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TECHNOLOGICAL AND INDUSTRIAL SELF-RELIANCE IN A GLOBAL CONTEXT *

by

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1. INTRODUCTION

Technological self-reliance - as the basis for self-reliance in agriculture, mining, manufacturing, public utilities, construction, and the services sector - is of crucial importance to the developing countries of the South. Crucial, because it enhances their economic independence and, thus, makes their political independence more meaningful. Crucial also, because technological self-reliance will prove to be instrumental in attacking the roots of the problem of poverty and, thus, to fundamentally improve the lot of the poor masses. To embark upon their technological transformation, many developing countries may need a corresponding socio-political transformation of their underdeveloped societies.

Enhanced economic independence would not only do more justice to the developing countries of the South. It would also, though it seems to threaten them, be in the interest of the industrialized countries of the North. Firstly, because otherwise the tensions in North-South relations might increase beyond controllable limits. Secondly, because whole-heartedly assisting the South to enhance its economic independence would temporarily, during a transitional period, solve some of the present employment problems of the North. Thirdly, because this transitional period would be long enough to enable the North to conceive and implement the structural changes needed in their own, overdeveloped societies.

Chapter 2 of this paper will deal with trends in North-South relations, viz.:

- interdependencies;
- inequities;
- arms trade; and
- population

over the period 1950-1975.

These relations have considerably deteriorated over the period 1950-1975. If they would continue unchecked over the period 1975-2000, this would set the scene for global disaster. To prevent global disaster, it will be of vital importance to:

- reduce relative, if not absolute, levels of interdependence;
- decrease inequities, also in terms of income;
- stop escalation in the North-South arms trade; and
- lower population growth in the South and halt it in the North.

To achieve more self-reliance, not only in the South but also in the North, will prove to be essential in these respects.

In Chapter 3 it will be made clear that self-reliance, though its starting point has been the legitimate desire of the developing countries to enhance their economic independence, is a comprehensive concept. In addition to the economic aspect, it also has social, cultural, environmental and political aspects. Self-reliance starts at the level of the human individual, who should be allowed and enabled to develop him or herself. It can, however, only exist together with selective participation. The latter links the human individual, in an organic manner, to the higher levels of the socio-economic system (from the local community to the world level). The higher this level, the higher the degree of self-reliance can be and the lower the need for selective participation in the next level is.

If self-reliance is to enhance economic independence, it should at least mean increasing self-sufficiency in the satisfaction of basic needs (drinking-water, food, shelter, clothing, health and education), including the total system to produce and distribute them. It will then be shown that the international division of labour need not be contradictory but can be complementary to self-reliance. To accomplish this 'comparative advantage', as the traditional basis for the international division of labour, should only be allowed to work in as far as production and distribution of non-basics are concerned.

In Chapter 4 it will be argued that, if the developing countries are to increase their degree of technological self-reliance, their autonomous capacity for technological change and innovation must be strengthened. Industrial self-reliance, even if limited to the satisfaction of basic needs, already involves a range of, mostly 'light', manufacturing activities. To achieve some sort of balanced industrial base, it is necessary also to include some 'heavy' industry. Countries rich in fossil fuels, ores and minerals, even need a mining, refining and shipping industry if they are to maximize their share in total value-added.

It will then be shown that the developing countries, if they are to attain the Lima target, need to have by the year 2000 a manufacturing output of 9-fold the level of 1975. To achieve this, corresponding investments will have to be made in machinery and equipment, factory buildings, infrastructure, research and development capacity, and education and training capacity. These investments amount roughly to US$ 125 billion in 1975 and US$ 675 billion in 2000, or 11% of Southern GNP. As a maximum, the developing countries could allocate 40% of their gross domestic savings + net inflows to this purpose. As will be estimated, they would need additional capital transfers from the North, First and Second Worlds, amounting to US$ 17-20 billion annually up till 1990 and then dropping off to zero by 2000, and a total of roughly US$ 400 billion over the period 1975-2000. It will be argued why these amounts could and should be made available by the industrialized countries.

In Chapter 5, finally, a summary of conclusions will be given as well as some recommendations for future action.

2. TRENDS IN NORTH-SOUTH RELATIONS

2.1 Interdependencies

The level of North-South interdependencies has sharply risen over the period 1950-1975. This is very well illustrated by the cases of two vital commodities, viz. grain and oil.

Trade in grain (million metric tons) (1)

	1948-1952	1976
North	+3	+38
South	-4	-40

From this table (Northern exports do not equal Southern imports due to inaccuracy of data) we read that Southern grain imports amounted in 1976 *ten-fold* the level of 1948-1952.

