Export-Lead Industrialization of LDCs: A Theoretical Export Strategy

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I. Introduction

This paper focuses on searching the strategies for solving the critical problem (export) of today's developing countries who are undergoing industrialization.

To achieve this goal this paper contends that such developing countries should adapt their trade policy to the framework of dynamic world trade patterns which result from changing income levels among nations and changing commodity structures of trading countries. Thus, a developing country should recognize and continuously alter its export commodities in accordance with the changing world economy, despite the differing and even conflicting principles of comparative cost advantage and factor endowments. Shifting its emphasis from one to another group of exports as consumption patterns change in developed countries, an industrializing less-developed country should expand growth industries characterized by export potentials in the high-income markets of industrial countries.

To facilitate this policy, a developing country must push far beyond the traditional trading bargains and practices. For example, it should take into

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account the implications of the growth industries of those countries with which it trades. Since improved access to the markets of advanced countries is unlikely by itself to be available for manufactured exports from low-income countries, developing countries should explore their strategies.

This paper contends that the most promising possibilities for long term expansion by developing countries lie in the realm of manufactured goods, since world demand grows most rapidly in manufactured products.(1) There is a horizon of manufactured items suitable to the capabilities of many developing countries. The key approach is to select the appropriate industrial commodities which respond to changing world trade patterns, and which in particular can be integrated into the high-income markets of the major industrial countries.

It is in this spirit that the theoretical models are presented in order to elaborate a trade strategy for these developing countries: improvement engineering model in international product cycle for industrializing LCDs today.

Unlike primary products which are usually homogeneous in nature and sold in international competitive market structure (perfect competition in theory), manufactured products are usually differentiated in nature and sold in international noncompetitive markets—imperfect competition. The transition of developing countries from primary products exporting to manufacturing products exporting is accordingly as a whole from undifferentiated commodities to differentiated products.

Thus, the paper attempts to construct a model showing the relationship between international product cycle process associated with improvement engineering an exportable manufacturing product of an industrialized LDC. This implies a theoretical model in which total improvement engineering expenditure is the independent variable and exports the dependent.

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(1) H.B. Lary, *Imports of Manufactures from Less Developed Countries*, New York, National Bureau of Economic Research, 1968, p.5. J.E. Haring, "Export Industrialism and Economic Growth: A Dynamic Model," *Western Economic Journal*, Spring 1963, pp.114-25; A. Meizels, "The Effects of Industrialization on Exports," *Economies of Trade and Development*, edited by J.D. Theberge, New York, John Wiley, 1968, pp.35-8. A.H. Small, *The American Market for Manufactured Exports from the Developing Countries*, New York, Praeger Publishers, 1972, pp.17-8. Youn S. Kim, *Postwar Japan's Foreign Trade (1945—1965) and Its Lessons to Developing Countries*, unpublished Ph.D. Dissertation, 1973, pp.187-95.

Before allocating investment capital, improvement engineering should undertake a thorough analysis to determine if the economic success is of sufficient magnitude over the product life span. This paper focuses on theoretical aspect of economics in constructing improvement engineering—export model.

II. International Product Life Cycle Process

Raymond Vernon introduced the concept of the product cycle.(2) The product cycle in international economy is closely associated with growing technological innovation which brings about a series of shifts in the composition of major trading commodities. This theory is analyzed here in the light of postwar phenomenon of the changing commodity pattern of world trade.

The product cycle theorem becomes of relevance to a country involved in production restructuring under the changing world trade pattern. The direction of production restructuring would be associated with selecting a few products. This becomes a vital factor determining the degree of industrial success. Since success breeds further success, the correct direction of industrialization could orient the economy toward an industrial spurt. The product cycle model is theoretically significant, so such as to be examined both *ex post* and *ex ante*. The author contends that the model can be used as well for the specific purpose of a development strategy.

