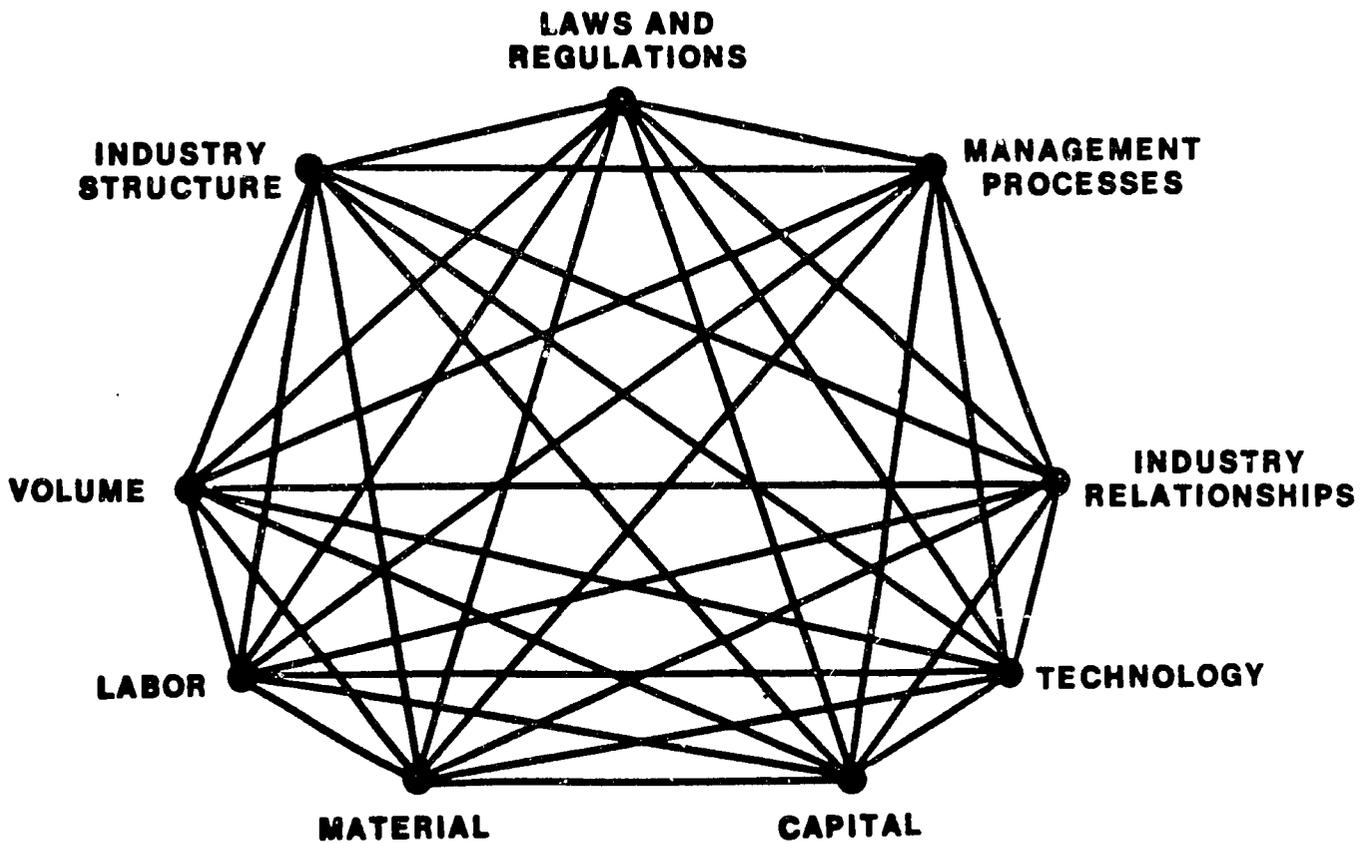
Supporting goals 17

Good Things Were Observed in the Industry

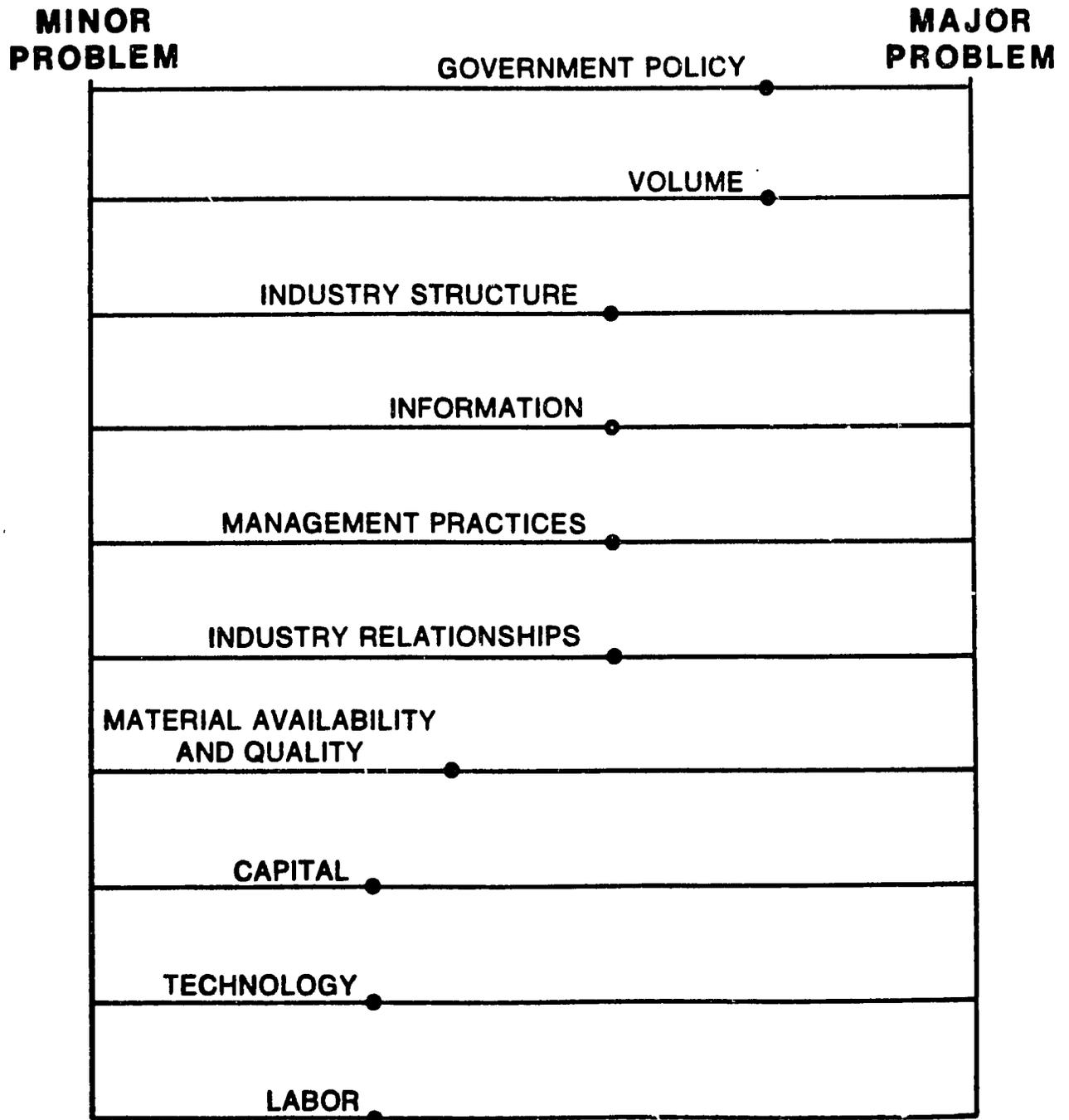
- An interest in moving forward
- A reasonable number of well educated managers
- A large, trainable work force
- Appropriate technology and equipment for the current situation

**THESE CONSTITUTE A BASE
FROM WHICH THE INDUSTRY
CAN GROW AND DEVELOP**

**Key Obstacles to
Improvement in Productivity
are Interrelated**



Some Obstacles are Greater than Others



**Government Policy Controls
Inputs but gives Little
Direction to Outputs**

- Inconsistent record with respect to:
 - Participation
 - Local content
 - Investment
 - Performance measurement
 - Trade protection

 - Policies controlling inputs impede productivity in the following areas:
 - Worker discipline
 - Staffing levels
 - Inventory levels
 - Investment

 - These policies and regulations discourage investment in the industry
-

Industry Structure is Inefficient

- **Management style of most public sector companies impedes productivity**
 - Management style in Egypt is characterized by:
 - Focus on today's problems (limited planning)
 - Verbal communication (few information systems)
 - Centralized decisionmaking
 - This style is appropriate for medium or small companies but not for large companies
 - All major public sector producers of automotive parts have 500+ employees

- **Vertical integration in public sector companies impedes productivity**
 - Diffuses scarce resources among many companies
 - Reduces competitive forces
 - Increases size and complexity of the firms
 - Prevents investment in training and specialized equipment

- **Horizontal diversification has also hurt productivity**
 - Dilutes management attention
 - Overloads control systems

- **Division into smaller, better focused companies would improve productivity**

Industry Structure is Inefficient

- **Private sector companies are currently too small to play a major role in the short term:**
 - **Constitute less than 5% of new parts market**
 - **Have limited resources for growth**

 - **Ideal, medium scale companies do not exist:**
 - **Ideal size: 100 to 300 employees**
 - **Large enough to support specialized capabilities (e.g., sales, engineering)**
 - **Suits Egyptian management style**
 - **No companies of this size were seen**

 - **Service companies are lacking**
 - **Examples of types of companies needed:**
 - **Tool and die makers**
 - **Heat treaters**
 - **Steel service centers**
 - **Mill supply**
 - **Lack of these companies leads to:**
 - **Long lead times for foreign supply**
 - **Poor quality local services**
 - **High cost purchase of limited quantities or services**
 - **Inefficient vertical integration**
-

Industry Structure is Inefficient

- **Aftermarket distribution is inefficient:**
 - **There are few wholesalers or distributors**
 - **Therefore, manufacturers must sell directly to retail and repair shops**
 - **This system is inefficient because it makes:**
 - **Manufacturer's sales effort much more expensive**
 - **Identification of market opportunities difficult**
 - **Start-up of aftermarket manufacture prohibitively expensive**
 - **Establishment of brand recognition for quality difficult**
-

Low Volume on Automotive Parts Discourages Investment and Causes High Costs

- **Low volume is a result of:**
 - Low scale assembly in Egypt
 - Small size of Egyptian market until the very recent past
 - Tremendous variety in the aftermarket
 - Other attractive markets for manufacturers to produce other products
 - Little effort on exports

 - **Low volume leads to:**
 - High fixed costs for technology and equipment (e.g., dies)
 - Low investment in development for the future
 - Demand for a high level of protection
 - Use of general purpose machinery which leads to higher production costs

 - **The volume problem can be solved through:**
 - Natural growth of the market
 - Policies favoring less variety
 - Increased production of complete vehicles
 - Aggressive effort on exports
-

Information for Planning and Control is not Available

- **Lack of industry data inhibits entry of new manufacturers**
 - Official statistics are late (and inaccurate according to some sources)
 - No other data are readily available
 - Potential entrepreneurs and investors cannot find data to:
 - Identify products or markets that offer most potential
 - Estimate market size and growth for target products
 - Quantify their business plans

 - **Lack of a classified list of manufacturers leads to inefficient sourcing and reduced competition**
 - Alternative sources are difficult to find
 - Potential buyers are difficult to find
 - Sales costs are increased
-

Information for Planning and Control is not Available

- **Lack of cost data leads to high cost production**
 - **Manufacturers do not know where to focus cost reduction efforts**
 - **Production managers can make costly decisions without learning the consequences**
 - **Opportunity costs (e.g., idle machine time) are nearly invisible**

 - **In the public sector, lack of measures encourages overemphasis on production goals**

 - **Development of modern information and control systems is hindered by concern managers will be accused of mismanagement**
-

***Better Management Practices
Would Improve Production,
Quality, and Cost Control***

- **Certain management practices inhibit productivity gains:**
 - **Planning and prioritization are short term and unsystematic**
 - **Weak control systems lead to lost production, poor quality, and high costs**
 - **Quality**
 - **Maintenance**
 - **Vendor**
 - **Inventory**
 - **Scheduling**
 - **Costing**
 - **Methods are inefficient because they have not been engineered or are not properly implemented**
 - **Work flow**
 - **Material handling**
 - **Housekeeping and safety**
-

***Better Management Practices
Would Improve Production,
Quality, and Cost Control***

- Current practices lead to a “Can’t Do” attitude among both managers and workers

- The situation is hard to correct:
 - Management is not committed to change
 - Environment is not yet forcing change
 - Only a few models of excellence are available, for example
 - Treco
 - Military Factory 135
 - Arab Union for Trade and Industry

**IN THE STUDY COMPANIES, MODERN
MANAGEMENT PRACTICES WOULD
INCREASE PRODUCTION 10% TO 40%**

Existing Industry Relationships Do Not Build Productivity

- **Sales is an important function in modern industry:**
 - Searches out potential customers
 - Identifies customer's needs for products
 - Relates customer's needs to the firm's engineering and manufacturing functions
 - Provides continual feedback on quality, future needs, improvement opportunities and competition
 - Helps customers avoid
 - Stock outs
 - High cost specifications
 - Expensive order changes

 - **Sales function is especially needed in Egypt:**
 - Published data do not permit easy identification of suppliers or customers
 - Distributor/wholesaler function is nearly absent
 - Customer purchasing departments are not especially aggressive
-

**Existing Industry
Relationships Do Not Build
Productivity**

- Nevertheless, sales function is largely absent in Egyptian companies:
 - Entirely lacking in some companies (sales depend on personal contacts of the chairman or owner or upon initiative of customers)
 - Ineffective in most others due to:
 - Poor conception of the job (order writing department)
 - Lack of transport
 - Low status

- For this reason, both NASCO and AAV have established departments to search out, and develop and monitor suppliers

