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# Prospects for the Automotive Industry in LDCs

*In a technologically changing and highly competitive environment, there may be some investment opportunities, particularly in component and commercial vehicle production*

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**S** spurred by rising demand for automobiles and other vehicles, particularly in the developing world, the global automotive industry has grown rapidly in recent years. It represents a significant proportion of global economic activities, with extensive links to many diverse industries and sectors. In 1988, world production of all vehicles was about 49 million, up 4.5 percent over the previous year, and some 20 percent higher than in 1983. Most production still takes place in the developed countries, mainly in members of the Organization for Economic Co-operation and Development (OECD). But developing country production has been growing rapidly, and, if current trends hold, demand for vehicles in these countries will grow the fastest in the next decade.

This may create greater opportunities for investment in this industry in the developing world. But where and what type of investment? There is no simple answer. The automotive industry is a complex one. It is undergoing a massive technological transformation and, as a direct result of shifting patterns in global trade and manufacturing, the industry has become globalized. In other words, a growing portion of a company's production is outside its home country, and intercompany cooperation agreements are on the rise. At the same time, there is heightened international competition, in both sales and production of vehicles and their components. A number of LDCs have entered into the production of automobiles in the last decade or so. Most have yet to establish a firm foothold in the marketplace.

## Nature of the automotive industry

The automotive industry is extremely diversified; major product categories include passenger cars, buses, trucks, utility vehicles, and two-wheeler and three-wheeler vehicles. The demand, production processes and organization, technological requirements,

marketing, and distribution for each of these products vary considerably.

The automotive industry in the developing world is different from that of the developed world. LDC production volumes are typically small, and key operations such as research and design are virtually nonexistent. In almost all cases, the LDC manufacturer is linked with a foreign firm as either a subsidiary or a joint venture, or through a licensing arrangement.

Over the past few decades, the growth of the automotive sector in LDCs has been driven mainly by government policies that feature high levels of protection and high local content requirements. While these policies have stimulated local manufacture of vehicles and components, they have at times enabled some local industries to survive even though they are inefficient. In a few LDCs, however, automotive production has reached a level of efficiency that allows LDC products to compete successfully in international markets.

## Structure of the LDC market

Of the 48 million vehicles produced worldwide in 1988, about 10 percent were produced in developing economies (excluding Eastern Europe). Six of them—Brazil, China, India, Republic of Korea, Mexico, and Taiwan Province of China—account for 70 percent of total production of automobiles in such economies. In all, about 30 LDCs manufacture or assemble vehicles, and at least 60 produce parts and components.

Although product mix varies significantly among LDCs, in general they produce a larger proportion of commercial vehicles (39 percent in 1988) compared with the OECD countries (27 percent). Investment costs can be amortized more rapidly through mass production of passenger cars than through low-volume production of commercial vehicles, yet production of the latter is often more

suitable for LDCs for the following reasons: the labor content per commercial vehicle is higher since production volumes are lower for commercial vehicles than for cars, and design changes for commercial vehicles occur less frequently than for cars, making the costs of design, retooling, and, more generally, of the introduction of new models lower. Finally, the high cost of transporting heavy-truck and bus bodies from overseas suppliers also favors at least partial local assembly or manufacturing.

A rough estimate of the value of LDC vehicle production in 1988 is \$90 billion, including \$45 billion in Eastern Europe. Estimates of component sales are not available. LDC automotive exports amounted to about \$8 billion in 1987, of which about \$5.5 billion reflected sales of vehicles—mostly subcompact passenger cars and light commercial vehicles—while the rest was sales of components. LDC vehicle exports are highly concentrated in terms of both origin and destination. Only three countries—Korea, Brazil, and Mexico—have managed to export sizable volumes, with export sales in 1987 of \$3 billion, \$1.5 billion, and \$1.5 billion, respectively, mostly to the United States. These three accounted for over 90 percent of all LDC vehicle exports. The lack of diversification into several markets is dangerous because if the US market contracts, as is now the case, it would be difficult for these exporters to develop alternative marketing systems in the short run.

The demand prospects for the industry are encouraging. Demand for cars to the year 2000 is expected by industry analysts to increase by an average of 1–2 percent per year in the OECD countries, 7 percent per year in Eastern Europe, and 8 percent in LDCs. Although the current slowdown in demand in the United States may be replicated in other markets during the next two to three years, the long-term growth in demand, together with significant current

developments in the industry, present some opportunities for profitable investments in LDCs.

## Automobile manufacturing

Automobile manufacturing requires significant financial, technical, managerial, and organizational resources and expertise. It also needs large production and sales volume if profits are to be achieved within the technological life of a particular design. Only a relatively small number of LDCs have the necessary conditions (e.g., access to a large market, adequate managerial, engineering, and labor skills, and cross-border movement free of logistical and regulatory constraints) to support an economically viable automobile manufacturing industry (see Table 1).