The implication for developing countries is that the sequence of diverse and multiple product cycle processes provides an opportunity to developing countries to engage in higher productive industries, namely manufacturing industries, while developed countries tend to move to sophisticated production coupled with vertical industrial growth, leaving certain industries to the developing countries which are undertaking production restructuring toward

(2) R. Vernon, "International Investment and International Trade in the Product Cycle," *Quarterly Journal of Economics*, May 1966, pp.190-207; "Consider the Cotton Textile Industry, Where U.S. and European Dominance gave way first to Japanese competition and later to competitors from Hong Kong, Korea, and Taiwan. Today the cycle is entering a new phase, with India and Pakistan developing their own cotton textile industries. Wool and synthetics are following a similar evolutionary path." *Foreign Trade: Hearings Before the Subcommittee on International Trade of the Committee on Finance*, U.S. Senate, part 2g II parts, 62-7900, Washington, D.C., Government Privatory Office, 1972, p.1027.

manufacturing industries.

In Figure 1.A, the production process from new commodity through maturing commodity to standardized commodity status in the advanced country is shown broadly in order to characterize the implicit nature of the product cycle process in the country which introduces new commodities. The time dimension is indicated by t horizon while the quantity is shown by the vertical dimension. The t_0 implies the introduction of a new commodity in the high-income market of an advanced country.

The period from t_0 to t_2 implies the market pioneering duration requiring the cost of marketing in spreading information about and advertising the new product, both at home and abroad. From the t_2 on, the production stimulated by market acceptance would be boosted toward its maturing stage, along with exploiting economies of scale. In this stage the industry would be called a progressive industry, and it will realize high productivity gains and profits as well. In addition, the introduction of new commodities following one another will result in a series of the production processes of new product, maturing product and standardized product. The incentives from the market mechanism tend to feed the product cycle process causing continuous introduction of new commodities in the high-income markets of advanced countries. The high-income market is a suitable place for introducing new products. This market lures new commodities characterized by innovation.

In Figure 1.B, the product process of a developing country is depicted in the context of the product cycle version. The t_1 represents this country being exposed to a new imported commodity, coinciding with consumption up to the point when she engages in her productive operation, t_2. The production might be encouraged by the various policy measures such as import control and subsidies, for which the infant industry argument could be utilized.

The rationale of the infant industry argument is that a catch-up industry is in a competitively disadvantageous position *vis-a-vis* an established industry in an advanced country.

Therefore, the argument prescribes protection. However, "it is essential that the protection should be confined to cases in which it fosters will after