Trade in oil (million metric tons) (2)

	1951	1975
North	-114.3	-1,102.4
South	123.6	1,088.2

From this table (Northern imports do not equal Southern exports due to inaccuracy of data) we read that Northern oil imports amounted in 1975 *ten-fold* the level of 1951.

In total North-South trade amounted in 1975 more than *five-fold* the level of 1950. However, the South is more dependent on the North than the North is on the South. In 1977 some 75% of total Southern exports were going North whereas less than 25% of total Northern exports were going South. (3)

Continuation of the trends in North-South interdependencies:

- would create dangerous new forms of political dependence; a former US Secretary for Agriculture observed: "Food is a weapon. It is one of the principal tools in our negotiating kit".

- would become impossible from a shipping point of view; "Japan's projected oil needs in 1985, for example, would require an unbroken chain of 200,000-ton tankers at intervals of 25 miles from the Persian Gulf to Tokyo Bay". (4)

2.2 Inequities

Per capita income is an imperfect indicator, even when corrected for a difference in purchasing power. Nevertheless, the ratio of the per capita income of the richest and of the poorest 10% of the world population, or decile ratio, does illustrate the extent of North-South inequities and their trend. (5)

	per capita income in 1974 US$ with purchasing power in poorest countries		increase
	1950	1975	
North, richest 10% (decile)	860	1542	79%
South, poorest 10% (decile)	88	120	36%
decile ratio	10:1	13:1	

From the table we can read that the per capita income, over the period 1950-1975, has increased by as much as 79%, or with 2.4% yearly, for the richest decile, and by only 36%, or with 1.3% yearly, for the poorest decile. As a result of this, the decile ratio has deteriorated over the same period from 10:1 to 13:1. If this trend would continue - the possibility of which, tragically enough, is not to be discounted - then the decile ratio would further deteriorate to 17:1 in the year 2000.

The RIO Report calculated the decile ratio at 13:1 in 1970 and discusses it in the following terms: "This decile ratio of 13:1 and its trends must be deemed unacceptable *for reasons of human decency and for the dangers of political instability which they imply*. The existence of such disparities is incompatible with an equitable social and economic order and the redress of them must be afforded highest priority by the international community".(6)

The Report makes, therefore, suggestions how the decile ratio can be reduced from 13:1 to 13:2 and even 13:4, over a 42 years period. The latter ratio, "or about 3:1, is equivalent to the present ratio, considered barely acceptable, between the rich and poor *regions* within the EEC.... And this ratio of 3:1, assumed to be necessary for world political stability, could only be achieved...., at least on the basis of the assumptions made, over a period of 42 years. The question is of course whether the poor are prepared to wait half a century to attain what now is barely acceptable, within the industrialized world".(7)

To express North-South inequities in terms of per capita income is not to suggest that the income gap is the most acute inequity. Inequities in terms of wealth, knowledge and power are at least as acute. Nor does it suggest that the Third World should primarily seek a redistribution of present incomes. After all, it is a redistribution of future growth opportunities which is most vital to and is in fact being sought by the Third World.

2.3 Arms Trade

North-South arms trade over the period 1950-1975 is characterized not only by a growth in quantity, but also by a change in quality, in that sophisticated weapons increasingly enter the South. The growth in quantity is shown in the following table.(8)

part of Third World	average annual imports of major weapons by the Third World in US$ mlns, at constant (1973) prices			
	1950-63	1964-68	1969-73	1974-75
Latin America	-	114	206	497
Africa	-	200	224	779
Middle East	-	549	1,181	2,451
Asia	-	660	917	618
total	(421)	1,523	2.528	4,345

The figure for the period 1950-63 should be handled with care. It is, first of all, at constant 1970 prices. Secondly, during this period many Third World countries still had to obtain their independence. Furthermore, for the US., which is the source of 53% of total arms exports to the South, total non-market transfers in '50-'65 to the South amounted to US$ 18,3 billion in current yearly prices, whereas market transfers came to US$ 2,7 billion.(9) If corrections were made to take the above into account, the average annual imports in the period 1950-63 may well have been of the same order of magnitude as those in 1964-1968. However, from the period 1964-68 to that of 1974-75 North-South arms trade has practically tripled.

