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MANUFACTURE OF LOW-COST VEHICLES IN DEVELOPING COUNTRIES ^{1/}

Prepared by the
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1. Road vehicles in developing countries

The economic development of any country requires an adequate network of transportation. The exploitation of natural resources, the transport of passengers, the exchange of finished and semi-finished products within the country and the distribution of inputs and outputs to the agricultural sector, all require an efficient transportation system both for long distance and local uses.

In developing countries, while long distance transportation is catered for in reasonable conditions by means of airplanes, sea- and river-going vessels, trains and trucks, local transportation is generally very inadequate. This local land transportation relies, on the one hand, on man or animal powered carts, little improved since generations and, on the other hand, on motor vehicles - passenger and commercial - which were designed and engineered for the conditions of utilization and manufacture prevailing in the developed economies.

It is a fact that the motorized road transportation in most developing countries has followed almost completely the pattern of the industrialized countries. Therefore, most vehicles being utilized are not suited to their prevailing conditions, namely from the viewpoints of purchasing power, climatic and road conditions, utilization and maintenance. As far as private transportation is concerned, these traditional vehicles have been only utilized by the top social stratum, and therefore their impact in general economic development has been severely limited. In many developing countries, a widespread utilization of private vehicles among the higher income groups, aggravates and perpetuates an unbalanced wealth distribution.

The problem therefore is that developing countries lack low-cost private vehicles widely disseminated among the vast majority of its population of industrial workers, small businessmen, agricultural labourers and others.

Of extreme actuality and importance is the savings in fuel achieved by the wider use of low-cost, vis-a-vis conventional vehicles.

2. The automotive industries in developing countries

The establishment of transportation equipment industries in developing countries followed a similar pattern. Only the upper stratum needs for transportation were taken into considerations and therefore, traditional passenger vehicles of the low-medium and medium-size ranges were mainly considered and their assembly started with some minor local content.

In some other cases, more common and basic needs were also considered and commercial vehicles and buses, which in fact cater for a wider segment of the population, were assembled or manufactured.

However, going further down the scale to lower income groups, both in rural and urban areas, we find much more pressing and basic needs for private, inexpensive and simple vehicles, which remain unsatisfied in most cases. These needs affect the vast majority of population in developing countries. Their automotive industry does not produce the vehicles they need and can afford to buy.

Traditional vehicles, being designed for high scales of production, need high outputs to be produced at international prices. The figures of 300,000 and 50,000 units per year have often been quoted as break-even outputs for passenger and commercial vehicles, in case of 100% local content.

Because the market for traditional vehicles in developing countries is narrow, increasing local content lead to higher production unit costs. Therefore, if the emphasis is placed on industrialization and a high local content is demanded, the production costs of vehicles can be 200% - 300% of those in developed countries. If a moderate cost is aimed at, then the local content has to be small and industrial opportunities diminish considerably. A more generalized production of low-cost road vehicles will not solve this type of problems in its entirety. However, basic vehicles can be produced economically at substantially lower production outputs and in most cases almost 100% local content can be easily achieved. The manufacture of this type of vehicles is also of a much less technological sophistication requiring less capital and more labour.

There are a few developing countries where traditional vehicles are produced at high outputs and practically at international prices. However, even there, a large percentage of the population cannot afford to buy these vehicles. The simpler vehicles produced are motorcycles which are aimed at the leisure market and therefore out of the scope of our problem. Even in such countries, the penetration and impact of low-cost vehicles would be considerable.

To place the whole question in a nutshell, we can say that it is difficult for an ox-cart utiliser to switch directly to a vehicle such as a truck because of obvious financial, social and infrastructural reasons. The gap would be too large. This gap can be more easily bridged through the wide utilisation of low-cost vehicles such as cargo tri-wheelers.

Analysing the historical evolution of the automotive industries in Europe, particularly after the second world war, one could notice a wide variety of engines for bicycles, scooters, simple motorcycles, cargo and passenger tri-wheelers and very simple four-wheelers, which paved the way to today's widespread utilization of the automobiles and trucks.

3. The concept of low-cost vehicles

The limits of the classification "low-cost vehicles" can be placed higher or lower. For the purpose of this study, we have considered the following three groups.

(1) Two wheelers

- (a) motorized bicycles, consisting of a normal bicycle and a gasoline motor of up to 50 cc, adapted to power the front or rear wheel;
- (b) mopeds - bicycles designed with an integrated gasoline motor to power generally the back wheel. It can have auxiliary pedals or not
- (c) motorcycles, with engine from 50 cc to 350 cc, for sturdy use. Can have a side-car for passenger or cargo transport.

(2) Tri-wheelers

Having an easily fabricated metal frame and body. The latter can be made in fibreglass reinforced plastics. The engine can be between 150 - 1200 cc. Vehicle should be preferably for dual purpose utilization - passengers and cargo. The single wheel can be either at the front or at the back of the vehicle.

(3) Four-wheelers

As designed by many international companies for production and utilization in developing countries. They are basically small trucks with body, frame and suspension gear designed for sturdy use and easy manufacture in small numbers with simple equipment and tooling. Can be also used as a passenger vehicle. The engine capacity can vary between 600 and 1500 cc.

4. Pricing, taxation and credit

Ex-works prices are of paramount consideration for a substantial market penetration and should not exceed the levels of US\$150 for the case of mopeds, US\$250 for motorcycles, US\$400 - US\$1,000 for tri-wheelers and US\$2,000 for the case of four wheelers.

Sales taxation should be as low as possible, particularly for the two- and three-wheelers. In these cases it should not exceed 10% - 15%.