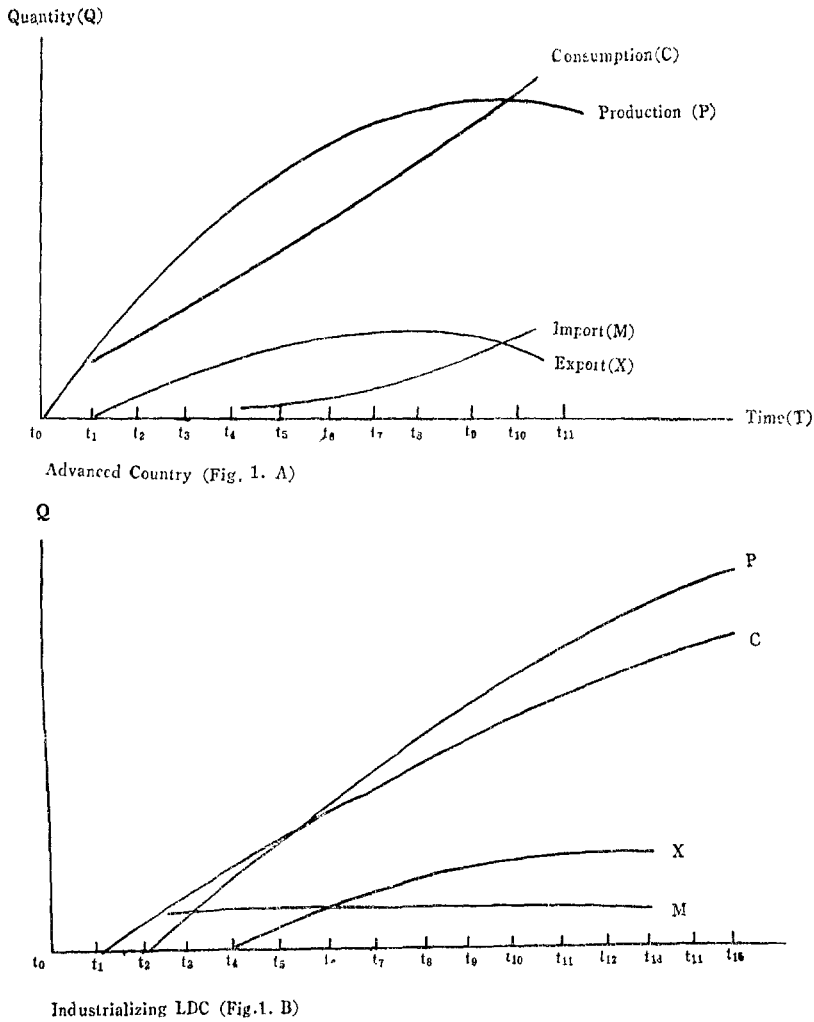

Fig. 1. International Product Cycle Process

a time be able to dispense with it."(3) To put it differently, the infant industry argument associated with the product cycle model should be implemented by a production restructuring program under the supposition that the eventual saving in costs in the expanding and investing *M* industries, for example, could compensate for the high initial costs of the catch-up period. "The broad historical record suggests that protection may

(3) M. Kemp, "The Mill-Bastable Infant-Industry Dogma," *Journal of Political Economy*, Vol. 68, February 1960, p.65.

have accelerated economic development since the original industrial revolution in England has done so behind a protectionist wall."(4)

The t_4 in Figure 1.A and B indicates both the imports from a developed country and the export from a developed country. The character of this stage is extremely complex in nature due to the international market mix of advanced, semi-advanced developing countries and late-developing countries. The products of the late-come country could establish acceptability in its home market as well as in the third market of the late-come countries, and its entry into the high-income market of the advanced country could be expedited in turn.

The duration from t_2 to t_{12} in Figure 1.B is characterized by the version of product cycle in commodities originally invented abroad. In other words, the diversity and multiplicity of new products have allowed a late-come country involved in similar sequences of the product cycle process to proceed from new products, to maturing products and standardized products, after acknowledging the time-lag between the advanced country (or leader) and the late-come country (or follower).

In summary, in "each country one finds a constantly changing spectrum of industries in various stages of development—initial entry, early development, rapid growth, export, maturity, import, decline. Because this is an ongoing process, it is illogical to expect a particular country to dominate production in a given manufactured product forever."(5) Accordingly, the less productive industries of an advanced country could be classified as progressive industries to the developing country which is executing production restructuring in line with the changing commodity pattern of world trade as well as with the international product cycle process.

The implications for developing countries is that the sequence of diverse and multiple product cycle processes provides an opportunity to industrializing LDCs today, to engage in higher productive industries namely manufacturing industries, while advanced countries tend to move to sophisticated products in more value added industries, leaving certain industries

(4) E.E. Hagen, "An Economic Justification of Protectionism," *Quarterly Journal of Economics*, November 1958, p.513.

(5) J.B. Cohen, ed., *Pacific Partnership: United States-Japan Trade*, Lexington, D.C., Heath, 1972, p.253.

associated with labor intensive or less sophisticated industries to developing countries.

The international product cycle in relation to LDCs has unique characteristics. That is, the LDCs are the last to receive any particular process; they are the last link in the chain of transmittal of the product cycle. There are no more follower countries. Therefore, the strategy of the LDCs should be to strike the extension of standardized product life span, by introducing improvement engineering.