Qualitative change is demonstrated by the number of countries in the South which possessed advanced weaponry in 1977 compared with that in around 1950.(10)

advanced weaponry	period	number of countries in South
modern aircraft	1960 → 1977	1 → 47
missile systems	1951 → 1977	1 → 42
modern tanks	1950 → 1977	1 → 83
modern warships	1950 → 1977	1 → 67

Finally, it should be stressed that the arms race consumes 40% of all R & D budgets, which otherwise, partly or in full, could have been directed towards the solution of the urgent problems of under- as well as of over-development. Furthermore, that the import of sophisticated weapon technologies exacerbates rather than alleviates the problems of a dual economy.

2.4 Population

In the period 1950-1975 world population has grown from 2.5 to 4.0 billion people, or with some 1.5 billion. In the period 1975-2000 it is expected to grow from 4.0 to 5.9 billion people, or with some 2.0 billion.

part of world	population in millions and as % of total in the years:		
	1950	1975	2000
North	847 (34%)	1,111 (28%)	1,330 (22%)
South	1,652 (66%)	2,841 (72%)	4,598 (78%)
total	2,479 (100%)	3,952 (100%)	5,928 (100%)

As we can read from the above table (11) the population in the South will nearly triple over the period 1950-2000, or increase with 2,1% yearly, whereas the population in the North will 'only' increase with one half, or with 0,3% yearly. The problem of increase of population should, however, be as much, if not more, a question of concern in the North as in the South, because of the vastly disproportional share of the world's resources the North consumes and of the disturbances to the world's ecosystems it generates.

Although the limits to the earth's support capacity are as yet unknown, it is clear that a world population of 5.9 billion will, even as such, create considerably more tensions than are already generated by the present 4.0 billion. In addition, the rapid relative and absolute increase in the South - of which the population in 1975 was already larger than the total world population in 1950 - will create vastly increasing tensions between the poor South and the rich North and will enormously challenge social and economic systems within Southern countries. The more so, since their urban population (settlements with at least 20,000 inhabitants) will even increase more than twice as fast than their overall population due to rural-urban migration. Their population, furthermore, will be young; their number of children under age 15 will be 6 times larger than in the rich countries and even exceed total population in the latter. (12)

Conclusion: The 1950-1975 trends in North-South relations - in terms of interdependencies, inequities, arms trade and population - do not augur well for the further development of these relations and, therewith, for the future of the world. If these trends would be allowed to continue unchecked, then by the year 2000 a vast majority of poor and relatively young people would confront a small minority of rich and relatively old people. Increasingly well armed in terms of quantity as well as quality of weapons and controlling a large part of the resources vital to the North. All elements would be there for a global conflict of an unprecedented scale.

3. SELF-RELIAN E

3.1 A Comprehensive Concept

To prevent global disaster - which seems unavoidable if the trends in North-South relations will increasingly make these uncontrollable - it is of vital importance, firstly, that the present levels of interdependencies do not grow further, at least not in a relative sense. Secondly, that the present trends of increasing inequities are reversed, also in terms of income. Thirdly, that the present escalation in North-South arms trade is halted. And, fourthly, that world population growth is slowed down, though this could hardly have impact before the year 2000. A fundamental change in the present trends can only be obtained through achieving more self-reliance, not only in the South but also in the North. Only thus can the ability for each human individual to control his or her relations with others, the basis of a harmonious human society, be restored in a natural manner.

Self-reliance is a comprehensive concept. Its starting point is the legitimate desire of the developing countries to enhance their *economic* independence and, thus, to make their political independence more meaningful. But in addition to the economic aspect, self-reliance also has *social*, *cultural*, *environmental* and *political* spects.

The *social* aspect of self-reliance is that it necessitates a fundamentally different structure of society. This structure is much more horizontal since hierarchic elements result from the needs felt for them, upwards at each level, by equals rather than that they are inserted downwards by an 'elite'.

The *cultural* aspect of self-reliance is that its high degree of decentralization, at all levels, results in a large measure of flexibility. This flexibility will not only allow for cultural diversity at the national level but even accomodate minorities and their cultures at the local level.

Self-reliance has an *environmental* aspect, since it implies a careful attuning to locally present (traditional) skills, resources and eco-systems. Self-reliant communities generally maintain more harmony with nature, as history has shown, than is the case when local resources are exploited by external forces.

Finally, the *political* aspect is perhaps the most important one. After all, the starting point for self-reliance is that the human individual is allowed and enabled to develop him or herself. Allowing means that the present elites - whether they are to be found at the local, national or international levels - will have to yield a large part of their traditional power.