The initial investment required for setting up a car manufacturing facility is substantial. It can range from \$1.5 billion for development, engineering, and tooling for a new passenger car in Europe to \$150 million for a 35,000 cars-per-year assembly plant in China. The high initial investment cost and the need for frequent additional investments to remain competitive, make large-scale production and sales essential.

A volume of 250,000 cars per year has traditionally been regarded as the minimum economic size of a car manufacturing plant. Recently, some of the major automobile manufacturers have developed management, design, and production processes that can be profitable at lower volumes. Already there are a few examples of highly efficient Japanese plants operating profitably at volumes of about 150,000 cars per year. This development may increase opportunities for investments in some LDCs that are now constrained by the small market size.

## Changes in technology

The industry is seeing major changes in process and product technology, and these changes have important implications for the competitiveness of LDC manufacturing and assembly operations. One of the most significant areas of technological development is new materials. There is an increasing shift from iron and steel to aluminum, and from special steel and die-cast zinc to plastics and composites. The second main change is in product technology, with a substantial increase in the application of electronics.

Robotization and computer-aided design and production are now widely adopted by manufacturers of automobiles and components in the industrialized and the more advanced developing countries. These technologies enable manufacturers to improve quality and respond to consumer preferences by producing different models on the same

**Table 1**  
**Vehicle production in developing economies, 1987<sup>1</sup>**

	All vehicles (In thousands)	Passenger cars (In percent)
<b>Latin America</b>		
Argentina	193	82
Brazil	920	74
Chile	7	37
Colombia	52	79
Mexico	233	61
Peru	13	36
Venezuela	115	64
<b>Asia</b>		
China	455	4
India	286	52
Indonesia	163	21
Thailand	102	28
Pakistan	33	49
Turkey	139	46
Rep. of Korea	980	81
Malaysia	49	69
Philippines	8	73
Taiwan Province of China	251	77
<b>Africa</b>		
Egypt	24	82
Kenya	11	17
Morocco	17	73
Nigeria	43	72
<b>Europe</b>		
Portugal	124	68

Source: Automobile International, *World Automotive Market*, 1988. Numbers have been rounded up.  
<sup>1</sup>Excludes Eastern Europe and the Republic of South Africa.

assembly line and, through less retooling, rapidly shifting to new models with shorter production cycles. Design is particularly important because about 70 percent of the eventual total cost of a passenger car is determined by the decisions made during this stage.

The implication of these technological developments for LDCs is that the labor content in the cost of car production is decreasing and the production process emphasizing quality and flexibility requires experience and expertise not easily available in an LDC. In a few cases, LDCs can adopt labor intensive technologies that do not unduly compromise product quality and efficiency. These are more likely to be found in the production of commercial vehicles and some components for which labor content is higher than for cars. However, as the gap between modern automotive technology and LDC technological capabilities widens, some LDC vehicle producers will find themselves at an increasing disadvantage. This may be offset through collaboration between domestic and international manufacturers, but in countries with a poor manufacturing and engineering

base, the scope for efficiency gains will be limited. Collaboration has been very common to date, mostly in the form of joint ventures and licensing agreements, and these arrangements will become even more important in the future.

## Production processes

In addition to technology, organization of the production process is changing rapidly, particularly in the area of component procurement characterized by the Just-In-Time (JIT) inventory concept. JIT aims to improve the efficiency in the flow of materials, reduce storage costs, and increase production flexibility. A related trend is the decrease in in-house manufacturing, particularly in OECD countries. LDCs could benefit from this trend by specializing in component production, provided they maintain high quality and reliable delivery. A few economies (e.g., Korea or Taiwan Province of China) with the necessary level of technical and organizational capability and a developed infrastructure (transport and communications) to adopt JIT would be able to achieve lower production costs and attract foreign investment.

Although plants of a somewhat smaller economic size may become more common in the future, car manufacturing will remain a high-volume operation during the next decade. Accordingly, car manufacturing will continue to require a large market, of which the home market will need to be a major portion, as has been demonstrated by the experience of all major manufacturers. LDC production primarily for export is not an economically viable proposition since labor costs, about 15 percent of the total car manufacturing cost, are not by themselves a sufficient reason to locate in an LDC.

## Component manufacturing

In developing countries, there appear to be more opportunities in component than car manufacturing. The value of components produced worldwide in 1988 as original equipment has been estimated at \$350 to \$400 billion with perhaps an equal amount for replacement parts. The global value of component trade in 1987 amounted to about \$60 billion, of which an estimated \$3.4 billion originated in LDCs (see Table 2).