An industrializing LDC should establish industries on the premise that there is growing demand for their products at home and abroad. The process regarding the new products introduced is that production increasing during the stage of infant industry policy, and then the exports expand accordingly (production and exports of commodities such as clothing, footwear, textiles, toys, housewares, and electrical appliances). These industries producing largely for consumer markets in high-income market can be explained in the context of LDCs' industrialization within the framework of international product cycle process.

Industrial goods produced in developing countries are facing market structure of monopolistic competition(6), in which economic theory has been highlighting the importance of nonprice competition. Thus, the strategy of improvement engineering for extending the product life span of standardized goods can be called nonprice competition.

III. Improvement Engineering—Export Model

The purpose of improvement engineering is to raise demand to a new and higher level and to extend a larger product life span.

This paper attempts to construct a model showing the relationship between exports and improvement engineering. The model assumes improvement engineering expenditure is viewed as the independent variable and export as dependent. Granted that there are other factors besides improvement engineering that influences exports, there are not taken into account in order

(6) Small, *op. cit.*, pp.44-55; see also E. Chamberlin, *Theory of Monopolistic Competition*, 2nd ed., Cambridge, Mass., Harvard University Press, 1936. D. Dewey, *The Theory of Imperfect Competition: A Radical Reconstruction*, New York, Columbia University Press, 1969.

to project the significant relationship between the two variables.

The improvement engineering (*IE*) expenditure line is rising proportionally[7] to export. The gross profit line as well as export earning is largely influenced by the *IE* line. That is, the export earning line increases as the *IE* line, which implies product improvements associated with style, quality, design, packing, and packaging.

With larger doses of improvement engineering, export rises by decreasing rate indicating that diminishing return to improvement engineering are at work.[8] Since the types of exports which are mostly largest manufacturing products is one which is eventually asymtotic to the saturation level, the ratio of the change in exports and the change of the improvement engineering will approach zero showing the limitation of improvement engineering

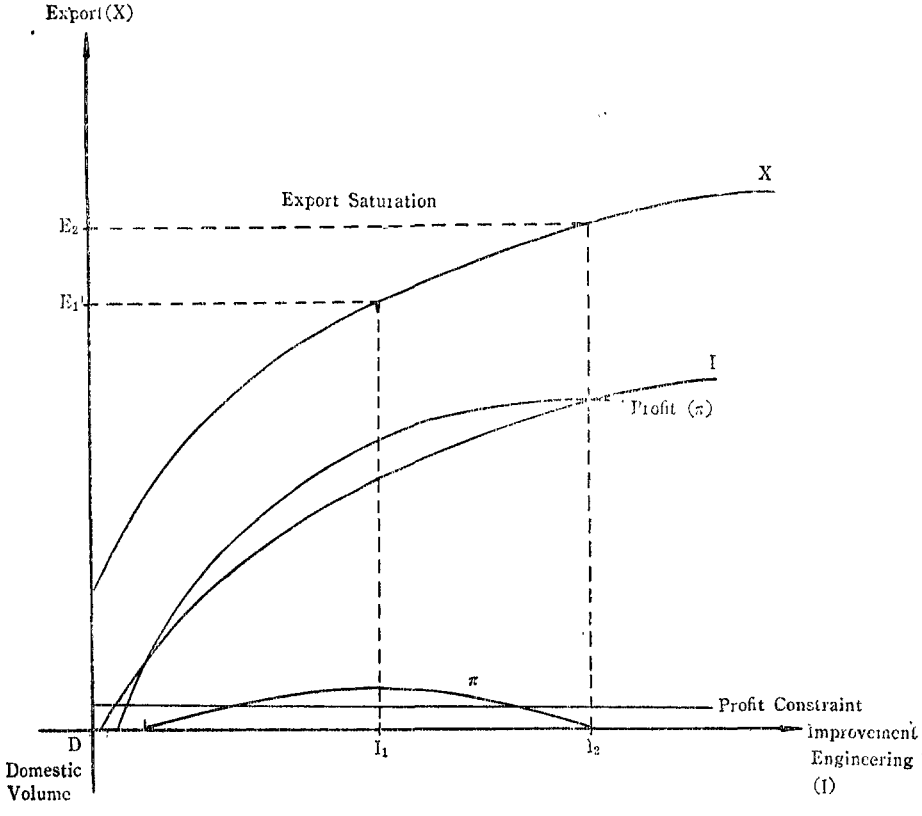

Fig. 2.A. Improvement Engineering-Export Model

(7) B.W. Niebel and A.B. Draper, *Product Design and Process Engineering*, New York, McGraw Hill Book, Co., 1974, pp.36-41.