**AN AGGRESSIVE SALES EFFORT
WOULD SOON FILL MOST OF THE
EXISTING IDLE CAPACITY BY MEETING
EXISTING NEEDS OF CUSTOMERS**

Raw Materials are Hard to Get

- **Order cycles for imported goods are long (up to 14 months) due to:**
 - Committee approvals
 - Currency problems
 - Shipping requirements
 - Customs delays
 - Arbitrary decisions by Customs

- **Deliveries of local raw materials are often undependable:**
 - Advance payments are required
 - Delays of up to 4 months are reported
 - Orders are sometimes cancelled by supplier without warning
 - Quality is often under specification

- **Service centers are lacking for**
 - Steel
 - Mill supplies

- **Specifications are complex and varied:**
 - Some are out of date
 - A variety, German, Japanese and American are used which causes excess inventories of closely similar materials
 - No Egyptian standard specifications exist

Raw Materials are Hard to Get

- **Purchasing practices impede productivity**
 - Lack of emphasis on long term vendor relationships leads to competition solely on price rather than on performance, quality and delivery
 - Low emphasis on standardization leads to high inventory levels and lack of interchangeability
 - High number of approvals on purchase orders (in the public sector) delays the process. One company requires 39 steps to complete a purchase
 - Lack of value analysis leads to high costs (compared to worldwide manufacturers) and purchase of parts regarded and priced as low volume, obsolete, specialty items by suppliers
 - Insufficient foreign currency causes delays, excessive paperwork, poor practices in purchasing process and excessive levels of inventory
-

Capital is a Problem for Private Companies

- **Private sector companies are:**
 - Small
 - Not financially sophisticated
 - Eager to grow

- **Capital is needed for:**
 - Facilities and equipment
 - Inventories (especially raw materials)

- **Loan capital is not the entire answer**
 - Rates are high relative to margins (17% versus 10%)
 - Magnitude of required growth (1,000% or more to be significant) requires equity base

- **Investors are hesitant because of:**
 - Lack of management depth
 - Narrow customer base
 - Poorly prepared proposals

Available Technology is not Being Fully Applied

- **Managers are not using available technology**
 - Manuals though initially provided are not used
 - Resources in Egypt are not well known (e.g., ITAP)

 - **Little effort has been expended to improve on existing designs and processes:**
 - R&D departments are virtually nonexistent
 - R&D budgets are small or nonexistent
 - Private sector R&D is done by the chairman who has much else to do
 - A few exceptions (e.g., Yayat) exist

 - **Private sector has been more innovative**
 - Innovation focuses on production machinery rather than product design
 - Innovation is forced by lack of funds
-

Available Technology is not Being Fully Applied

- **Push for inappropriate technology exists**
 - Labor saving machinery where labor is cheap
 - Large scale machinery for small scale outputs
 - Being modern for its own sake

 - **Nevertheless, most processes are designed around general purpose equipment which is appropriate for Egypt's situation:**
 - Small scale, flexible production
 - Limited maintenance capability for sophisticated control systems
-

Lack of Mobility and Engineering Skills Impede Productivity of Human Resources

- **Low mobility retards productivity**
 - Turnover rates are low (less than 5%/year)
 - Prevents spread of good practices
 - Retards innovation
 - Dampens enthusiasm

 - **Industrial engineering skills are nearly absent, especially for:**
 - Materials handling
 - Production scheduling
 - Quality control

 - **Appropriate worker skills are available**
 - On the job training is sufficient for most jobs
 - A few specialty skills (e.g., tool and die) are in short supply
-

**Public Sector Labor Practices
Inhibit Improvement of
Productivity**

- **Overstaffing hurts two ways**
 - Increases man-hours/unit of output
 - Reduces real output

- **Incentives are not used**
 - Monetary incentives are too uniform
 - Promotion is largely based on seniority, not performance
 - People are too seldom moved across departments
 - Managers do not expect (or get) innovation
 - Few awards are made for good work or ideas
 - Performance is not measured

- **Effective tools for discipline are generally not available**
 - Dismissal for cause
 - Reduction in grade
 - Bonus for excellence

Recommendations

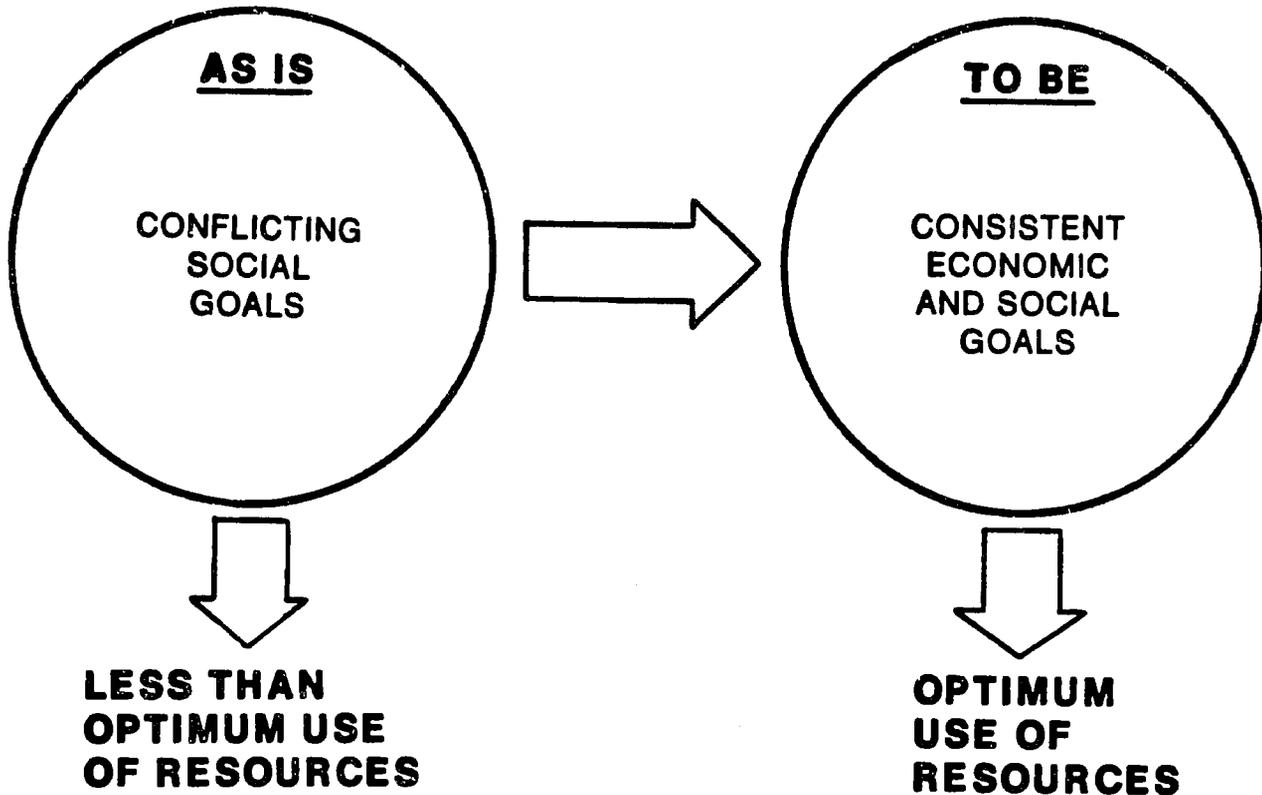
- Clarify and maintain goals
 - Focus the industry
 - Improve manageability
 - Promote development of efficiently sized companies
-

Focus the Industry

- Clarify and maintain goals
- Prepare a long-term sector plan — and stay with it
- Limit the variation in parts required to serve the Egyptian market
- Invest where Egypt has an economic advantage
- Develop linkages among all industry participants
- Encourage constructive competition
- Establish specialized industrial service companies
- Develop an efficient distribution system for the aftermarket
- Establish a trade association to help implement elements of the above strategy

**SEE THE FOLLOWING PAGES FOR
FURTHER DISCUSSION OF THESE
RECOMMENDATIONS**

**Improvement in Productivity
Requires Changes in Goals
and in Management of Resources**



Example Goals for the Egyptian Automotive Sector

Establish consistent social and economic goals for the industry. Consider the following example:

<u>Rank Order</u>	<u>Objective</u>
1	Achieve a mass of demand sufficient to support a high level of local production of automotive parts
2	Maximize value added in Egypt, for example: Trucks: 70% by 1990 Cars 45%
3	Provide affordable transportation
4	Provide jobs with a livable income
5	Generate a net surplus on resources employed
6	Obtain a balance of trade (exports = imports) on automotive products

Prepare a Long-Term Sector Plan and Stay with It

■ Objectives

- To ensure orderly, integrated development of the industry
- To provide guidelines for investors
- To provide stability to government plans and policy for the sector
- To maximize the benefit/cost ratio
- To maintain a high rate of economical growth in the industry

■ Responsibility

- The High Committee currently planning the new automobile plant should initiate development of the plan. They should select an industry specialist to draft a plan for their consideration
- The automotive trade association (see later recommendation) should update the plan annually
- Input should be sought from other significant participants (both public and private) in the industry, e.g., General Motors, AAV and Treco
- A policy statement that provides guidance to the industry's development should be submitted to the People's Assembly. The purpose of this action would be to stabilize the outlook of the industry for private investors

Prepare a Long-Term Sector Plan and Stay with It

- **Specific elements should include:**
 - **Defined long-term goals for the industry**
 - **Estimated demand for vehicles for each of the next 10 years by type. The NASCO projection is a good starting point but it should be updated annually**
 - **Estimated number of vehicles on the road by type by brand. Assistance may have to be given to the vehicle registration department to accomplish this**
 - **Planned domestic production of vehicles by model by year**
 - **A prioritized and time phased list of projects needed to support both vehicle assemblers and the aftermarket. Consideration must be given to the market size required for profitable operation**
-

Prepare a Long-Term Sector Plan and Stay with It

■ **Specific elements should include:**

- **Consideration of needs for investment in both manufacturing and distribution functions**
 - **Defined roles for public, private and joint venture sectors. In defining roles, consideration should be given to:**
 - **Size of project. A larger number of smaller projects should be favored over a small number of large projects**
 - **Potential for mixed public and private investments in the same project (to encourage cooperation)**
 - **Interchange of materials and parts among public and private sectors, for example:**

Forgings (public) → machining (private) → assembly (JV)
 - **Level of technology required. Pursue foreign investment in high tech manufacturing**
 - **Economic objectives. Current regulations on pricing, promotion of people, compensation and reinvestment make economic operation of public sector companies very difficult**
 - **Available expertise. An effort should be made to build on current excellence where possible**
-

Prepare a Long-Term Sector Plan and Stay with It

- **Specific elements should include:**
 - Recommended trade policies. Consideration should be given to:
 - Export potential
 - Level of tariff protection required to compensate for tariffs on raw materials and equipment and for subsidies on local goods
 - A benefit/cost analysis. This is needed to reassure those who have read the uniformly unfavorable reports on industry economics

 - **Distribute the plan widely, including:**
 - All existing automotive feeder industries
 - Investment banks
 - Foreign embassies
 - Known Egyptian investors
 - GOFI and GAFI (to distribute to inquirers)
-

Limit the Variation in Parts Required to Serve the Egyptian Market

■ Objective

- To increase the number of parts for which the Egyptian market is large enough to permit economical domestic production

■ Responsibility

- The Chairman of NASCO should form a committee of assembly company chairmen to review the potential for standardization of components

■ Implementation

- Restrict the varieties of vehicles produced in Egypt:
 - Number of proposed automobile models (3 including jeeps) appears appropriate
 - Number of approved truck producers (4) appears high. Two producers could cover the market while yet ensuring competition
 - Proposed policy of producing the same model for 10 years or more is appropriate but important technical improvements should be incorporated as they occur
-

Limit the Variation in Parts Required to Serve the Egyptian Market

■ Implementation

- Standardize selected components among assemblers
 - Consider standardizing parts that require the following:
 - High fixed investment costs per unit
 - Highly specialized equipment that cannot be modified easily to produce similar parts for other assemblers
 - Engine and drive train elements are early candidates
 - Standardization should be agreed upon jointly by the assemblers
 - Reduce variation in imports
 - Induce each foreign manufacturer to import only a small number of models (e.g., 2 car models, 2 light truck models)
-

Invest Where Egypt Has an Economic Advantage

■ Objectives

- To obtain an even balance between imports and exports of automotive products. Invest first in products that can be sold economically both in Egypt and abroad**
- To obtain maximum return on investment**
- To help the whole Egyptian automotive industry remain competitive on the worldwide market. Keep the costs of the Egyptian product competitive so there is less pressure to evade/change tariff and trade rules and so that the transportation factor costs of other Egyptian industries do not reduce their worldwide competitiveness**
- To avoid further subsidies to an industry that primarily benefits the wealthier part of society**
- To encourage foreign participation in the industry. Brazilian and Mexican experiences show the benefits of a policy of balanced trade in automotive products and its attractiveness to assemblers**

■ Responsibility

- Initially, the High Committee should identify, rank and promote appropriate projects. The committee will need the help of a competent consultant**
- The Trade Association (recommended later) could assume this responsibility after it is established**

Invest Where Egypt Has an Economic Advantage

■ Implementation

- Identify products which utilize Egypt's comparative advantages:
 - Low labor cost
 - Relatively skilled work force
 - Raw materials (e.g. iron)
 - Previous successful experience (e.g. springs and tires)

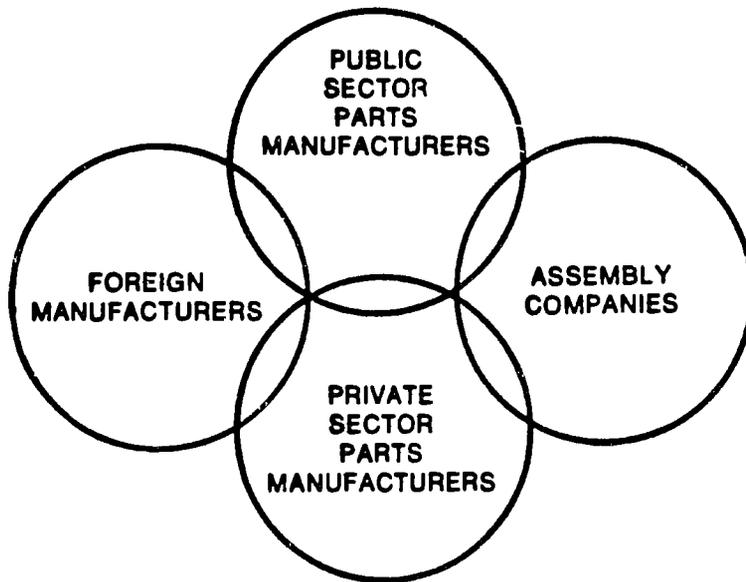
 - Measure the size of the potential market available to the Egyptian manufacturer:
 - Assemblers
 - Aftermarket
 - Exports
-