3.2 Selective Pa ticipation

Self-reliance is not to be mistaken for autarchy. It can only exist together with *selective participation*. The latter links the human individual, in an organic manner, to the higher levels of the socio-economic system. The higher the level at which self-reliance is practiced - local community, (intranational) region, nation, (international) region, world - the higher its degree can be and the lower the need for particapation in the next level is.

Self-reliance, as has been argued already, starts at the level of the human individual, who should be allowed and enabled to develop him or herself. In this respect, special attention should be given to women, who are presently in most respects worse off than men. But the human individual is a social being and his or her development should, therefore, be seen as part of that of the *local community*, in which he or she should actively participate. At this level the basis should be laid for, at least, the growing of food (only rural communities), the provision of drinking-water, the construction of shelter and the fabrication of clothing. All this should be done whilst carefully managing natural resources, including productive soils, and at the expense only of sustainable pollution levels of air, water and land. A surplus of certain goods and services should be produced, whilst a deficit in others, even basic ones, cannot be avoided.

Because of these surpluses and deficits, neighbouring local communities can and must enter into active cooperation with each other. It is at the level of the *(intranational) region* that self-reliance in term of food (only rural regions), drinking-water, shelter and clothing should be strongly enhanced and where, in most cases, the basis for the provision of health care and education is to be laid. Furthermore, the construction of a network of roads, linking the communities to each other, is to be started at this level. Also here surpluses and deficits in the production of certain goods and services will remain. The most notable will be food, in which, generally, rural regions will have a surplus and urban regions a deficit. The different interests of the various regions should, therefore, be balanced at the level of the *nation*.

Out of a total of 186 countries (not necessarily nation-States), there are 103 with a population of less than 5 million and 60 even with less than 1 million. (13) Especially the latter could never achieve a sufficient degree of self-reliance on their own. They should aim for *collective self-reliance* at the *(international) regional level*, which in the case of small island countries may even be needed to satisfy basic needs of their populations. But even through regional cooperation among countries with more than 5 million inhabitants, 100% self-reliance will not be achieved. The necessity for *selective participation* in the global level will remain. It is at the global level that surpluses and deficits, especially in certain scarce resources, are to be balanced through cooperation among equal nations. Equal, because each nation would have acquired a comparable capacity to control its own destiny.

3.3 Basic Needs

If more (collective) self-reliance is to lead to a higher level of economic independence, so as to make political independence more meaningful, then (collective) self-reliance should *at least* mean increasing levels of self-sufficiency in the satisfaction of basic needs. This does not mean to say that increasing levels of self-sufficiency in the satisfaction of non-basic needs is of no importance. It only means that lower levels of satisfaction of non-basic needs are imaginable in times of crisis, without necessarily as such eroding the political independence of the countries in question. The necessity to achieve high levels of self-sufficiency in the satisfaction of basic needs does not only apply to the developing countries but also to the industrialized countries, a point often overlooked by them.

It is generally recognized that basic needs *at least* include:

- drinking-water;
- food;
- shelter;
- clothing;
- health; and
- education.

The basic needs for drinking-water is apparently so obvious that it sometimes does not even figure on the list. The type of basic needs included in addition to those listed, tends to vary with differences in culture, climate and social systems, whereas their number tends to increase with the welfare level already achieved. The discussions on basic needs mostly concentrate on the following two questions:

- should basic needs only include biophysical needs (e.g. food) or also psychosocial needs (e.g. participation)?
- which minimum, and sometimes even maximum, standards should be set for the various basic needs?

Increasing levels of self-sufficiency in the satisfaction of basic needs, includes the system in terms of:

- raw materials;
- capital;
- skills of various types;
- energy; and
- technology

to produce them and of:

- infrastructure;
- transportation and storage; and
- institutional mechanisms

to distribute them.

The more 'production' is decentralized, by allowing and enabling human beings to develop themselves, the less requirements are to be fulfilled for 'distribution' to be equitable.

3.4 International Division of Labour

The answer to the question in how far self-reliance is related to the international division of labour, depends on the basis on which the latter is founded. Traditionally the international division of labour has been based on *comparative advantage*. The classical theory of comparative advantage alleges that it is in the interests of all countries to specialize in the production of those goods in which they have the greatest relevant efficiency and to import the goods in which they have disadvantages.

It is assumed that *free trade* is the best course for all nations, since its restrictions would limit the degree to which they can enjoy mutual benefits. Free trade, though strongly advocated in Western circles, however, is a *myth* in theory as well as in practice. Its workings are detrimental to the relatively unstable markets of raw materials, to which the principle is applied, and beneficial to the relatively stable markets of (semi-)manufactures, to which it is not applied. Truly free trade, furthermore, tends to favour the economically strong at the expense of the economically weak and, thus, to increase inequity. The concept of an international division of labour based on comparative advantage is, therefore, if unrestricted, contradictory to that of (collective) self-reliance. Contradictory, because it leads to specialization even in the satisfaction of basic needs and because it tends to increase inequities.