Taking a typical sales price of \$160 for a moped, this is still beyond the possibilities of the vast majority of purchasers in developing countries, who will be earning in the region of \$50 - \$60 per month. Therefore, credit facilities need to be specially considered for the purchase of these vehicles. Interest rates should be as low as possible and the repayment period should be so extended as to permit the rates to be within the purchasing power of the lower income groups.

Special loans should therefore be provided through savings banks, agricultural credit lines, etc.

The trading of these vehicles should be also carefully arranged so as to avoid high profit margins, which would be incompatible with the lowest feasible sales price.

5. Penetration of low-cost vehicles in developing countries

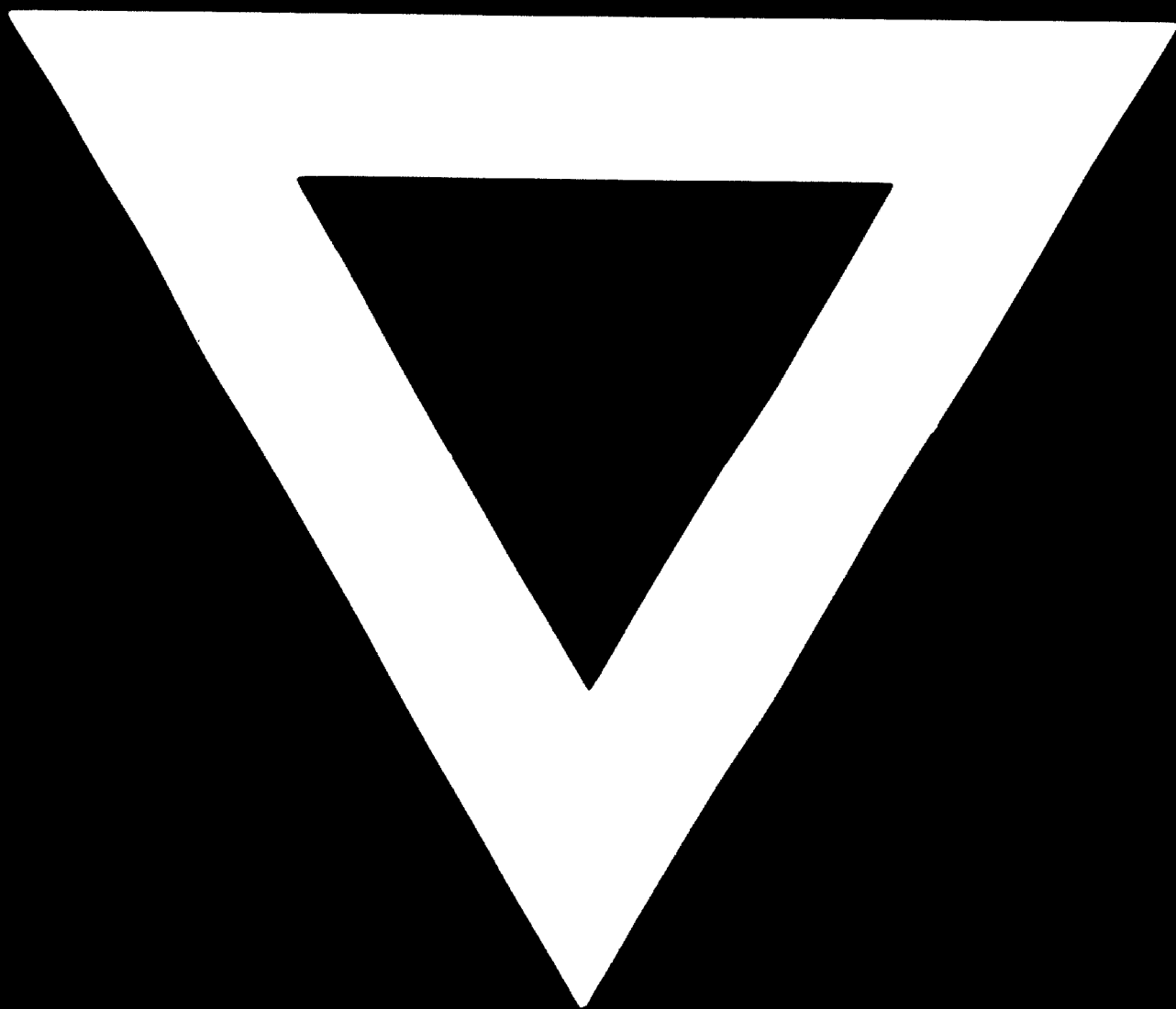
There is today a whole variety of vehicles within the ranges described in this paper. We feel that no further research on technological development is needed for a wider dissemination of this concept. However, production in developing countries is still concentrated in the traditional means of transportation. The technical assistance operations of the United Nations Industrial Development Organization (UNIDO) in the field of automotive industries have been dealing largely with policy-making/assembly/manufacture of passenger cars and, less frequently, buses and commercial vehicles, while requests for technical assistance in subjects relating to low-cost vehicles have been only vestigial.

In UNIDO's projects dealing with policy making, we have called the attention of governments to the needs and benefits of basic types of transportation vehicles and the impact in the national economies resulting from giving priority to the local manufacture of simple vehicles such as these described above, in opposition to the larger vehicles designed for developed economies. However, results at short range have not been very positive. The international automotive manufacturers which have designed the so-called basic transportation vehicles (four wheelers) have not met either the success originally anticipated.

However, the projects which have been implemented in several countries met considerable success and prove this concept to be quite feasible.

The case studies to be submitted at the expert group meeting will analyse this experience in depth and will pinpoint bottlenecks and positive features.





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