Invest Where Egypt Has an Economic Advantage

■ Implementation

- Analyze the economics of the proposed projects including:
 - Economic scale compared to available market
 - Net effect of tariffs and subsidies
 - Financial return to the investors
 - Rank order the projects according to their economic attractiveness. Include this rank ordered list in the Sector Plan
 - Promote these projects to Egyptian investors
 - Suggest these projects as alternatives to requests to invest in less desirable projects
 - Publicize the need for investment in these areas
-

Develop Linkages Among All Participants



■ Objectives

- Obtain better utilization of facilities. Significant public investments have been made in basic facilities (e.g. forges) that are not being fully utilized
- Manage relationships with foreign companies to provide not only technological expertise but also managerial expertise and access to markets
- Break down the barriers between public and private sectors

■ Responsibility

- Companies (especially those with idle capacity)
- Bankers (as part of loan counseling)
- ITAP could assist by identifying foreign suppliers of technology

Develop Linkages Among All Participants

■ Implementation

- Assemblers could help feeder companies by:
 - Providing technical advice
 - Providing laboratory services to improve quality
 - Buying and holding inventories of raw materials. This could be especially cost effective when several feeders require small amounts of the same material
 - Buying specialized equipment (e.g. dies) for use by feeders
 - NASCO is already providing such service but it could be strengthened by adding additional qualified engineers
-

Develop Linkages Among All Participants

■ Implementation

- Public sector companies with idle capacity could substantially improve their marketing and sales effort to private sector companies
 - New, private sector projects can be designed to build upon available resources in the public sector, for example:
 - Radiator project could utilize NASCO 1,000-ton press to form the tanks
 - U-joint project could obtain forgings from El Nasr Forgings
 - Associations with foreign manufacturers should be more actively pursued not only for technical knowledge but also for:
 - Management assistance (especially for formal systems)
 - Marketing (especially for exports)
-

Items of Trade Among Automotive Industry Participants

SOURCE	BUYER/USER			
	INTERNATIONAL AUTOMOTIVE INDUSTRY	EGYPTIAN FEEDER INDUSTRIES	EGYPTIAN ASSEMBLY COMPANIES	EGYPTIAN DISTRIBUTION
INTERNATIONAL AUTOMOTIVE INDUSTRY		TECHNOLOGY RAW MATERIALS SEMIFINISHED PARTS EQUIPMENT MANAGEMENT ASSISTANCE MARKETING ASSISTANCE	TECHNOLOGY FINISHED PARTS AND ASSEMBLIES MARKETING ASSISTANCE	LOW DEMAND PARTS
EGYPTIAN FEEDER INDUSTRIES	FINISHED PARTS AND ASSEMBLIES	SEMIFINISHED PARTS	FINISHED PARTS AND ASSEMBLIES	FINISHED PARTS AND ASSEMBLIES TOOLS
EGYPTIAN ASSEMBLY COMPANIES	TRUCKS BUSES FOR DEVELOPING COUNTRY MARKETS	RAW MATERIALS TECHNOLOGY NEEDS ASSESSMENT		CARS, TRUCKS, BUSES, TRACTORS, CYCLES, TRAILERS PARTS, TOOLS TRAINING
EGYPTIAN DISTRIBUTION		MARKET DATA	MARKET DATA	

Encourage Constructive Competition Among Suppliers

■ Objectives

- Encourage high levels of productivity among suppliers to obtain:
 - Low costs
 - High quality
 - Reliable deliveries
- Encourage local suppliers to keep up with international developments in their field

■ Responsibility

- A purchasing council consisting of a representative of each assembly company could be formed to promote local production. We suggest that the Director of Purchasing and Supply at NASCO initiate this action
 - Ask MDP and ITAP to help strengthen weak competitors
-

Encourage Constructive Competition

■ Implementation

- Purchasing departments of the assembly companies should coordinate the development of suppliers (we encourage formation of a professional society of automotive purchasing personnel for this purpose)
 - Where the market is sufficiently large, encourage the formation of two Egyptian suppliers
 - Where the market is too small to permit more than one economic supplier:
 - Discourage entry by competitors
 - Maintain a foreign source as a check on prices and as a backup in case of delivery failure
-

Establish Service Companies

■ Objectives

- Provide higher quality products
- Reduce lead time for tools and materials
- Respond to needs of small firms for access to small quantities of material and supplies
- Reduce costs
- Substitute local manufacture for imports
- Encourage standardization

■ Examples of needed companies:

- Heat treatment (especially for heat treatments requiring special temperature controls, atmospheres or quenching)
- Tool and die maker
- Chemical processing (e.g., galvanizing)
- Spare parts manufacturer
- Mill supply (to provide disposable supplies required in a modern factory)
- Steel service center (stocks commonly used grades, may draw or roll to meet customer specifications)

Establish Service Companies

■ Responsibility

- The Engineering Industries Corporation is well placed to survey the needs of member companies and then to stimulate development of a company. The Chairman should appoint a vigorous, knowledgeable person to lead this effort on a full-time basis

 - The E.I.D.D.C. could review the opportunity for developing, promoting and expanding its heat treatment and tool and die facilities
-

Establish Service Companies

■ Implementation

- Establish a company for each needed service
 - Identify the best physical location taking into account existing facilities, capacity, current level of activity, severability from the current parent company
 - Restructure the facility as an independent company
 - If necessary, encourage formation of a new (private sector) company
 - Recruit/assign skilled people to staff the company
 - Hire a manager who has both marketing and technical expertise in the industry to manage the company
 - Recruit/assign the most experienced available personnel to the center of excellence (special incentives may be needed)
 - Recruit an aggressive marketing/sales director to ensure the service is properly promoted
 - Provide sufficient capital for needed equipment and initial inventories
-

Establish a Wholesale Distribution System for the Aftermarket

■ Objectives

- To provide access to the market by local manufacturers
- To reduce costs of distribution
- To improve response time to demand for slow moving parts
- To permit introduction of branded parts for the aftermarket with an associated image of price and quality
- To provide better information on market needs

■ Responsibility

- The Federation of Industries, because its membership includes both public and private firms, is best positioned to implement this activity
 - Short term consulting assistance will be required to more clearly define the needs and to identify appropriate participants
-

Establish a Wholesale Distribution System for the Aftermarket

■ Implementation

- Identify promising companies now offering some distribution services
 - Obtain assistance for them from an established American or European wholesaler company (e.g. NAPA or Unipart)
 - Initially focus on providing parts for the Fiat family of cars. Add others as capability and market size develop
 - Establish a brand name for parts offered by this organization
-

Establish an Automotive Trade Association

■ Objectives

- To provide a forum where issues affecting the entire industry can be discussed
- To provide an organization that can act for the benefit of the entire industry

■ Responsibility

- Chairmen of the assembly companies could initiate the formation of the association
 - Participation of all sectors of the industry should be solicited — public, private, manufacturers, assemblers and distributors
 - Care should be taken to avoid dominance by any faction, e.g. assemblers or public sector companies
 - External funding may be needed until the association is well established
-

Establish an Automotive Trade Association

■ Functions

- Represent the interest of automotive manufacturers (feeders and assemblers) and distributors both public and private
 - Collect and disseminate data on the industry; e.g.
 - Number of registered vehicles by model
 - Number of vehicles produced by model
 - Value of parts produced and imported
 - List of manufacturers classified by products produced
 - List of distributors
 - Provide the focus and staff for developing industry plans
 - Advocate policies and legislation that would benefit the Egyptian automotive industry
 - Identify profitable opportunities for new projects within the industry and promote them
 - Develop and coordinate an export program for the automotive industry
-

Establish an Automotive Trade Association

■ Implementation

- Convene an organizing conference
 - Invite chairmen of all companies known to be involved in automotive manufacturing and distribution
 - Elect a Board of Directors (carefully balanced to reflect diversity of the industry)
 - Outline objectives of the first year
 - Establish revenues and budgets
 - Present papers of interest to the industry (A. T. Kearney would be prepared to present a paper)
- Recruit a staff including an Executive Director
- Solicit help in establishing procedures and functions from a similar American or European society, e.g. Motor Vehicle Manufacturers Association
- Hold annual conferences of the membership to:
 - Present and discuss major issues affecting the industry
 - Elect Board of Directors
 - Establish policy and direction of the society

Improve Manageability

- **Restructure large companies into medium scale companies**
 - **Train Egyptian managers in the use of modern planning and control systems**
 - **Recognize and reward good performance by workers and managers**
 - **Increase mobility of management and skilled workers**
 - **Replicate centers of excellence**
 - **Reduce the time and costs of getting raw materials**
 - **Upgrade marketing and sales function**
 - **Improve approach to quality production**
 - **Establish production and management curricula in universities**
 - **Establish measures of productivity**
-

Restructure Large Companies Into Medium Scale Companies

■ Objectives

- To better match Egyptian management style to the requirements of the organization
- To provide more top management time for operating issues
- To shorten lines of communication within companies so that action can be taken more quickly
- To more clearly identify good and poor performance
- To enable facilities to compete in wider markets (GM is not likely to buy engines from its chief competitor, NASCO, but might from an independent supplier)

■ Responsibilities

- The chairmen of the new holding companies are best placed to initiate the restructuring
- MDP could help define appropriate new organization structures

■ Candidates for consideration:

- NASCO: Break out engine and machining hangars into separate companies
 - Military Factor 9: Break out automotive foundries
 - General Metals: Break out pressure and die casting foundries
-

Restructure Large Companies Into Medium Scale Companies

■ **Implementation**

- **Make changes only after careful study**
 - **Consider restructuring companies that meet any of the following criteria:**
 - Produces several different types of products**
 - Employs more than 1,000 workers**
 - Operates more than one plant**
 - Manufactures a high percentage of raw materials or components required for the final product**
 - **Restructure companies around a central and narrow theme, e.g.**
 - A specific process technology (e.g. die casting)**
 - A specific product: engines**
 - **Be prepared to invest in services required to support the new companies, e.g.**
 - Laboratories**
 - Repair shops**
 - Management training**
 - **Set higher goals for performance for the new companies than were set for the integrated facility**
-

Train Egyptian Managers in the Use of Modern Planning and Control Systems

■ Objectives

- To obtain higher level of productivity from resources now available
- To obtain higher quality products
- To increase the ability of companies to identify and take advantage of new opportunities

■ Responsibility

- Chairmen must approve and wholeheartedly support major improvement activities
- MDP should continue its outreach to the industry
- USAID could support other, complementary activities

■ Implementation

- "Training" is most effective when managers are provided with good systems and shown how to use them. Unfortunately, few good systems are available, but must be developed. The following recommendations suggest how this can be most effectively done
-

Train Egyptian Managers in the Use of Modern Planning and Control Systems

■ Implementation

- Consider contracting selected elements of management responsibility to an international expert for a minimum of three years
 - Purpose is to expose the Egyptian managers to modern management systems so that they will be much better managers at the end of the period
 - Precedent for such action already exists in Egypt:
 - Military Factory 135 (in the past)
 - Hotels (today)
 - Contract will need to specify:
 - Expected measures of performance
 - Investment budget (and its source)
 - Rules of operation (we suggest it operate under the normal rules of public sector companies if possible)
 - Potential candidates include El Nasr Forgings and Helwan Iron Castings:
 - Both are cause for major concern as suppliers
 - Both could use the infusion of modern technological concepts as well as better management systems
-

Train Egyptian Managers in the Use of Modern Planning and Control Systems

■ Implementation

- Consider hiring an individual with in-depth experience in Western management systems as Assistant to the Chairman in other companies
 - Task would be to initiate improvements in company's management systems and technical methods and then follow through implementation
 - Executive should have been a senior operating executive from a similar firm in Europe or the U.S. An experienced search firm could ensure success by selecting a person with high levels of technical and interpersonal competence
 - Minimum period of employment should be two years in order to get effective implementation
-

Train Egyptian Managers in the Use of Modern Planning and Control Systems

■ Implementation

- Continue the full scale MDP approach to large public sector companies
 - MDP was introduced to General Metals and El Nasr Forgings during this project. General Metals has already invited MDP's assistance
 - MDP's approach is appropriate for such multilevel, complex companies. Their emphasis on participation of company's managers in definition of productivity problems is particularly appropriate
 - Proposed cycle time is far too short. Implementation is likely to require intermittent effort over 18-24 months to be effective
 - MDP assistance to small companies should focus on helping them to plan and set priorities. Most do not yet need formal systems
-

Recognize and Reward Good Performance by Workers and Managers

■ Objectives

- To unleash the creative energies of Egyptian workers and managers
- To provide incentives to become more productive
- To encourage employees to identify more closely with the company's situation

■ Responsibility

- Chairmen could much more effectively utilize the limits of existing laws to reward employees
 - Chairmen could use the help of experts in employee relations and compensation to build systems that motivate workers
 - Ministry could take the initiative to loosen the regulations on maximum incentives and dismissal of employees
-

Recognize and Reward Good Performance by Workers and Managers

■ **Implementation**

- Improve incentive plans
 - Consider implementing a gainsharing or Scanlon type plan in a company (See Appendix I for a description). If it is successful, implement it in other companies
 - Survey current practices in Egypt and adapt the best practices to other companies
 - Tie salaries of top management to improvement of productivity rather than merely increased production
 - Promote managers on the basis of performance
 - Tie performance measurement more closely to productivity and innovation
 - Reduce emphasis on education background and seniority when promoting people
 - Engage the experience and knowledge of workers to improve operations. Activities such as the following could be considered
 - Quality circles
 - Suggestion boxes
 - Autonomous work teams
-