(Collective) self-reliance would, at most, allow comparative advantage, as the basis for the international division of labour, to work in as far as the production and distribution of *non-basics*, as defined by each country or group of countries, are concerned. This would apply to all, developing as well as industrialized, countries. It would call for self-sufficiency levels of, for instance, at least 80% in basic foodstuffs and a comparable degree in energy. To achieve such degrees of self-sufficiency in food and energy, Japan needs the close cooperation with China, for which their 1978 Peace Treaty has opened the way. (Collective) self-reliance would also call for a self-sufficiency in shoes of, say, 1 pair of shoes per capita per year. Until recently, the latter seemed in most Western industrialized countries to become impossible. Their shoe industry, because of its relative labour intensity, has increasingly been hit by 'low-cost imports'. However, the advent of 'micro-processors' (chip technology) may well have changed this picture.

The above is not to suggest that the international division of labour and its concomitant volume of international trade should not increase anymore. For the period 1975-2000 a 50% population growth is projected and an 83% increase in global GNP per capita expected. (see page 13) If the relative volume of international trade would remain the same, its absolute volume would, thus, already increase to more than 2.75-fold. Even if (collective) self-reliance would decrease the relative volume of international trade, this might still double over the period 1975-2000. This would mark a tremendous change with 1950-1975, in which it quintupled.

4. TECHNOLOGICAL AND INDUSTRIAL DEVELOPMENT

4.1 Technological Self-Reliance (14)

Technological self-reliance should be seen as one, though vital, component of self-reliant development. Just as self-reliance is not necessarily synonymous with autarchy, technological autonomy does not mean technological independence. Rather it means the *ability to choose and prevent the onset of partial technological dependence*. (15) If the developing countries are to increase their level of technological self-reliance, their autonomous capacity for technological change and innovation must be strengthened. This autonomous capacity refers to the capabilities for the choice, acquisition, adaptation, absorption and innovation of technology within a dynamic and development-oriented framework.

Just as the pursuit of (collective) self-reliance may require selective participation in the global level, enhanced technological autonomy may necessitate selective delinking from the world level, however difficult this may be in practice. However, "the autonomous capacity for technological development does not mean that a country must reinvent the wheel but rather that it should have the capacity to do so if it had to - possibly in circumstances beyond its control. And it certainly means the capability to improve upon wheels invented elsewhere".(16)

The *choice of technology* is not a simple choice between labour- and capital-intensive production but a much more complex one. Agriculture, construction and services sector offer more opportunities for exercising technological choice than basic industry. Furthermore, the choice of technology can only be made after the sectors have been chosen on the basis of such factors as natural resources available and the size and growth of markets.

A society's capacity for *technological innovation* is the result of complex relationships between available capital, skills, information, and scientific infrastructure. For example, it involves intense cooperation between government and industry, needs the existence of 'social carriers', requires the tracing of 'hidden technologies' and implies national self-confidence. To embark upon their technological transformation, many developing countries may need a corresponding socio-political transformation.

Technology planning appears to be far from easy. Yet, without some form of longer term technology planning, a country will find it difficult to decide which technological inputs should be imported and which should come from domestic sources. Nor will it be possible to ensure that these inputs are appropriate in terms of resource use, employment creation, income redistribution, needs satisfaction and environmental effects.

4.2 Industrial self-Reliance

Industrialization remains one of the main roads towards economic development. Without it, the countries of the Third World will never be able to erase the tradition of unequal development which threatens to permanent'y condemn them to a subordinate place in the world economy. Indeed, developing countries increasingly realize that industrialization "can and must play a critical and pivotal role (in) achieving basic development objectives'.(17)

Industrial self-reliance as an important component of self-reliant development, would, of course, start with the satisfaction of basic needs, including the manufacture of some of the capital goods needed for their production. This would lead to the following manufacturing activites from the International Standard Industrial Classification (ISIC-1968):

basic need	manufacturing activity
drinking-water	382. machinery except electrical (pumps)
food	31. food, beverages and tobacco 362. glass and glass products 381. fabricated metal products(agric.implements)
shelter	33. wood and wood products 361. pottery, china and earthenware 362./381 (see under food)
clothing	32. textile, wearing apparel and leather 382. electrical machinery(textile and leather)
health	352. other chemical products(pharmaceutical)
education	342. printing, publishing and allied 383. (see under clothing) (printing)

The above industries are mostly 'light' in nature. However, not only to satisfy basic needs, but also to achieve some sort of balanced industrial base, it is necessary to include at least some 'heavy' industry. For instance: pumps, agricultural implements, textile and leather machinery and printing machinery should form the basis for a more comprehensive machinery industry. An industry to produce transport equipment (lorries, bicycles, and ships) is needed. Printing demands a paper industry.