Growth of the components industry depends primarily on opportunities for subcontracting, both in the LDC itself and internationally. Reliance on external suppliers has increased substantially because of the need for greater flexibility and the emphasis on lowering costs. In Japan, only an estimated 30 percent of a car is produced in-house (40–45 percent in the United States and Europe). Suppliers in developed countries

**Table 2**  
**Automotive component exports from**  
**developing economies, 1980-87**  
(In millions of US dollars)

	1980	1985	1987
Argentina	63.3	62.9	67.2
Brazil	—	424.6	1,500.0 <sup>1</sup>
Colombia	20.6	6.0	—
Hong Kong	0.8	1.8	2.2
India	72.1	48.7	—
Rep. of Korea	20.5	93.0	181.0
Malaysia	2.7	3.7	5.7
Mexico	—	499.0	1,000.0 <sup>1</sup>
Morocco	7.4	10.0	15.9
Philippines	30.3	20.9	—
Portugal	6.6	66.0	130.4
Singapore	82.6	78.5	98.4
Taiwan Province of China	94.7	345.6	618.3
Thailand	9.3	11.4	21.3
Tunisia	0.3	4.4	19.1
Turkey	43.9	65.5	71.6

Source: United Nations Trade Data, 1989.  
Note: Excludes Eastern Europe.  
—Indicates data not available.  
<sup>1</sup>Unofficial estimates.

may not be able to reduce costs continuously because of high labor and overhead costs. Hence, the need to reduce costs, often exacerbated by appreciating currencies and wage increases, will lead major car manufacturers toward component manufacturing in LDCs, provided that strict quality and delivery standards can be met.

Different types of LDCs attract different types of component production. JIT and greater involvement by the supplier in research and design engineering means that sophisticated, capital-intensive components (such as engine parts, gear boxes, or special metal parts) are likely to be produced for the local or export market in technologically advanced economies with a developed automotive industry (e.g., Brazil, India, and Korea) or those that are near major manufacturing countries (e.g., Mexico, Portugal, Turkey, and Taiwan Province of China). Production of labor-intensive, simple technology components such as wire harnesses, upholstery, interior trim, batteries, exhaust systems, and odometers will be feasible in less technologically advanced LDCs (e.g., Algeria, Malaysia, Morocco, and the Philippines). In almost all cases, association with a major company, under a joint venture or licensing arrangement, to provide technical support will be necessary. With the JIT system, the supply to original equipment manufacturers will have to be extremely reliable, which will rule out politically unstable developing countries, or those with undeveloped communications and transport net-

works.

The importance of real exchange rate movements in the location of component manufacturing facilities is illustrated by the influx of Japanese investment in Southeast Asia since the rise in the yen. Japanese automotive manufacturers expect to continue investing there at least during the next two or three years with Taiwan Province of China, Indonesia, Malaysia, the Philippines, and China high on the list of candidates for Japanese investment. Thailand will continue to attract investment, but rising labor costs and infrastructure bottlenecks are causing a more cautious approach among potential investors. Brazil provides another example. Its component exports increased from \$1.5 billion in 1987 to a reported \$2.4 billion in 1989, even though vehicle exports during the same period decreased substantially. However, in late 1989 and early 1990, several component and vehicle assemblers in developed markets discontinued imports from Brazil in favor of other countries, because of the overvalued Brazilian currency.

In all cases, with possible exceptions in simple spare part manufacturing, local investors would need to associate with established component manufacturers to ensure quality control availability of technology, and access to the market. It would be extremely difficult for a newcomer to penetrate the market, especially with the very stringent quality standards required and the traditionally close ties between car manufacturers and their suppliers.

Policy developments are likely to be important for the future growth of the components industry in LDCs. One possibility is that traditional import substitution policies may give way, in part, to regional trade agreements among LDCs. Progress to date on this front has been limited. The ASEAN (Association of Southeast Asian Nations) complementarity program, specifically established to facilitate trade of automotive components among member countries, has been constrained by the protectionist barriers that each country maintained. Some private companies, however, are playing a role in promoting trade. Mitsubishi and Toyota, for example, within the limitations of regional trade policies, have been particularly active in Southeast Asia in producing auto components in different countries and supplying their assembly or servicing operations in the region from these sources. More successful examples are the Auto-Latina project jointly undertaken by Ford and Volkswagen, under which automotive products are exchanged between the two companies from facilities located in Argentina, Brazil, and Venezuela; and the Scania facilities in Argentina and Brazil, which also exchange portions of their respective outputs.

## Overview

During the next decade, keener competition among major producers and the efforts to reduce costs will present opportunities for developing countries mainly in component manufacturing. However, the ever-increasing sophistication of management, production, and delivery systems will require manufacturers in developing countries to maintain high-quality and reliable delivery if they are to be competitive in the international market. Production of commercial vehicles may also be suitable for some developing countries because labor-intensive production processes would give them a comparative advantage in servicing their respective local and regional markets over distant OECD production sites.



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