Increase Mobility of Management and Skilled Workers

■ Objectives

- Utilize scarce manpower better
- Transfer good experience among firms
- Encourage managers to imagine alternate ways of accomplishing goals
- Shift excess workers to more productive situations
- Provide more opportunities for advancement for talented managers and engineers
- Encourage cooperation and understanding among departments

■ Responsibility

- Within companies, the Chairman should initiate transfers of managers between departments
 - Among companies, the Chairman of the holding company should move individual senior managers
-

Increase Mobility of Management and Skilled Workers

■ Implementation

- Ease procedures for allowing transfers among public sector companies
 - Permit public sector workers to take up to a two-year leave of absence to work in private companies
 - Promote a policy of moving managers among departments at least once each five years during the first fifteen years of their careers
 - “Second” managers to other firms for up to two years to gain experience. Such experience may be particularly rewarding when supplier and assembly companies interchange personnel
-

Replicate Centers of Excellence

■ Objectives

- Transfer good management practices from “Centers of Excellence” to other companies
- Offer more opportunities to managers who have been innovative and productive

■ Responsibility

- The Chairmen of the holding companies are best placed to evaluate the performance of companies and their senior managers. They should, therefore, implement these recommendations
- Operating companies can help by cooperating when asked to give up a high-quality senior manager or to accept managers from other companies

■ Implementation

- Chairmen of holding companies could identify “Centers of Excellence.” These are companies or departments of companies that have demonstrated consistent improvement in productivity or have been consistently innovative
- As openings develop, senior managers in “Centers of Excellence” should be given first consideration as chairmen of other companies. There they could apply the good systems and methods they have learned.
- Young but promising managers in other companies could be reassigned to “Centers of Excellence” for a period of two to three years. Then they could be rotated back to their original company into a more senior position to apply their new experience

Reduce the Time and Costs of Getting Raw Materials

■ Objectives

- Reduce the cost of inventories
- Reduce the time required for companies to respond to changing market conditions

■ Responsibility

- The Chairman of the Engineering Industries Corporation could convene a committee to work on this problem
 - A senior manager from the Customs Department should be requested to sit on the committee
 - Assistance may be sought from the Egyptian Standards Organization and/or from international standards organization
 - MDP could develop a set of model procedures for purchasing
 - The Government Audit Department could review and streamline recommended purchasing procedures
-

Reduce the Time and Costs of Getting Raw Materials

■ Implementation

- Establish distributors and service centers as recommended earlier
- Standardize specifications for commonly used raw materials
 - Select a standard from among those commonly available. Typically, similar but slightly different standards exist in the U.S.A., Europe and Japan
 - Encourage manufacturers to revise their specifications to match the new Egyptian standard
 - Distributors and other importers should then be able to order in larger quantities and then deliver the small quantities required by manufacturers out of these larger stocks
 - Such standardization should have little effect on costs of raw material since many of the foreign firms already manufacture to both domestic and foreign specifications
- Reduce the amount of paperwork and time required to get permission to import, set up letters of credit, and clear customs
 - The first step is for companies to review and improve their internal procedures. A great variation in time required for processing was reported to us (from one week to several months)
 - The sector committee could work with Customs and banks to simplify the procedures
 - Customs department should be pressured to improve their procedures and performance

Upgrade Marketing and Sales Function

■ Objectives

- Improve the ability of companies to define and meet the real needs of the market
- Encourage development of new products
- Encourage exports

■ Responsibility

- Company chairmen must first recognize the benefits of better identification of customers and their needs
 - MDP could develop and offer a program on marketing for executives in the industry
-

Upgrade Marketing and Sales Function

■ Implementation

- The proposed marketing development program should be aimed at three levels:
 - **Top executives.** This program would explain the purpose of marketing, its benefits to the company, the resource requirements of a good marketing program and how to measure performance of marketing personnel
 - **Marketing Executives.** This program would cover the same topics as the top executive course but would also explain in detail how to set up and manage a total marketing program
 - **Sales Personnel.** This course would touch lightly on the topics mentioned above. It would concentrate on how to identify customers, understand their needs and relate the company's products to those needs
 - **MDP** could encourage formation of a professional society of automotive marketing personnel. The purposes of the society would be to develop the skills and capabilities of its members and to promote the benefits of good marketing programs to top management
-

Establish Production Management Curricula in Universities

■ Objectives

- Provide graduate engineers with a basic understanding of production as well as design concepts and skills
- Encourage research and consulting assistance in basic production systems such as quality control, maintenance, materials handling and production scheduling

■ Responsibility

- Engineering schools in the major universities should begin development of these programs
 - Professional societies (after they are formed) could provide guidance regarding needed skills and knowledge
 - Professional guidance could be offered through the MIT Technology Application Program
-

Establish Production Management Curricula in Universities

■ Implementation

- Universities could assign a senior professor with experience in industry to begin developing the curricula. They might be based upon the experience MIT has accumulated in this field
 - Offer the program initially as a graduate or extension program to engineers already working industry
 - Students could more quickly apply the concepts
 - Professors would soon get a better understanding of what is useful in Egypt
 - Initial courses might focus on:
 - Methods for quality control and quality assurance
 - Materials handling
 - Shop floor safety
 - Maintenance
 - Production scheduling
 - Inventory control
-

Establish Measures of Productivity

■ Objectives

- To motivate managers to improve productivity. Kearney research in the U.S. has shown that companies that do not measure productivity obtain far less improvement than those who do
- To permit better evaluation of company performance when making pricing and investment decisions

■ Responsibility

- The prime responsibility for establishing measures of productivity must rest with the company managers
- In the public sector, the chairman of the holding companies can encourage measurement by requiring companies to report their results on measures of productivity
- MDP, as part of its program, can offer technical advice on measures companies might use

■ Implementation

- A list of measures that might be used is presented in Appendix II of this report
 - The information system that the Chairman of the Engineering Industries Corporation plans to install should include at least a subset of these measures
 - The measures developed by MDP as part of their work could be formally prepared in a workbook for companies and published
-

**Promote Company
Development**

- Help companies develop proposals for investors
 - Encourage local development of products and processes
 - Encourage exports
 - Publish a directory of suppliers
 - Encourage development of equity capital in manufacturing
-

Help Companies Develop Proposals for Investors

■ Objectives

- Encourage entrepreneurs to rapidly take advantage of opportunities
- Increase local content
- Mobilize private capital for investment in industry

■ Responsibility

- USAID could fund such a program under the sponsorship of an organization such as:
 - Federation of Industries
 - An investment bank
 - Egyptian American Business Council
 - E.I.D.D.C. could push the program through the Small Scale Industries Extension Services Department
-

Help Companies Develop Proposals for Investors

■ Implementation

- Survey banks and other known sources of loan and equity capital to determine:
 - The availability of money
 - Their information requirements
 - Their criteria for approving projects
 - Their terms

 - Review the list of attractive opportunities listed in the long-term plan with existing entrepreneurs. Where there is a fit between the list and the interest of an entrepreneur, begin development of a business plan (see below)

 - Where opportunity exists but no existing entrepreneur in the industry is interested, seek elsewhere for a potential entrepreneur:
 - Experienced executives currently in the industry who are willing to assume some risk
 - Entrepreneurs in related industries
 - Entrepreneurs interested in an automotive project not on the list who can be persuaded to switch
-

Help Companies Develop Proposals for Investors

■ Implementation

- Once an interested entrepreneur is identified, assist him to prepare a business plan including:
 - Marketing plan (products, markets, sales channels, prices, projected sales)
 - Manufacturing plan (technology employed, equipment needs, construction period, operations start-up)
 - Human Resources plan (organization structure, background of key people, source of new people)
 - Financial plan (projected revenues, costs, profits, assets, liabilities, cash flows, equity and loans)
 - Regulatory considerations (approvals required, exemptions, potential delays).

This plan should be presented in a format that meets the information needs of investors

- Help the entrepreneur to identify and approach potential sources of technology. Consider:
 - License or other participation of a foreign firm
 - Engineering company
 - Internal or local manufacture

- Assist the entrepreneur to approach potential sources of capital, for example:
 - Local investors
 - Banks
 - Islamic banks
 - Foreign manufacturers
 - Other foreign investors

**Help Companies Develop
Proposals for Investors**

■ **Implementation**

- Assist the entrepreneur to obtain foreign assistance if needed. Such an affiliation might take the form of:
 - Joint venture
 - Equity participation
 - License
 - Management contract
 - Marketing agreement

 - After acquisition of financing and technology is complete, help the entrepreneur develop an implementation plan
-

Encourage Local Development of Products and Processes

■ Objectives

- Reduce the costs of importing technology
- Develop products/processes that more closely meet local needs
- Develop a “can do” attitude toward improvements

■ Responsibility

- Companies must take initial responsibility by setting aside money and talented engineers for development
 - In the public sector, the Chairman of Engineering Industries Corporation could require submission of an annual product and process development plan
 - ITAP could undertake a program to promote development efforts in automotive companies
-

Encourage Local Development of Products and Processes

■ Implementation

- Implement pilot program for product development at NASCO**
 - Request ITAP to fund expert assistance to establish a product development program**
 - Invite a senior truck engineer to review the NASCO truck for opportunities to modernize the truck**
 - Request the engineer to lay out a recommended sequence of improvement projects with estimated savings for each**
 - Assign a talented, creative engineer to manage the program**
 - Invite the foreign engineer to return periodically to review progress**
 - Publicize the results**
-

Encourage Local Development of Products and Processes

■ Implementation

- Offer key technologies program to selected managers
 - Request ITAP to manage the program
 - Select a set of four automotive process technologies (e.g., heat treating, welding, stamping, and die casting)
 - Identify a group of managers across the industry who manage the technology. Include people from both public and private sectors
 - Invite an expert to come to Egypt to:
 - Lecture on the subject
 - Offer on-site advice on current problems
 - Use these lectures as a springboard to start a professional society dedicated to advancement of Egyptian expertise in each area
 - Send selected members of the society to the U.S. to attend annual convention of the relevant professional society there
 - Help members become familiar with the information aids available in Egypt (e.g., ITAP library) through on-site visits
 - Channel further assistance in the technical area through the society
-

Encourage Local Development of Products and Processes

■ Implementation

- Encourage outreach by assembly companies
 - Current NASCO effort could be usefully imitated by the other assembly companies:
 - Considers new proposals from any company - public or private
 - Offers a variety of assistance:
 - Drawings and specifications
 - Testing in NASCO labs
 - Sharing of development costs and even of some capital costs, e.g., dies
 - Assistance of NASCO engineers
 - Assistance of outside experts at NASCO expense
 - Outreach will be more effective if companies are held strictly accountable for commitments made when applying for license to manufacture
 - Assembly companies should be willing to consider changes in design or specifications to:
 - Meet the special needs of Egyptian consumers
 - Allow for the special limitations of manufacturing in Egypt. Such changes should not:
 - Reduce the attractiveness of the product
 - Increase costs
-

Encourage Exports

■ Objectives

- Increase exports to match imports of automotive products
- Encourage Egyptian companies to meet international standards of cost, quality and performance

■ Responsibility

- Ultimate responsibility must remain with the chairman of each company
- Nevertheless, a central export promotion office could provide guidance and coordination. This office could be a department of the proposed trade association
- Short-term expert assistance is needed to get the project started

Encourage Exports

■ Implementation

- Develop an export promotion campaign:
 - Survey the feeder industry to determine which companies are interested, their products and their potential markets
 - Retain expert counsel who is intimately familiar with European and North African automotive industries to prepare an export promotion plan based on the information gathered in the first step
 - Establish a Central Coordinating Council to:
 - Advise companies on effective export strategies
 - Prepare brochures touting the capability of Egyptian manufacturers
 - Provide an Egyptian presence at international trade fairs
 - Provide initial contacts in the international automotive industry when a company begins exporting
 - Assist manufacturers to select dealers and distributors abroad
 - Review tariff and customs rules to:
 - Permit rapid approval of export shipments (to less than one week)
 - Provide rebates of customs duties on raw materials included in the exports
-

Encourage Exports

■ Implementation

- Approach African and Middle Eastern markets first with:
 - High-volume replacement parts, for example:
 - Batteries
 - Belts
 - Filters
 - Tires (which Egypt once exported)
 - Seat covers
 - Special duty parts, for example:
 - Springs
 - Rubber parts
 - Radiators
 - Horns
 - Approach European aftermarket with:
 - High volume parts that have high labor content
 - Nearly obsolete replacement parts
 - Approach manufacturers in countries such as Turkey, Yugoslavia, Algeria, and Greece regarding mutual specialization and exchange of parts and assemblies that require a larger than national market to justify manufacture
 - Negotiate with licensors to:
 - Become suppliers to them
 - Obtain access to their distribution system
-

Publish a Directory of Suppliers

■ Objectives

- Help buyers and sellers more quickly find each other
- Enhance competition where it exists
- Enlarge markets through better information

■ Responsibility

- E.I.D.D.C./ITAP is initially best equipped to undertake this role

■ Implementation

- A small team (e.g., two members) should be established to conduct the necessary research and preparation
 - Research steps include:
 - Obtain a list of all suppliers to NASCO, General Metals, AAV and other assemblers
 - Obtain a list of automotive suppliers from the GOFi and E.I.D.D.C. data banks
 - Interview all members of the base lists to identify:
 - Their products
 - Their principal customers (especially distributors)
 - Their competitors
 - Interview known aftermarket distributors and major repair shops (e.g., Cairo Transport) to identify manufacturers who do not sell to assemblers
-

Publish a Directory of Suppliers

■ Implementation

- Compile the directory with the information arranged two ways:
 - By supplier by product
 - By product by supplier
 - Distribute the directory widely:
 - Charge no more than the cost of printing it
 - Promote it by mail to all companies in the directory
 - Arrange for distribution through an organization such as Al Ahran
 - In the second edition:
 - Solicit updates from companies already in the list by mail
 - Sell advertising space to companies (e.g., name in larger print, space and ads)
 - Focus fieldwork on identifying additional companies (not now on the list) serving the automotive industry
-

Encourage Development of Equity Capital in Manufacturing

■ Objective

- To provide the capital required for the rapid expansion of the industry
- To increase private sector participation in the automotive industry