Countries rich in fossil fuels, ores and minerals, even need a mining, refining and shipping industry if they are to maximize their share in the total value-added. The technology then needed mostly has to be acquired elsewhere because, for technical reasons and to be competitive in the world market, sophisticated technology is needed. After all, one cannot liquify gas by hand.

4.3 Needs of the Developing Countries

According to the Lima Declaration and Plan of Action on Industrial Development and Cooperation, by the year 2000 the developing countries should account for at least 25 per cent of world industrial production. (18) In this document, 'industrial' was not defined, nor was it specified whether 'production' refers to gross or net output (value added). In the present paper industrial is considered to be 'manufacturing' (thus excluding 'mining' and 'electricity, gas and water') and production to be net output.

Combining projected population growth with expected increase in GNP per capita income and with corresponding growth elasticity of manufacturing output, gives the following 1975-2000 picture.

description	1975	2000	multi-plier	annual growth
North				
GNP (billions 1974$)	4,465	10,552	2.36x	3.50%
population (millions)	1,111	1,330	1.20x	0.72%
GNP per capita (1974 US$)	4,019	7,934	1.97x	2.76%
growth elasticity (19)	1.12	1.01	1.06x	-
manufacturing output			2.51x	3.74%
South				
GNP (billions 1974$)	1,105	4,743	4.29x	6.00%
population (millions)	2,841	4,598	1.62x	1.95%
GNP per capita (1974 US$)	389	1,032	2.65x	3.98%
growth elasticity (19)	1.50	1.35	1.42x	-
manufacturing output			6.10x	7.50%
North + South				
GNP (billions 1974$)	5,570	15,295	2.75x	4.12%
population (millions)	3,952	5,928	1.50x	1.64%
GNP per capita (1974 US$)	1,409	2,580	1.83x	2.45%

By 2000 Southern manufacturing output would amount to *9-fold* the 1975 level, representing 7.5% annual growth. However, to achieve the Lima target by 2000 *9-fold* the 1975 level is needed, or 9.2% annual growth. (20) This is lower than the UNCTAD estimate, viz. 11 to 15-fold (21), which excludes China and is based on an expected Northern annual growth higher than 3.5%. However, to expect the latter is felt not to be realistic. (22) Furthermore, to take account of income gaps between OECD and CMEA and, within OECD, between Spain/Portugal/Turkey, Greece and the 'rest', the latter can only grow 3.0% annually, if CMEA is to grow 4.5% and Spain/Portugal/Turkey/Greece 5.5%. (23)

To achieve that Southern manufacturing output by 2000 will amount to 9-fold the 1975 level, the South will need as much as an overall annual growth of roughly 7%. Furthermore, corresponding investments will have to be made in machinery and equipment c.a. (factory buildings, infrastructure, research and development capacity and in education and training capacity). These investments would roughly amount to 11% of Southern GNP over the period 1975-2000. (24)

4.4 Assistance by the Industrialized Countries

The developing countries will not be able to make all the investments needed to attain the Lima target out of present gross domestic savings + net inflows. Assuming that they can allocate, as a maximum, 40% of their gross domestic savings + net inflows (presently amounting to some 20 + 4% of their GNP) to investments in 'machinery and equipment c.a.', this would render US$ 106 billion in 1975 and leave US$ 17 billion still to be funded. However, if the developing countries are able to increase gross domestic savings + net inflows to 25 + 2.75% of GNP by 2000, then 40% of these would render all of the US$ 677 billion needed.

description	1975	2000
GNP (billions 1974 US$)	1,105	6,092
investments needs machinery c.a. (billions 1974 US$)	123	677
40% of gross domestic savings + net inflows (20 + 4% of GNP in 1975; 25 + 2.75% in 2000)	106	677
needed additional capital transfers from North (in billion 1974 US$)	17	-

The capital transfers needed from the North would remain constant at US$ 17-20 billion annually to around 1990 and then drop off to zero by the year 2000. In total they would amount to roughly US$ 400 billion over the period 1975-2000. (25) The industrialized countries, from the First *and* Second Worlds, together could and should make such additional funds available.