(8) *Ibid.*, pp.27-8.

dimension.

The strategy is that if maximum short-run net profit is the objective, then the optimum improvement engineering expenditure is DI_1 which produces DE export. But if the objective is (new) maximum export, then the DI_2 improvement engineering is justified for raising export up to DE_2.

By introducing the criteria of profit constraint (minimum profit), a developing country can achieve, in the long run, both larger volume of export and economy improvement engineering.

IV. Improvement Engineering and Its Implications for Manufactured Exports from Developing Countries to Advanced Countries

With the writings of Edward Chamberlin, one other sales device was considered explicitly in demand theory, specifically, promotional efforts were discussed frankly, and the concept of "promotional elasticity of demand"(9) made its appearance. Then the concept of income elasticity of demand was formulated. "Demand Theory largely resolves about three determinants: price, promotional outlays and level of national income."(10) Thus, policies of export promotion should be a strategic mix of price and improvement engineering. The most common practices of improvement are manufactured exports suitable to the consumer market of high-income countries, by adapting design changes, style, quality, and product requirements.

Postwar world trade has been dominated by the intratrade among developed countries, so that the rules of world trade have been dictated accordingly. As a developing country, it has an advantage in promoting manufactured exports to the large market of the advanced country. "If the two countries are of unequal size, the reciprocal aspect of demand may not come into play at all. The price ratio of the larger country will prevail, and the smaller country can sell as much cloth——to the other as it chooses at the established given price. This is the importance of being unimportant. In theory at least, the small country can reap large gains from trade."(11)

(9) A.R. Oxenfelt, "From price elasticity to the marketing mix and beyond," *Business Quarterly*, Winter 1965, pp.23-24.

(10) *Ibid.*, pp.23-24.

(11) C. Kindleberger, *International Economics*, Homewood, Richard D. Irwin, Inc., 1973, p.36.

As a matter of fact, a country desiring to advance her position in world trade had to respect and learn various rules and transactions within the system. For example, the high-income markets of advanced countries have been experiencing product differentiation at every turn in business and in every market place, along with price competition. Television, radio, and media have extensively advertised product differentiation in order to inform and attract buyers. Price appeal is only one of various promotional tools. Thereby, improvement engineering becomes a strategic tool in manufactured exports markets where elasticity has been positive in response to changing style, quality, and design.

In the consumer goods markets of advanced countries, buyers emphasize the intangible elements of style, design, and quality. Flavor, style, attractive containers are important selling devices.(12) For example, dress buyers tend not to emphasize the fiber content. In contrast, in capital goods markets, buyers stress such features as operating economy, tensile strength, durability and product performance.

As to an empirical example, the practice of early postwar Japan is a case in point.

1. In order to promote improvement engineering the Japanese government set up the Japan External Trade Organization (JETRO). By acting as the central organization of improvement engineering authorized by the government, JETRO's agents have been spread out in key trading areas of the

Table 1. Annual Rates of Volume Growth of Manufactures (percentages)

	Manufacturing Output		Export of Manufactures	
	1955~1973	1973~2000	1955~1973	1973~2000
Developing Countries (LDCs)	7.5	10.0	10.0	12.0
Developed Countries (ICs)	5.5	4.0	9.5	6.0
Socialist Countries of Eastern Europe	9.0	6.0	10.0	6.0
TOTAL	6.5	5.5	9.5	7.0

Note: In order to arrive at these estimates for the year 2000 it was necessary first to establish the pattern of world output of and trade in manufactures in 1973.