■ Responsibility

- USAID could engage a financial specialist to study the availability of equity capital and how to increase it
- Federation of Industries would be logical sponsor given its membership

■ Implementation

- Determine the need for equity capital in the industry given target growth rates
 - Base the estimate on the list of projects outlined in the recommended long-term plan
 - Review resources of existing firms with owners
 - Determine the availability of equity capital
 - Contact sources of capital to determine the amount available and its application
 - Develop an understanding of the factors that determine the attractiveness of investments in other areas compared to the automotive industry
 - Propose methods for mobilizing sufficient capital for the industry
-

Acknowledgments

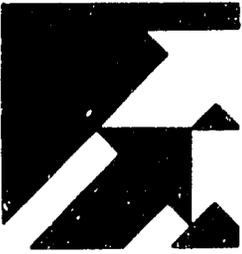
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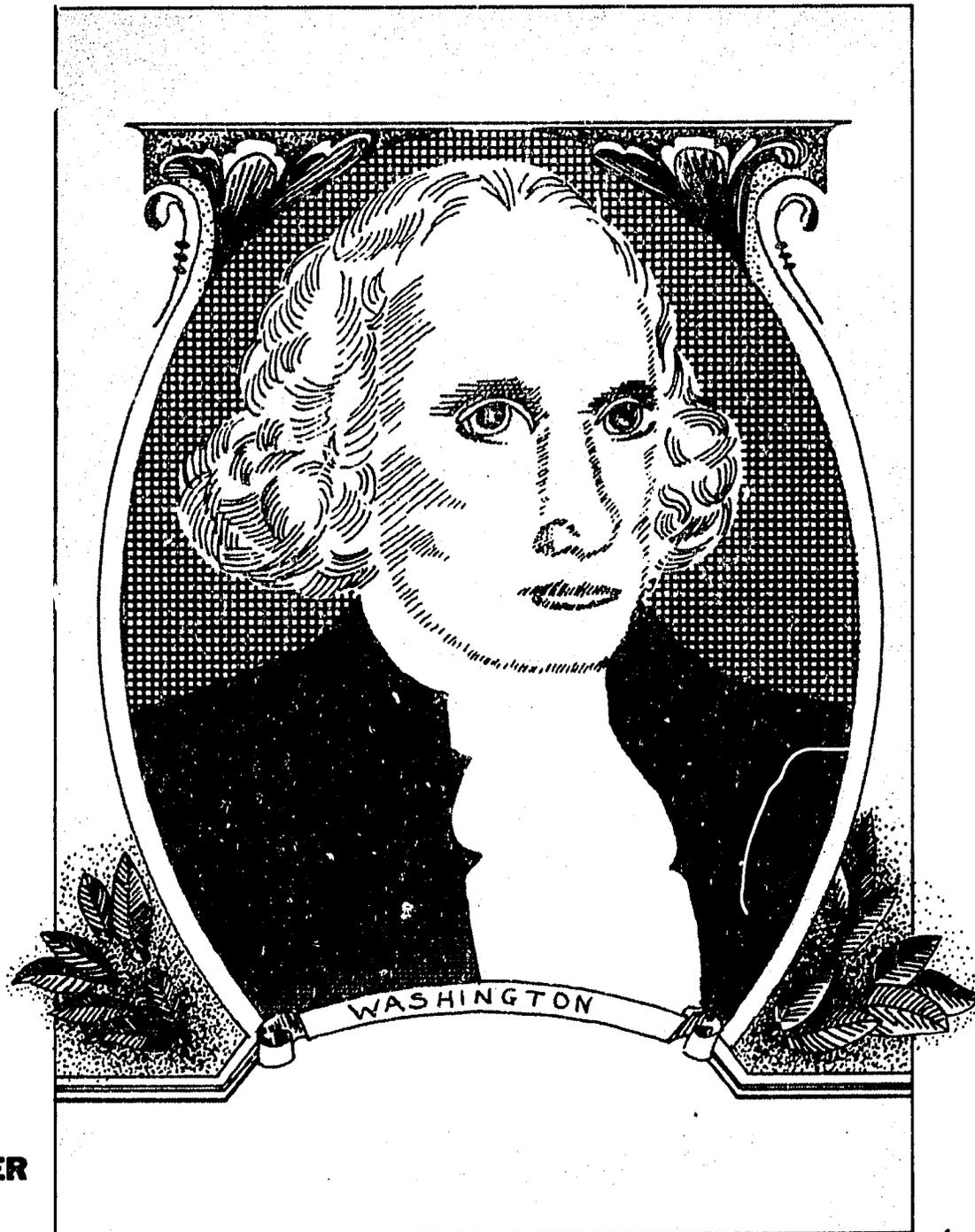
APPENDIX I

ACHIEVING IMPROVEMENT IN PRODUCTIVITY THROUGH GAINSHARING



Sharing the Productivity Payoff

By Carla O'Dell
Consultant



A gainsharing primer

Introduction

Productivity gainsharing and its companion concept profit sharing have been the subject of interest and experimentation since their inception in the 1930s. Devised initially during the Depression to link wage increases to the company's fate, gainsharing approaches eventually fell from favor as both labor and management looked increasingly to long term wage agreements and cost-of-living adjustments during the prosperous fifties and sixties.

But the turbulent decade of the seventies brought a renewed interest and there are now over 500 American plants with gainsharing plans and thousands of other firms with some version of profit sharing. More and more companies are asking their employees to link part of their compensation to the productivity of their work group or the fortunes of their firms.

Observers have long argued that the compensation practices of American firms respond too slowly to changes in business conditions. High salaries and wages are granted when productivity and profits are growing, but there is no way to cut back in hard times except to lay people off.

During the inflationary seventies, compensation far outstripped real productivity growth, but companies could pass through their payroll costs in the form of higher prices. No longer able to do so, they are looking for means of reducing labor costs to compete in the international marketplace. They notice that the major Japanese firms are able to vary their labor costs to reflect current market conditions by paying 10 to 50 percent of their compensation to lifetime employees in the form of semiannual bonuses. The Japanese model is one factor setting the stage for gainsharing.

In addition, employees are more willing to link their pay to productivity, which they now see as an urgent national issue. In a recent Harris survey, 63 percent of the American people and their leaders in business, labor and government agreed that sharing the gains of productivity improvements would have a significant positive impact on the problem. In another survey, a *Business Week* poll of executives found 83 percent would be willing to share the gains in productivity improvement with employees in return for wage and work rule concessions.

It is against this backdrop that the current experiments with gainsharing are being played out. While the general economic conditions set the stage, the reasons firms actually adopt gainsharing are far more specific to their particular situations.

About the author

Carla O'Dell is a consultant and specialist in human resource strategies, cooperative labor/management relations, gainsharing and employee involvement approaches to productivity improvement and organizational effectiveness.

O'Dell served as a senior advisor and consultant with the American Productivity Center for four years and continues to work closely with the Center. She has developed and managed Center projects and workshops including one on productivity gainsharing and approaches to employee involvement.

She frequently participates in productivity and quality of work life conferences as a trainer and speaker. Currently O'Dell is serving as moderator of the Center's computer teleconference discussions of reward systems and will prepare comments for the White House Conference on Productivity later in 1983.

A basic definition

Gainsharing — Any of several programs designed to involve employees in improving the productivity of their work group through better use of labor, capital, materials and energy. Gains resulting from "working smarter" are shared between the company and the employees according to a predetermined formula that reflects progress toward productivity and profitability.

Gainsharing plans are designed to share the value of improvements in productivity or financial performance over historical levels between a company and a group of employees (a department, a plant or the whole firm). In order to be considered gainsharing, the gains in improvement are shared in cash, and they are based on group performance. Individual incentive plans, such as piece rates or commissions, may be appropriate and effective reward systems, but they are not gainsharing. Individual rewards tend to put worker output ahead of plant or group output and lack a focus on overall productivity gains. Variations in which merchandise or time off with pay are the rewards may also be valid and effective, but they too are outside the mainstream of gainsharing.

There are four major gainsharing plans in use: Scanlon, Rucker, Improshare and profit sharing. Some companies have created their own approaches which tend to be hybrids of the four common plans. Though generally cited as a group incentive, profit sharing straddles the gainsharing fence since the payout from many such plans is a contribution to a pension fund and not cash.

Beyond their emphasis on cash payouts for group performance, gainsharing plans have several other dimensions in common.

All must be built upon some *historical base period*. In order to

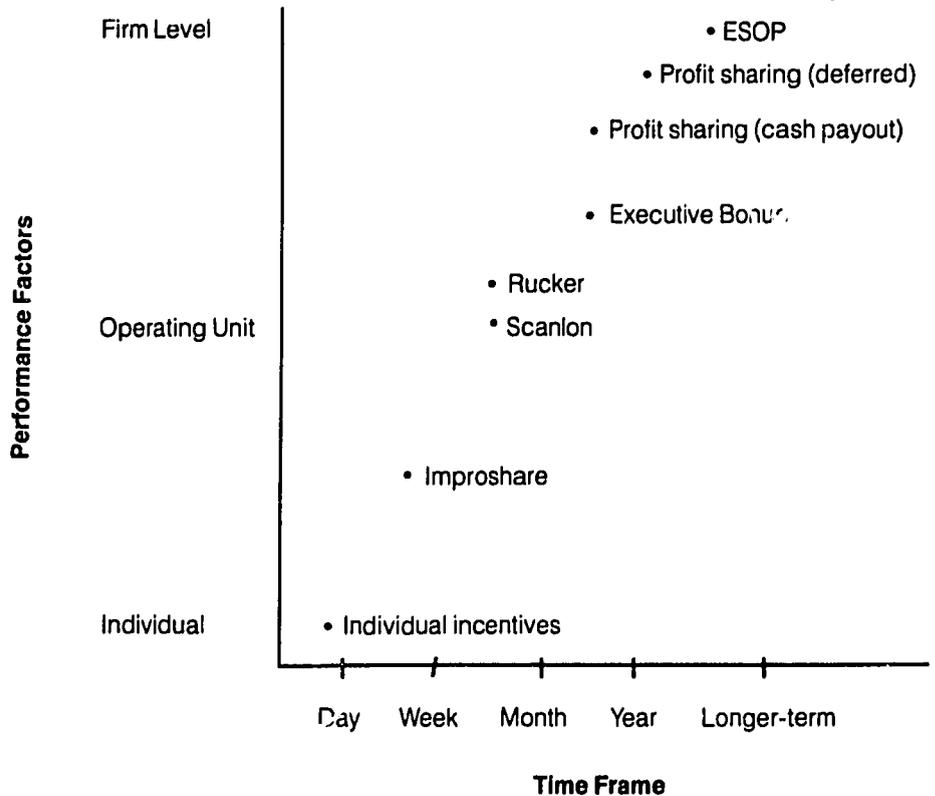
reward for improvement, some baseline measure of performance has to be established. Usually, the formula reflects average performance over a representative time frame of one to five years. When this level of performance is exceeded, a bonus is earned.

The company and employees *share the gains* according to a *pre-determined agreement* about what is an equitable split. The ratio varies with each plan. Improshare, which rewards for improvements in units per labor hour, splits the gains 50/50 with employees. Typically, Scanlon plans give 75 percent to employees. The Rucker split is based on the historical ratio of labor costs to value-added. Profit sharing splits are variable and reflect a perceived level of fair ROI or ROA before payout. Regardless of the split, the principle is always the same — it should be fair and acceptable to the company and the employees.

Time periods vary, but every gainsharing plan involves *paying a periodic bonus*. The bonus is calculated and paid weekly (Improshare), monthly (Scanlon and Rucker) or quarterly to annually (profit sharing). With each of these there are tradeoffs. The more frequently a bonus is paid, the more likely people are to see a relationship between the bonus and their performance. However, the short-term focus may not be in the best long-term interests of the operation as a whole. Companies often try to create a balance of long-term and short-term rewards. Figure 1 illustrates different gainsharing plans and other reward systems in terms of two dimensions — the performance factors on which rewards are based and the time frame in which they tend to be calculated.

A fourth characteristic of gainsharing plans is that bonus distribution is based on *group performance*. If a 10 percent bonus

Figure 1
Factors Affecting Payout



is earned by a group of employees, then every employee gets additional compensation (a bonus) during the bonus period amounting to 10 percent of his or her salary and wages. Most companies pay in a separate check so that there is no confusion between regular pay and bonus.

In Scanlon, Rucker and Improshare plans, some percentage (usually 25 to 30 percent) of the employee share of the bonus is held back each bonus period in a *deficit reserve*. This serves as a cushion for those periods when performance falls below historical levels. At the end of the year, any

money in reserve is distributed to employees as a lump sum, which can be substantial if the company and employees have had a good year.

Most companies with Scanlon, Rucker or Improshare plans try to *define the work group* to include everyone at a particular location in the gainsharing pool. The purpose is to increase *esprit de corps* and overcome some of the handicaps of the territorial boundaries that form between departments, management and blue and white collar employees. For profit-sharing plans the group can be the entire firm, spanning many locations.

Variations on a theme

Beyond these common features, gainsharing plans differ along two dimensions: 1) their formula and 2) the degree of formal employee involvement that accompanies the reward system.

Every company considering gainsharing must develop its own formula. It must decide whether measures of performance will be financial or physical and whether the measures will include labor-only inputs or other inputs such as material, energy and capital. (Figure 2).

Financial formulas, such as Scanlon, Rucker and profit sharing, have the virtue of reflecting market factors, so that employee earnings vary with changes in business performance, as well as the contribution of employees. But these formulas can also be distorted by inflation and shifts in pricing and costs. Many financial factors are beyond the direct control of people in the operation segment of the company — sales, pricing, marketing strategies, materials and supply costs. For this formula to work, employees need to understand how these financial factors affect performance.