They could do so, because US$ 17 billion in 1975 only roughly equals the total amount the industrialized countries are falling short in their present ODA from the target of o.7 percent of their GNP. (26) Could also, because US$ 400 billion over 1975-2000 only roughly equals one year of world military expenditures.

They should do so, because an enhanced industrial and technological and, thus, over-all self-reliance of the developing countries would not only do justice to them but also promote world stability. Should also, because it would create, for the time being, more than 800,000 jobs in the OECD-DAC countries, if the additional capital transfers would be spent there and, thus, alleviate some of their pressing unemployment problems. (27)

The North may consider to transfer the capital needed by the South through a special UN Industrial and Technological Development Fund, to be established as an Interagency cooperative effort, involving also UNIDO, UNCTAD, ILO and World Bank. Through this Fund also know-how the South may need, especially the least developed countries, could be transfered. This could include the development of industrialization strategies taking satisfaction of basic needs as a starting point, the development of an autonomous capacity for technological change, down-stream operations, etc.

5. CONCLUSIONS

The conclusions from Chapters 2-4 can be summarized as follows:

Trends in North-South relations

• Northern grain exports to the South and Southern oil exports to the North amounted in 1975 ten-fold the level of 1950; in total North-South trade amounted in 1975 more than five-fold the level of 1950. Continuation of these trends would create dangerous new forms of political dependence and become impossible from a shipping point of view.

• The ratio of the per capita income, though an imperfect indicator, of the richest and of the poorest 10% of the world population has deteriorated, over the period 1950-1975, from 10:1 to 13:1. If this trend would continue it would further deteriorate to 17:1 in 2000. This is unacceptable for reasons of human decency and for the dangers of political instability which it implies.

• North-South arms trade has practically tripled from 1964-68 to 1974-75. Furthermore, the number of countries in the South which possess advanced weaponry has increased from 1 in 1950-1960 to 40-80 in 1977 for various weapon systems. In addition to this dangerous escalation, the import of sophisticated weapon technologies exacerbates the problems of a dual economy.

• World population has grown, over 1950-1975, from 2.5 to 4.0 billion people and will grow, over 1975-2000, to 5.9 billion. This will, even as such, create considerably more tensions than at present. In addition, the relatively rapid increase in the South will create vastly increasing tensions between South and North and enormously challenge Southern socio-economic systems.

If these trends are allowed to continue, by 2000 all elements would be there for a global conflict of unprecedented scale.

Self-reliance

• A fundamental change in the present trends can only be obtained through achieving more self-reliance, not only in the South but also in the North. Self-reliance - or, in simple terms, the ability to control one's relations with others - is a comprehensive concept. It has not only economic, but also social, cultural, environmental and political aspects.

• Self-reliance is not to be mistaken for autarchy. It can only exist together with selective participation, which links the human being to the higher levels of the socio-economic system. The higher this level, the higher the degree of self-reliance and the lower the need for participation in the next level. Selective participation in the global level will, however, remain a necessity.

• If more (collective) self-reliance is to lead to enhanced economic independence, it should at least mean increased self-sufficiency in basic needs, including the system to produce and distribute them. The more 'production' is decentralized, by allowing and enabling human beings to develop themselves, the less requirements are to be fulfilled for 'distribution' to be equitable.

• (Collective) self-reliance need not be contradictory but can be complementary to an international division of labour. To accomplish this, 'comparative advantage', on which this division has traditionally been founded, should only be allowed to work in as far as non-basics are concerned. Anyhow, free trade is a myth, in theory as well as in practice.

Technological and industrial development

• If the developing countries are to increase their technological self-reliance, their autonomous capacity for technological change and innovation must be strengthened. This capacity is the result of complex socio-economic relationships and to embark upon their technological transformation, therefore, many developing countries may need a corresponding socio-political transformation.

• Industrial self-reliance starts with the satisfaction of basic needs, to which end mostly 'light' industries are needed. However, also to achieve a balanced industrial base, it is necessary to include at least some 'heavy' industry. Countries rich in fossil fuels, ores and minerals, even need a mining, refining and shipping industry to maximize their share in total value-added.

• To achieve the Lima Target (by 2000 the developin countries should account for at least 25 per cent of world industrial production), Third World manufacturing output should amount by 2000 to 9-fold the 1975 level. The investments needed to obtain this level amount roughly to US$ 125 billion in 1975 and US$ 675 billion in 2000, or 11% of Southern GNP over 1975-2000.