Source: *Trade in Manufactures of Developing Countries and Territories, 1974 Review*, Geneva, United Nations Conference on Trade and Development, 1976, p. 6.

(12) Package and packing in high-income market have an important promotional function to perform.

Table 2. Exports of Manufactures of LDCs to Developed Countries in 1973

Product Groups	Percentage Change 1972~1973			Share of LDCs in Total Imports of Developed Countries (percentage)	
	Value in Millions of $	From LDCs	From World	1962	1973
Clothing	3,001	50	33	18.3	29.2
Engineering and Metal Products	2,814	75	34	0.6	3.4
Textiles	2,214	50	38	13.1	13.4
Wood Products and Furniture	1,784	92	55	11.2	15.6
Food Products	1,379	37	37	16.0	16.4
Miscellaneous Light Manufactures	1,342	42	31	5.2	9.1
Leather and Footwear	865	43	25	12.2	19.2
Chemicals	736	33	39	4.5	2.9
Iron and Steel	647	47	33	1.3	4.0
Drink and Tobacco Products	245	112	39	27.4	6.2
Worked Non-ferrous Metals	240	46	38	3.0	5.6
Non-metalic Mineral Products	141	45	35	2.2	2.7
Pulp, Paper and Board	121	78	32	0.5	1.2
Road Motor Vehicles	114	107	24	0.3	0.4
Rubber Products	55	46	36	0.9	1.6
Total of Listed Product Groups	15,699	55	34	4.9	6.3
Petroleum Products	4,312	53	64	48.2	35.8
Unwrought Non-ferrous Metals	3,882	49	48	46.7	37.9
Grand Total	23,893	54	36	9.5	8.8

Source: UNCTAD, *Trade in Manufactures of Developing Countries and Territories, 1974 Review; Review of International Trade and Development*, 1975, Geneva, United Nations Conference on Trade and Development, 1976.

world and they have disseminated valuable market information to Japan's export industries and to Japan's markets abroad. As the central market researcher, JETRO has been analyzing the trend of world trade, the market pattern of each export commodity, and also collects data on other countries' foreign trade regulations and systems.

Besides, in 1959 MITI set up the Department of Design in order to promote improved product style and design and to supervise the private activities related to these. In the postwar period Japan has been importing a great variety of technologies from industrial countries, and thus there has been a tendency to imitate the product design and style of other developed

countries. In 1960 the government sponsored an exhibition of Japanese crafts abroad, in order to encourage Japan's creative activity of designs and styles.

2. As to quality aspect, the Japanese government has established tight quality standards over export commodities: "Japan's strict and extensive officially controlled export inspection system exposes (yet does achieve a limited success) a regular export reject rate of up to 25 or 30 per cent in some products such as electrical consumer goods," where small and medium producing sector has prevailed.(13)

For industrialized LDCs, improvement engineering provides strategic options in regard to export promotion which should be given most serious consideration.

In practice a new product is usually adapted by the developing country being first imported from an advanced country. This product substitution is first oriented in the domestic market, but later on it could result in exportable commodities. What is urged here is immediate consideration of improvement engineering to manufactured exports suitable to changing high-income consumer markets of advanced countries. Improvement engineering should be adapted for making products in accordance with export market preference.

The headway made along the line is shown by the recent record of certain developing countries which are already engaged in penetrating the high-income markets. Korea, Taiwan, Hong Kong, the Philippines, Israel, Brazil, and Mexico are cases in point. Korean major export items to high-income markets include light manufactured products like electrical appliances, clothing, wigs, textile, and footwear. This paper argues that the important part of the Korean success in export performance is due to adopting improvement engineering.

(13) *The Financial Times*, London; *Japan*, New York, American Heritage Press, 1970, p.95. The implication to developing countries is that the exports of light manufacturing products require adequate degree of standardization and adequate level of quality control. This policy can be implemented by the effective system of government supervision.