Gainsharing formulas based on physical measures of labor productivity, such as Improshare and allowed labor, are not influenced by changes in base wages/salary or selling price of the product, but they are very volume sensitive. As orders for product decline, few companies reduce direct and indirect labor at the same rate; the result is often reduced labor productivity. It is also possible to be paying a bonus based on improved labor-per-unit ratios while the company is losing money because of market pressure to reduce selling price. Generally, physical performance formulas provide stronger motivation to production employees than office,

Figure 2
Types of Gainsharing Formulas

	Financial Measures	Physical Measures
Output/Labor	<p>Scanlon</p> $\frac{\text{Sales value of production}}{\text{Payroll costs}}$	<p>Improshare</p> $\frac{\text{Number of units produced}}{\text{Labor hours}}$ <p>Allowed Labor</p> <p>Allowed labor/unit - Actual labor/unit</p>
Output/Multiple Inputs	<p>Rucker (Value-added)</p> $\frac{\text{Sales value - materials and outside purchases}}{\text{Payroll costs}}$ <p>Profit Sharing (multi-cost)</p> $\frac{\text{Sales}}{\text{All costs}}$	<p>Total Factor</p> $\frac{\text{Total outputs}}{\text{All inputs}}$

technical and support functions.

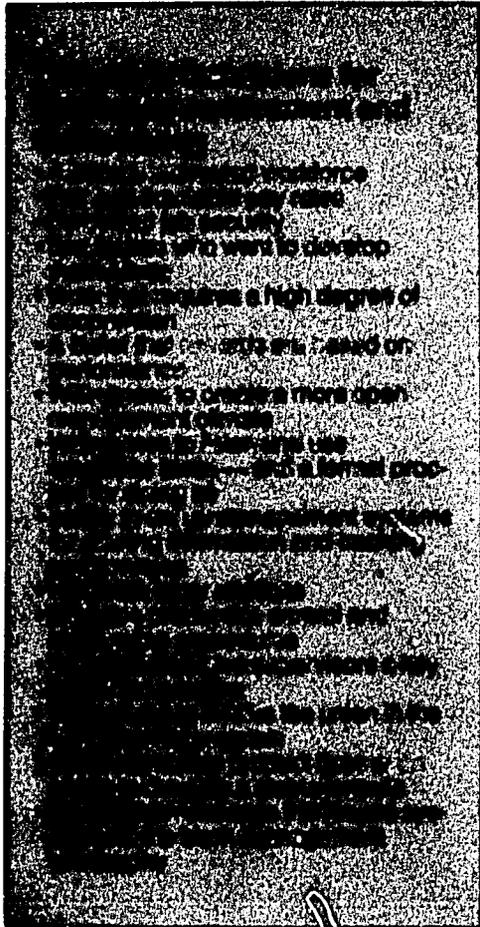
There is no "perfect" gainsharing formula — all reflect trade-offs and points of emphasis. Consequently, each company should give consideration to developing its own unique formula to reflect its business and philosophy. Though the process requires more planning on the front end than does adopting someone else's formula, the results will have a long-term payoff in employee support and increased productivity. (See box).

Formula issues tend to get the most attention when managers are exploring gainsharing options. However, the form and extent of *employee involvement* are proba-

bly a better determinant of a gainsharing program's ability to achieve productivity and quality of work life improvement. Employee involvement is the engine that drives gainsharing. It is the vehicle through which employees make the innovations on a daily basis that lead to long-term improvements in productivity.

The degree of involvement varies from plan to plan, and often evolves as gainsharing becomes a part of the organizational fiber.

Scanlon plan companies place great emphasis on employee involvement systems and participative management. Most start with a suggestion committee review structure, and then expand



For them, as for many other gain-sharing companies, there are many intangible benefits to involvement and the formula is a way to "keep score and reward people for playing the game."

Companies often embark on Improshare without much attention to developing employee involvement systems for handling ideas. Often suggestion systems will evolve out of necessity after the plan is implemented. Columbus Auto Parts is one company that started with Improshare and has added quality circles to the approach.

Experience has shown that gain-sharing plans without some mechanism for responding to employee ideas and sharing relevant information with them are unlikely to produce lasting changes in the workplace or to be sustainable during poor business conditions. Once employees are given the opportunity to share in improvements, they expect management to listen to some of their ideas. As one manager at Phillips Petroleum (which has several gainsharing plans) said, "Management must be willing and able to suddenly have a lot of partners their business." Plans that start up without adequate preparation to respond to employee ideas create a frustrated and uncooperative workforce and an overloaded maintenance and engineering function and reinforce employee perceptions that management is not really interested in making them "partners in productivity."

During an economic downturn, most well-designed gainsharing plans will stop paying a bonus. Without an involvement system, the plan itself is effectively inoperative. With a strongly supported involvement system, companies needn't rely on the bonus alone to drive productivity improvement. Their plans work as well or better during

downturns because employees are even more motivated to keep coming up with cost reducing and productivity enhancing ideas.

Variations on both formulas and employee involvement approaches are infinite. Choosing the most effective system is an important decision. That decision must be closely linked to the organization's reasons for embarking upon gain-sharing and the philosophy underlying the plan.

The reasons tend to fall into some major categories: 1) a financial, competitive or labor relations crisis, 2) a belief in the power of financial incentives, 3) the need to replace or supplement an individual incentive, and 4) a desire to extend participation and teamwork into the reward system.

Crisis as catalyst

A financial, competitive or labor relations crisis is often the catalyst that sends a firm searching for solutions they would never have considered in less trying circumstances. For example, many gain-sharing plans are being born at the bargaining table. One that seems to have the ingredients for success is the Ford/UAW agreement on profit sharing which went into effect on January 1, 1983. In exchange for giving up their annual three percent improvement factor, Ford workers will share in the gains when Ford's annual before-tax profits exceed 2.3 percent of domestic sales. Just as importantly, Ford and the UAW are committed to employee involvement at every location, a "mutual growth forum" for addressing issues of common concern, and intensive skill training programs. Ford employees may be more willing to accept a stake in the company's future if they feel they have some influence in shaping it.

While a contractual agreement often leads to gainsharing, it does

later to more sophisticated communication and decision-making systems.

Rucker plans are usually implemented with plant-level Rucker committees that review employee suggestions. But many expand later into small group participation activities, such as quality circles or labor-management teams.

One company which has expanded the involvement factor of its Rucker plan is Morse Borg-Warner in Denver. Managers there describe the gainsharing plans as a "Rucker plan with a Scanlon philosophy." They are referring to the strong formal and informal emphasis on involving employees in identifying and solving productivity related problems in their operation.

not assure the gainsharing plan's success. It is becoming apparent that gainsharing cannot survive a breakdown in cooperation. Corry Jamestown Furniture Company had a labor management cooperation program and Improshare from 1974 until recently. A breakdown in labor relations has severely jeopardized the gainsharing program.

Gainsharing alone is not enough to create committed employees and improved labor relations. Other aspects of the day-to-day relationships between employees and managers have to change as well. Companies have to change the way they manage. For many, that is more than they "bargained for."

Belief in power of incentives

When managers talk about gainsharing, their comments often echo the following statements:

"The only way to get people to work more is to pay them more."

"All these people care about is their paycheck."

"The first thing people ask when we talk about productivity improvement is, 'What's in it for me?'"

"They won't believe we are serious about productivity unless we put some money behind it."

To managers who, accurately or not, believe in the power of financial incentives, gainsharing provides a seemingly low risk, low cost way to give people more money in return for productivity improvement without being locked into permanent increases in compensation.

These managers are partially correct. People are concerned about their personal welfare and compensation; they do think that they should get a fair share of gains they help create. The danger lies in the tendency of these managers to ignore the other reasons people might be concerned about productivity — job security, their

own development, control over their jobs, etc. A commitment to sharing the gains will not, by itself, address those issues.

Replacement for individual incentives

Many companies in the manufacturing sector have individual incentive plans that are costly to administer, reflect standards that are difficult to maintain, and create endless friction and bickering between management, industrial engineering and employees. Many indirect employees are not covered by these plans, which contributes to a lack of cooperation between departments and difficulty transferring people between jobs.

Nonetheless, the incentive culture dies hard. Gainsharing is an acceptable alternative to scrapping incentives altogether. Instead of focusing on the output of an individual worker, gainsharing shifts the emphasis to the overall productivity of the work group — that is, the production of the finished products. Consequently, workers are more likely to appreciate the entire production process. Instead of every employee being a business unto himself or herself, there is now an incentive for cooperation.

Atwood Vacuum shifted their 1,900 employees from an individual incentive plan to Scanlon. Their plan covers four separate locations, making it easier to transfer people within the company. They have averaged a 13 percent bonus over the years with some years much higher.

Philosophical underpinnings

These three reasons for beginning gainsharing all arise from the organization's need to solve a particular problem — a financial or labor crisis, worker resistance to productivity efforts or friction

caused by individual incentives.

"Common fate"

But companies are now embracing gainsharing for other non-crisis reasons as well. As a part of their overall productivity and quality of work life strategies a small but growing number of companies view gainsharing as a means of extending participation and teamwork into the reward system. They see gainsharing as a move toward a "common fate" culture. This point of view stresses the importance of employees as valued members of the firm. As such, all employees should share in the gains and losses that affect their company (or operating unit) whether these changes are the result of market factors or their own internal productivity performance. (See box).

This philosophy is in contrast to the contractual point of view traditionally held by American manufacturing — a belief that the company "contracts" with employees to produce a particular level of performance, with clear job descriptions and clear lines of authority and influence. Rewards in such companies tend to be based on factors over which workers have immediate influence — labor hours, product quality and reduced waste. Because of this narrowed focus, the companies see little need to share financial and business information nor do they tend to encourage a high degree of involvement in decision making or problem solving.

The responsibilities of employees are far broader and less clearly defined in a common fate culture. The emphasis is on creativity, cooperation, occasional self-sacrifice, a high degree of job security and ongoing employee development.

Characteristics of Philosophical Positions

	COMMON FATE	CONTRACTUAL
Philosophy	Shared responsibility, commitment, rewards	Fair day's work for a fair day's pay
Objectives	Increased productivity, profitability, quality, satisfaction and loyalty	Increased productivity, quality, or efficiency — focus on labor
Major Constituencies	All employees, customers, stockholders	Managers, stockholders, customers, employees
Employee Involvement	Extensive, within and between levels and functions; "way of life"	Programs — quality circles, etc.; employees; usually no formal system
Education & Training	Economic education; multiple skill training; problem solving and group process	OJT; feedback on job performance
Gainsharing Structure	Designed and administered by management-employee committee; formal, early union involvement	Management designed and administered
Job Security	Formal commitment; a key consideration in all decisions	Labor as variable cost; layoffs common during business downturn
Information Sharing	Open books — share broad information: profits, productivity, quality, costs, capital spending plans	Limited to information in bonus computation
Types of Formulas	Single split ratio (Scanlon); Value-added (Rucker); Multi-cost; Profit sharing	Improshare; skowd labor; production bonus

Companies who have or are developing the common fate — or "we're all in this together" — philosophy, tend to create formulas that are more comprehensive than a labor-only calculation. The formula often includes "bottom line" business factors — financial performance will determine the long-term ability of the company to maintain jobs and grow through increased investment.

Consequently, employees need to understand the financial factors affecting performance and need to become more knowledgeable about the business as a whole. A

management that hesitates to share financial information with employees — especially in organized settings — will find it has nearly insurmountable problems in implementing this philosophy.

Conclusion

Armed with an understanding of the basic concepts and philosophies underlying gainsharing, any organization can strengthen the link between productivity performance and rewards within the organization. From the experi-

ences of companies that have successfully implemented gainsharing programs emerges the following advice.

First, design your own formula, based on the key leverage point in the organization and on a desire to build a common fate rather than contractual culture. Make the design process a model for what you want the organization to be; that is, involve key people from all departments, get early union involvement in the exploration, build commitment and understanding through involvement rather than trying to sell the program later. Don't underestimate the time or energy involved in designing and implementing the formula.

Second, begin with the basic premise that employee involvement will be an integral part of gainsharing. Start with employee involvement if that makes sense in your organization, or initiate gainsharing and involvement together — but do them both. Involvement has implications for behaviors across the organization. Management will have to change toward a more responsive and cooperative mode. Engineering and maintenance as well as other critical management systems will find themselves under scrutiny from people who will turn to them to help implement solutions. Be prepared to get rid of internal barriers.

Third, even though barriers are overcome, it will take time for improvements to build up to produce major changes, so temper peoples' expectations. The best way to do that is through education and communication about how the formula works and about operating numbers and data. This communication cannot be limited just to the start-up phase of the effort but must be sustained and designed to incorporate new employees. They will need to be oriented to understand that this common fate culture

is different from any situation they may have ever worked in before.

Fourth, sustaining the program will require a degree of organizational stability. Be sensitive to the need for stable management — don't transfer the location manager, who has championed gain-sharing, to another site six months into the program. Provide supervisors and managers with the skills they need as the involvement program evolves.

Finally, never assume that the gainsharing effort has been perfected and can be cast in concrete. Conduct a formal annual review of the program to see how it is working, what problems have arisen and where it needs to be changed. Then get consensus around those changes.

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'Gain-sharing': the West's answer to quality circles?

Manufacturing firms are learning to share productivity profits with workers; some say the plan benefits everyone

North American companies are taking a fresh look at an old worker-incentive idea, gain-sharing, as productivity in manufacturing becomes more and more a nagging concern. Increasing threats from more efficient offshore competitors, especially the Japanese, have driven U.S. managers to look for low cost ways to raise their output. Sharing productivity gains with their workers – quickly, and in hard cash – has proven a remarkably successful solution for some.

Not all will talk about it, or even admit it is what they are doing. "One reason they don't broadcast it is it's a secret weapon," suggests Robert C. Scott, vice president of the Eddy-Ruckers-Nickels Co., a Cambridge, Massachusetts, firm that advises companies how to use a gain-sharing variant known as the Rucker plan. The advantages? "It gives you something on the order of 20% free gain in productive capacity," he says.

Seditious idea

Yet not all companies feel it's right for them. "There is the group that somehow suspects this is seditious to what they were taught in business school," he says. "They bristle at the thought that you can manage 'things' but you have to motivate people."

Nevertheless, a growing number of companies are implementing gain-sharing plans, or at least are considering them. Scott believes that from 300 to 700 companies use some form of gain-sharing. Carla S. O'Dell, a Houston consultant whose definition of gain-sharing is broader than Scott's, thinks the figure is close to 1,000.

Management consultants A.T. Kearney Inc. recently surveyed 456 leading companies engaged primarily in manufacturing and found that while only 18 had "gain-sharing" plans, 85 others were considering some change in pay systems for their hourly workers. "Of those, 61 of the 85 were seriously considering gain-sharing," says Thomas J. O. Neill, a principal at the firm's Chicago headquarters. "A lot of those who have them in place are very small companies," he says. Scott concurs, explaining:



Large gains in productivity were achieved in the first year by President C. Jonathan Hauck III (left) and Vice President F.F. Karabasz of Hart & Cooley, a U.S. manufacturer of heating system equipment.

Old schemes had loopholes that allowed workers to abuse incentive systems

Inequities have been wiped out, and morale is on the mend at Hart & Cooley

"The place to use it is in a plant of 60 to 500 people, where the market can accept a higher volume of product, and the hourly workers can affect the market acceptance."

Hart & Cooley, a Holland, Michigan, subsidiary of the U.S. multinational Clevepak Corp., is a manufacturer with 550 hourly employees. The company recently started using a custom-designed gain-sharing system, and within one year factory productivity increased somewhere between 22% and 24%, depending on which measure is used, says C. Jonathan Hauck III,

tions" – to compensate for circumstances seemingly beyond the workers' control – which would give a worker credit for problems such as bad parts arriving on assembly lines, a malfunctioning machine or anything else the industrial engineer didn't factor in his formula when he originally described the job. If an employee could convince his supervisor that he had to work in a "non-standard" situation, the theory went, he shouldn't be penalized and his production requirements were lowered. The effect was that he would get paid more for producing less.

Also, if the "standard" was somehow set lower than it should be – that is, if, as in one example, the industrial engineer doing the rating was made to believe that two parts per hour is a normal work pace when in fact it is no strain to make three parts per hour – then an employee could get an incentive bonus pay intended to reward him for fast work, when in fact all he was really doing was working at a normal pace. "If an employee sees a way to do the job faster," says Karabasz, "his incentive is to do it faster and make sure you don't find out about it."

Besides not really encouraging optimum performance, this plan had other disadvantages, says Karabasz:

- It tended to encourage an adversarial management/labour relationship.
- It tended to foster resentment of employees who had the more lucrative jobs.
- It tended to force managers into the role of policemen. "I would say that most managers would like to be a lot of things – partners in productivity, if you will – but not policemen," he says.

Because the plan was causing divisiveness between employees as well as the management/labour split, the union agreed to a clause in the 1981 contract recognizing that the Bedeaux-based compensation system had become outdated.

Union pressure

The clause went on call for "a complete review of these jobs and the method of incentive pay". But this was no benign declaration. It gave management one year to come up with something better. On top of that, it called for a union approval vote of the new system, which was heavily loaded against failure: it would be a strike vote if the union disapproved. It was spelled out

that way in the contract. Says Karabasz: "We had a lot of pressure to design a plan that was accepted."

With the help of consultants Kearney, Hart & Cooley management cobbled together a plan which would take into consideration the transition to be made from the old plan, as well as meet management's needs for a system to promote better productivity instead of just appearances of better productivity, something the loopholes in the old system seemed to encourage.

Karabasz admits that he was opposed to the idea of gain-sharing at first. "There are some real problems when you think about this concept," he says. "The basic one is sharing. For example, we made one change last year. By not putting a screw in a register, we saved \$244,000. Under Bedeaux, we would get all of that. Under gain-sharing, we get half," he says. But experience has converted him. "Do we really want to give that up?" he asks. "The answer is yes, because now, what's good for one is good for both."

Some doubts persist

After a three-month trial period, management convinced enough workers, and won their approval in a vote. Not everybody likes the new system. Says Robert E. Otis, director of personnel administration: "Of 550 employees, 95 were really milking the system. They weren't cheating – it was mostly loose standards which we couldn't get at."

To compensate some workers who had very lucrative jobs, management "bought out" their contracts by compensating them for lost wages. There's some disgruntlement still, managers say, but overall the new system raised morale because perceived inequities have been wiped out.

The "small group gain-sharing", as Hart & Cooley has named the system, works like this: hourly employees are divided into 15 groups, depending on what they do. Auxiliary jobs whose contribution to productivity can't be directly measured are also in groups, such as toolroom, maintenance and receiving.

Direct-labour groups are measured on two criteria: first, the number of units produced, compared with the number of units expected to be produced, based on time standards. Whatever surplus is produced

Hart & Cooley President Hauck says gain-sharing netted his company about \$1 million additional margin.



Management to allow an in-depth examination of how the new system works. The reason Hauck is so delighted is that his 1983 sales will come in at \$56 million to \$60 million, \$10 million will be pretax profit and, he projects, one-tenth of that – one million dollars – is directly attributable to the gain-sharing system.

Hart & Cooley is a major manufacturer of registers, grilles, diffusers and chimneys for heating and cooling systems in buildings. F.F. Karabasz, vice president and director of manufacturing, explains that since 1932 the company had been using a standard-hour plan, a modified Bedeaux plan.

The standard hour plan worked this way: each manufacturing job – stamping a vent cover, for example – is rated by an industrial engineer as requiring a fixed number of minutes to do. "The system says an average employee with an average amount of skill will do 60 minutes worth of work per hour," says Karabasz. Any extra production was rewarded with incentive pay.

This kind of plan, in theory, should encourage employees to produce as much as possible, but it didn't always work that way. There were loopholes. The plan also has a provision for "non-standard condi-

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over the average production from an earlier base period gives the group credit.

Second, the amount of productive time versus the amount of non-productive time – for whatever reason – is measured against a base-period ratio. Together, these two measures show productivity first as units of merchandise produced over time, and, second, as the proportion of time on the job actually spent working instead of doing something else – or doing nothing.

Now, the incentive is clearly to produce as much high-quality product as quickly as possible, with as much time spent working on functioning equipment as possible. Overtime works against the worker, since it shows a lower ratio of units produced over time. And downtime, no matter whose fault, also works against the worker, since it counts as "diverted indirect labour" and lowers the productive non-productive time ratio. There's no system to "milk" any more – the only thing that counts is the end result: productivity.

And the reward is money.

Here's how it came out for the week ending August 5: the steel and shear group, in charge of certain fabricating and slitting operations, scored highest, at 19.2% above standards (standards being hhs c,mbination of the two criteria, as they were performed during a base period before the gain-sharing system went into effect). The press group scored lowest, at 4.5% above standards. Indirect labour groups automatically get scores of the plantwide average, since there's no way to measure their productivity directly, and it is assumed that their work has a real effect on plantwide performance. The plantwide average for the week was 11.4%.

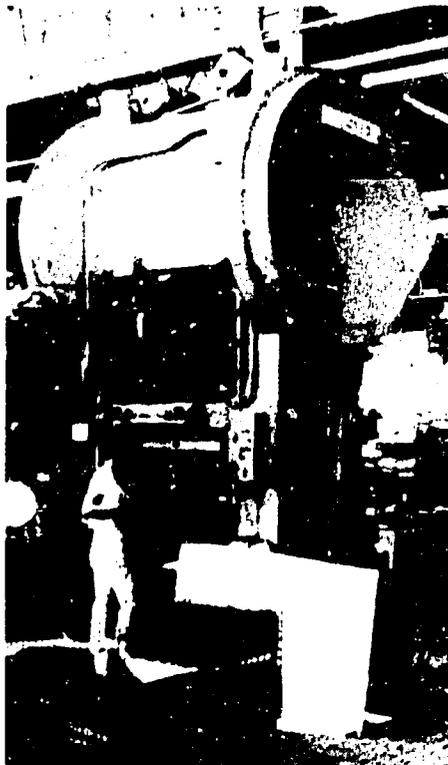
So in the pay cheque of a week later, a \$1-an-hour steel and shear worker received, before deductions, not \$400 for 40 hours but \$476.80, which incorporates his 19.2% bonus. The press group worker only gets 4.5% bonus. Comparing gain-sharing to Japanese management, Hauck says: "Quality circles are time-consuming. Our system pays off now."

Standardized designs

Hart & Cooley's plan was custom-designed, but other plans, such as the Rucker plan, are more standardized. The original gain-sharing plan in the United States originated in the 1930s from a visionary American steel worker, Joseph Scanlon, and the original plans at U.S. factories were Scanlon plans.

Carl F. Frost, a Lansing, Michigan, consultant who has helped many businesses install these plans, doesn't see much of a limit on the size of organization that can benefit, noting that organizations with from 30 to 3,000 employees are doing so now.

In brief, Scanlon plans measure gains on sales dollars compared with labour costs. Rucker plans measure the value-added in manufacture compared with labour cost



Workers in a Hart & Cooley steel and shear group took home a 19.2% bonus one recent week. "Our system pays off now," says President Hauck.

and Improshare plans measure the amount produced compared with the number of hours worked, assuming a time standard for production, as in all standard-hour plans.

Improshare is a copyrighted programme designed by Mitchell Fein, an industrial engineer based in Hillsdale, New Jersey. "There is no question that when workers are involved in productivity improvement, the improvement is much higher than when they are not involved," he says. There is more to gain-sharing programmes than simply changing around compensation formulas, he claims. "You first develop credibility and trust, and productivity is increased as a by-product." Fein says he has put 150 companies on Improshare plans.

One of them is the Hamilton, Ontario, plant of Firestone of Canada. Robert E. Granatier, personnel manager, says the plant started an Improshare programme in 1980, and measured productivity gains have been as high as 16% in a single week over earlier base periods. He says that the other promise – better labour relations – came true as well. "One thing it did was break down a lot of barriers. We have seen supervisors go from the old 'hammer over the head' attitude to one of working together," says Granatier.

Motorola Inc., based in Schaumburg, Illinois, has developed a more complex participative management programme which decentralizes management and includes gain-sharing among its features. E.L. Simpson, corporate director of participative management programmes, says: "Not only

is there a dramatic impact on cost, but on the balance sheet as well." Programmes in Phoenix, Arizona, operations have cut scrap production by two-thirds, dropped work-in-process inventory by one-half and reduced employee turnover by half, as one example, he says.

Naturally, gain-sharing programmes do not always work as they were intended. Robert M. MacQueen, director of human resources for diversified multinational Rexnord Corp., based in Milwaukee, tells of a plan at the company's roller chain operation, which started in 1976 but was ended last year. "The plan is very much price-affected," he says, "and the basic assumption is that wages and prices will go up in the same amount."

Payouts vanished

The plan worked very well in increasing productivity, but meanwhile the market for roller chain – used as a drive chain for motor cycles, for example – was collapsing. There weren't enough profitable sales in recent years to transfer the benefits of the plan into dollars and payouts disappeared. The company and the union went back to piece work incentives. Had the market for Rexnord's roller chain held, however, "I suspect it would have been a very good plan for us", MacQueen says.

There is also some suspicion on the part of labour. John L. Zalusky, an economist with the AFL-CIO, a major association of industrial unions, says: "The preference of unions is normally a fixed income stream." Though he feels it's a fair trade to give workers part of the additional income for being "innovative and creative" in their approach to work, he says, "the normal production workers should not have to do the work of the industrial engineer".

Zalusky also worries that an obsession with productivity can lead to a neglect for the union concerns of occupational safety, environmental protection and advancement of women and minorities, all of which he admits "no doubt cost more to employers".

However, consultant O'Neill says the changing nature of the workforce – fewer direct production jobs as more sophisticated technology enters the factories – has made gain-sharing an increasingly attractive alternative to more traditional compensation concepts.

"It makes less sense to focus on direct labour when a majority of the workforce is indirect labour," he says. "Under an incentive system where a guy comes up with an idea where he can be finished by noon and he says, 'I can't do that, management won't let me', nobody wins. With gain-sharing, both parties benefit, and people respond to that. They'll say, 'not only is management willing to listen to me, but to share the results with me'."

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APPENDIX II

PRODUCTIVITY ANALYSIS GUIDE

PRODUCTIVITY ANALYSIS GUIDE

Following this page are a set of measures of productivity for each functional activity of a typical manufacturing company. Below each set of measures is a set of questions that an analyst might ask when pursuing opportunities to improve productivity.

Not all measures are applicable to every company nor are they equally important. Measures marked by an asterisk (*) would provide sufficient data for a basic productivity improvement program. As greater understanding develops, additional measures (including some designed for the specific situation) should be added.

Many of the measures are not meaningful if data for only one point in time are available. The most important consideration is the trend. Is performance improving or getting worse? Because each company's situation is unique, these trends are usually more important than comparisons of these measures with other firms.

AUTOMOTIVE FEEDER INDUSTRY
PRODUCTIVITY ANALYSIS GUIDE

MARKETING MANAGEMENT

Measures

- Company's market share (trend--last 5 years)
- * Growth in sales/growth of market (trend--last 5 years)
- Actual sales/planned sales
- Number of new competitors in last 5 years/number of competitors
- Advertising costs/lead
- Advertising costs/L.E. increase in sales
- * Number of new products marketed in the past 5 years/total number of products now sold
- Value of sales of products new in past 5 years/total sales

Questions

- Does the company have a long-range business plan?
- Is the market defined?
- Does a market plan exist?
- Are factors known that determine market size and growth?
- Does a list of customers and potential customers exist?
- Are customer buying factors known?
- Are competitors' prices known?
- Are data on product, customer and salesman sales and profitability known?
- Does an effective advertising/promotion plan exist?
- Does marketing have responsibility for suggesting/justifying new products?
- Does the company have someone with skills in product/market analysis?
- Are customers regularly contacted regarding their product needs?
- Are new products or markets being identified?

PRODUCTIVITY ANALYSIS GUIDE

SALES

Measures

- * Growth in sales (last 5 years)
- * Actual sales/planned sales
- * Sales/salesman
- Sales/customer
- Market share
- * Sales expenses/total sales
- Percent of customers contacted/year
- Number of accounts sold/total accounts (actual and potential)
- * Sales to new accounts/total sales
- Sales of new products/total sales
- Profit/sales
- Bad debts/sales
- Accounts receivable/sales

Questions

- How large is the salesforce?
- How detailed is the sales plan?
- How are goods transported?
- What sales planning information is available?
- Is there a sales training program?
- What promotional materials are available?
- Are customer files (annual requirements, buying factors, buyers, etc.) maintained?
- Do salespeople prepare call reports?

PRODUCTIVITY ANALYSIS GUIDE

CUSTOMER SERVICE

Measures

- Lead time on orders (products, parts)
- * Percent of orders filled on time
- * Value of finished goods inventory/cost of goods sold
- * Number of monthly orders/number of customer service personnel
- * Number of days required to prepare and send invoices
- Average response time to a service call

Questions

- Does a general sales forecast exist?
- Does a product sales forecast exist?
- Have goals been set for days of inventory on hand?
- Are finished goods inventory data on a computer?
- Do formal rules for inventory replenishment exist?
- Have goals been set for shipping orders?
- Are backorders monitored?
- Does a service force exist?
- Are accounts receivable computerized?

PRODUCTIVITY ANALYSIS GUIDE

NEW PRODUCTS

Measures

- * Number of new products developed in each of last 5 years
Number of products new in past 5 years compared to total products
- * Sales from products new in past 5 years/total sales
Average cost of developing a new product
Number of projects completed on time last year/all projects completed
Number of projects completed/number of projects under way
- * R&D manpower/new products introduced/year
R&D staff/number of engineers in the company
R&D staff/total staff of the company
- * R&D expenditures/sales
R&D expenditures/increase in sales/year
- * Outside ideas considered/inside ideas considered
- * Technical conferences attended/R&D staff member

Questions

- How many people spend full time on R&D?
- How many projects are now under way? (Please list)
- Are there goals and time plans for each project?
- Is actual time usage of staff members measured and reported?
- Are ideas from the outside eagerly sought?
- Is there a defined program for finding useful licenses?
- Is the company's product technology up to date?

PRODUCTIVITY ANALYSIS GUIDE

PROCESS IMPROVEMENT

Measures

- * Value of cost reductions implemented during each of the past 5 years
- * Cost of cost reduction programs completed/expected first year savings
- Number of cost reduction programs under way/number of products sold
- Cost reduction programs completed within budget/number of cost reduction programs completed

Questions

- Is there a defined program for cost reduction?
- What is the scope of process improvement programs (material changes/substitutions, sequence of operations, new equipment evaluations, change of labor standards, change of handling methods, others)?
- How many people are assigned full time to cost reduction?
- How are targets for process improvement selected?
- Are time and cost of process improvement programs measured? Reported?
- Are suppliers of technology regularly queried about process improvements?
- Are suggestions of suppliers of technology regularly considered and implemented?
- Are vendors regularly asked to help solve process and cost problems?

PRODUCTIVITY ANALYSIS GUIDE

NORMAL PURCHASING

Measures

- Number of orders/year for the last 5 years (separate foreign and domestic)
- * (Number of orders/year)/number of purchasing personnel for past 5 years
- * Value of purchases/value of sales
- * Cost of purchasing/value of purchases
- Cost of purchasing/number of purchases
- Value of purchases/number of purchases
- Percent of shortages in received orders
- Percent of orders arriving after due date
- Labor cost/requisition
- * Average delay from receipt of a requisition to issuance of a purchase order
- * Average delay from issuance of a purchase order until physical arrival of goods (separate foreign and domestic)
- Average delay from physical receipt until formal acceptance
- * Average total delay from receipt of a requisition until formal acceptance (foreign and domestic separately)
- Number of domestic purchases/number of foreign purchases
- Number of blanket order purchases/total number of purchases (separate foreign and domestic)
- Number of open tenders/total number of purchases
- Number of competitive purchases/total purchases
- Number of no bid tenders/total tenders
- * Number of rush or urgent purchases/total purchases
- Percent of purchase orders for which an early payment discount is received
- Scrap sales as a percent of purchases (by year for the past 5 years)
- * Days of production lost due to lack of material or parts

Questions

- Have purchasing guidelines recently been revised?
- Is a definite effort made to buy repeatedly from vendors who give good service?
- Are most vendors prequalified?
- Are any purchasing files maintained by computer?

PRODUCTIVITY ANALYSIS GUIDE

NORMAL PURCHASING (Cont'd.)

- How are late purchase orders identified and followed up?
- Are small purchases delegated to plants and offices?
- Are forms prenumbered?
- What percent of raw materials are covered by more than one source of supply?
- Are employees who prepare requisitions trained to make ordering decisions?
- Is explicit consideration given to factors such as delivery costs, lead time, previous vendor performance considered?
- Are files kept of:
 - Prices
 - Purchases by vendor
 - Specifications by item
 - Vendor catalogs
 - Maximum and minimum stock levels
 - Transportation companies and costs?

PRODUCTIVITY ANALYSIS GUIDE

VALUE ANALYSIS

Measures

- Number of items subjected to value analysis in each of the past 3 years
- * Number of items analyzed/total items bought (for each of past three years)
- * Estimated value of annual savings generated by value analysis in each of the past three years
- Number of vendors inspected/total number of vendors

Questions

- Is anyone assigned full time to value analysis?
- How are items selected for value analysis?
- Are statistics maintained on value of purchases by item by year?
- Are statistics maintained on vendor performance or on performance of items bought from individual vendors?
- Have items purchased externally been considered for internal manufacture? Have any been made internally?
- Have services as well as products been analyzed for lower cost or better value?
- How many inspections of vendors have been made in each of the past three years?

PRODUCTIVITY ANALYSIS GUIDE

PRODUCTION PLANNING AND CONTROL

Measures

- Number of revisions to the annual forecast
- * Percent of orders completed on time against the schedule
- Percent of items produced that are scheduled at least one month in advance
- * Percent of orders requiring expediting to meet schedule
- * Percent of production runs interrupted by lack of parts or materials
- Percent of machines scheduled on a daily basis
- * Annual cost of production/value of work in process
- Value of work in process/value of average daily issues of finished production
- * Plant utilization rate (last 3 years)
- Cost of goods produced annually/average value of raw materials and work in process
- Days stockouts of critical materials
- * Value of obsolete and scrap material/value of raw materials
- Value of excess of obsolete or raw materials generated annually/value of raw materials used

Questions

- Is an annual production plan prepared?
- Is a monthly production plan prepared?
- Are machines scheduled daily?
- Are production orders issued to individual departments?
- How up-to-date is status of each job?
- Are statistics maintained of actual versus planned time by machine? By completion of each job?
- Are any parts of the scheduling process performed by computer?
- Have standards been set for the time and materials required for each step of each job?
- Do bills of material exist for each product?
- Do routing sheets exist for each product?
- Are records kept of the quantity of production (good and bad) at each step of the process?
- Are records maintained of machine utilization?
- Have staff members had formal training in production planning techniques?
- When was the production planning procedure formally reviewed and revised?

PRODUCTIVITY ANALYSIS GUIDE

PRODUCTION MANAGEMENT

Measures

- * Cost of labor/value of output
- Value of labor/value of materials
- Percent variance against standard cost
- * Percent of production orders completed on time
- * Value of scrap/value of good production
- Value of returns/value of shipments
- * Hours of downtime due to lack of labor or materials/
operating hours
- * Overtime hours/total labor hours
- Average lead time from start of production to completion/
standard lead time
- Total days delays in shipments/number of shipments
- Set-up time/job
- Set-up time/total machine time
- Energy usage/value of output
- * Value of output/worker hour
- * Total compensation/worker hour
- Value of output/L.E. of invested capital
- * Indirect labor hours/direct labor hours
- Hours of training/total labor hours
- * Maintenance hours/direct labor hours
- Jobs run with preset standards/jobs run without preset
standards
- Value of actual output/value of maximum output

Questions

Does production management work against a plan?

How frequently does it change?

Does management have statistics available on:

- Job status
- Cost of jobs
- Time and materials for each job
- Overtime
- Scrap, reject and rework rates
- Completed jobs
- Raw materials inventories
- Work in process inventories
- Actual versus requested ship dates
- Backorders
- Accidents (cause and severity)
- Equipment downtime
- Machine utilization
- Maintenance costs

Have any production managers been trained in the use of
computers in managing production?

PRODUCTIVITY ANALYSIS GUIDE

MATERIALS HANDLING

Measures

- Materials handling costs/manufacturing costs
- * Materials handling personnel/total manufacturing personnel
- Number of material handling moves/total number of operations
- * Hours of material handling labor/hours of direct labor
- Average delay between moves of work in process
- Percent of material handling equipment in working order (daily trend)
- * Cost per ton-kilometer of transportation to and from the plant
- Cost of damage due to material handling
- Number of "lost jobs"/total jobs in progress

Questions

- Is material handling an identifiable unit? Does it have a professional manager?
- When was the last formal study performed to minimize material handling?
- Are excessive amounts of work in process stored on the factory floor?
- Are sufficient machines and people available for materials handling?
- What percent of items are handled on pallets or in bins?
- What percent of warehouse space is utilized?
- Are finished goods packaged to avoid damage en route to customers?

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MAINTENANCE

Measures

- * Maintenance cost/total manufacturing costs
Maintenance cost/book value of equipment
- * Maintenance man-hours/total direct manufacturing man-hours
Maintenance man-hours spent on maintenance/total maintenance man-hours
- * Scheduled maintenance man-hours/total maintenance man-hours
Man-hours of preventive maintenance/scheduled man-hours of preventive maintenance
Man-hours of emergency maintenance/total maintenance hours
- * Spare parts inventory/annual spare parts usage
- * Hours of machine downtime/total available machine hours

Questions

- Is all maintenance directed by a job order?
- Is maintenance formally planned?
- Are the following kinds of data available:
 - List of jobs to be done
 - Standard times for repetitive jobs
 - Historical file of time and cost of maintenance for each machine
 - Historical usage of spare parts by category
- Does the company have a preventive maintenance program?
Is it implemented?
- Does the company have a planned program of equipment replacement?

PRODUCTIVITY ANALYSIS GUIDE

PLANT AND FACILITIES

Measures

- * Value of plant and equipment/value of sales
Value of sales/square meters of production, warehouse,
and administrative space
- * Actual output/capacity
Unused or underutilized space/available space

Questions

- Does the company have a long-range facilities plan?
How could the company grow before facilities become a
constraint?
- Is the plant laid out for efficient flow of materials?
- Are there significant constraints on company performance
due to location or lack of transportation?

PRODUCTIVITY ANALYSIS GUIDE

QUALITY ASSURANCE

Measures

- * Value of rejects plus cost of rework/value of production
Number of rejects and reworks/total production
Cost of quality control/value of sales
- * Value of returns and credits from customers/value of shipments
- * Cost of quality assurance/cost of production

Questions

- Are products tested for quality assurance before they are sold commercially?
- Are all quality control procedures documented?
- Are data on quality problems systematically maintained so that potential problems are identified early?
- Are quality control data used to improve production processes?
- Do quality assurance personnel meet with customers to review quality problems?
- Is a file maintained of all customer complaints of quality?
- Are vendors monitored for quality performance?
- Are job records sufficiently detailed that quality problems can be traced to their source?

PRODUCTIVITY ANALYSIS GUIDE

GENERAL ACCOUNTING

Measures

- * Days delay from end of reporting period to report submission/target delay
Total absolute value of revisions made after submission/equity of the company
- * Cost of accounting department/value of sales
Average collection period/target period
- * Accounts receivable/accounts payable
Cash and equivalents/average daily sales
- * Current assets/current liabilities
Debt/total assets
Interest charges/cash flow
- * Net profit plus interest/total assets
- * Net profit/net worth

Questions

- Are any accounting functions computerized?
- Does anyone systematically analyze the company's financial statements?
- Is an effort made to utilize cash to the maximum possible extent?
- Are any of the ratio values unusual for the industry?

PRODUCTIVITY ANALYSIS GUIDE

DST ACCOUNTING

Measures

- * Days delay from close of period to publishing of cost reports/target delay
- Cost of cost accounting group/cost of manufacturing

Questions

- Does the company have a formal cost accounting system?
- How often are cost accounting reports published?
- What level of managers receive reports?
- Does the cost accounting department prepare variance analyses? Are these reviewed with managers?
- Are cost data by product available?
- Are cost data by process step available?
- Are cost accounting functions computerized?

PRODUCTIVITY ANALYSIS GUIDE

DATA PROCESSING

Measures

- * Days delay in data reporting/target delay
Cost of data processing/value of sales
- * Data processing costs/number of transactions
Number of reports generated/month divided by number of
personnel in the department
Error rate on completed reports

Questions

Does the company provide the following basic reports?

- Inventory status
- Payroll analysis
- Sales analysis
- Production schedule
- Cost analyses
- Cash flow analysis

What plans for computerization does the department have?

Does an equipment and software plan exist?

PRODUCTIVITY ANALYSIS GUIDE

SELECTION AND TRAINING

Measures

- * Hours of training/total hours of all personnel
Cost of training/total personnel costs
- * Personnel turnover
Number recruited/number of open positions

Questions

- Does the company have a long-range personnel plan?
- Does the company have job descriptions for each position?
- How does the company recruit new people?
- Does the company maintain a file on each person? What does it contain? How can it be accessed?
- What is the distribution of the workforce in terms of:
 - Years of experience
 - Education
 - Age
- Does the company maintain a file of external training programs and encourage personnel to attend them?
- Does the company support formal internal training programs?

PRODUCTIVITY ANALYSIS GUIDE

COMPENSATION

Measures

- * Total compensation/sales (five-year trend)
- Average compensation/average Egyptian industry compensation
- Five-year trend in average compensation/five-year trend in inflation

Questions

- What is the compensation structure?
- How are compensation levels set?
- During the past three years what percent of employees have left for:
 - Other jobs of all kinds
 - Other jobs in Egypt
 - Other jobs outside of Egypt

PRODUCTIVITY ANALYSIS GUIDE

DISCIPLINE AND ATTENDANCE

Measures

- Percent of employees whose performance has been formally reviewed this year
- * Percent days absent (three-year trend)
- Cost of lost production attributed to industrial relations problems divided by average number of employees
- * Percent of workers not receiving an excellent rating on their annual review
- Number of requests for transfer/number of employees (three-year trend)

Questions

- Does the company prepare critical incident reports when disciplinary problems develop around individuals?
- What penalties are imposed for excessive absences?