• Since the South can allocate at most 40% of its gross domestic savings + net inflows to this end, additional transfers from the North are needed of US$ 17-20 billion annually until 1990, to drop off to zero by 2000. These transfers only equal Northern 1975 shortfall in ODA, they could be made and should be made. Temporarily, they may generate more than 800,000 jobs in DAC countries.

The North should not see the situation in the world as a growing threat to its present interests. Rather as an opportunity to safeguard its future interests, in as far as legitimate, by doing justice to the present and future interests of the South. To this end, the North should drop its increasingly defensive attitude and respond to the challenge with its enormous potential. It should prove that self-reliance, if well understood in space and time, is near to, if not identical with, solidarity. It is in this perspective, that an UN Industrial and Technological Development Fund is proposed and that it is hoped that such an idea would be discussed at the Third General Conference of UNIDO and, subsequently, at the Special Session on the Strategy for the '80s.

NOTES AND REFERENCES

1. Data from: Lester R.Brown, *The Politics and Responsibility of the North American Breadbasket*, Worldwatch Paper 2, Worldwatch Institute, Washington D.C., 1975 (see table 2 on page 11 and Figure 1 on page 13).

	1948-52	1976
North America	+23	+94
Western Europe	-22	-17
Australia NZ	+ 3	+ 8
E.Europe & U.S.S.R.	-	-27
Japan	- 1	-20
total export North	+ 3	+38
Africa	0	-10
Asia	- 6	-47
-/- Japan	+ 1	+20
Latin America	+ 1	- 3
total import South	- 4	-40

2. Data from: *World Energy Supplies, Statistical Papers Series J* no. 2 and 20, United Nations, New York, 1957 resp. 1977.

table 7: net exports of crude oils + refined fuels		1951
North America	-/-	38.6
Hawaii	-/-	1.4
Western Europe	-/-	62.0
-/- Malta and Gozo		.1
-/- Yugoslavia		.3
South Africa	-/-	2.4
Japan	-/-	3.2
Oceania	-/-	7.7
-/- Hawaii		1.4
Eastern Europe, U.S.S.R. and China (Mainland)	-/-	0.8
-/- China (Mainland)		-
total North	-/-	114.3

		1951
Africa	-/-	11.1
-/- South Africa		2.4
Egypt	-/-	2.5
Caribbean America		74.4
Other America	-/-	12.6
Middle East (incl. Egypt)		71.2
-/- Egypt		2.5
Far East	-/-	3.5
-/- Japan		3.2
Malta and Gozo	-/-	0.1
Yugoslavia	-/-	0.3
total South		123.6

	1975 imports	exports	net exports
table 6: trade crude petroleum in million metric tons			
Developed	1,080.7	41.0	-/- 1,039.7
-/- Yugoslavia	-/- 7.4	-/- 0.0	7.4
CP Economies	76.6	103.1	26.5
total North	1,149.9	144.1	-/- 1,005.8
Developing	273.8	1,265.1	991.3
Yugoslavia	7.4	0.0	-/- 7.4
total South	281.2	1,265.1	983.9
table 10: trade energy petroleum products, in million metric tons			
Developed	234.2	103.8	-/- 130.4
-/- Yugoslavia	-/- 0.8	-/- 0.2	0.6
CP Economies	11.0	44.2	33.2
total North	244.4	147.8	-/- 96.6
Developing	57.5	162.5	105.0
Yugoslavia	0.8	0.2	-/- 0.6
total South	58.3	162.7	104.4
total tables 6 + 10			
table 6 : North			-/- 1,005.8
table 10 : North			-/- 96.6
Total North			-/- 1,102.4
table 6 : South			983.9
table 10 : South			104.4
Total South			1,088.3

3. Data from: Helga Steeg, *Trade Policy in the North-South Dialogue*, in Development and Cooperation 2/79, published by the German Foundation for International Development, Berlin.

World Trade in 1977 in billion dollars

from ↓ to →	industrialized countries	east bloc with China	developing countries	world
industrialized countries	523 (71.8%)	35 (4.8%)	170 (23.4%)	728 (100%)
east bloc with China	31 (28.4%)	63 (57.8%)	15 (13.8%)	109 (100%)
North (with China)	652 (77.9%)		185 (22.1%)	837 (100%)
North (without China)	220 (77.2%)		65 (22.8%)	285 (100%)
developing countries	208 (73.0%)	12 (4.2%)	65 (22.8%)	285 (100%)

If one would estimate trade of China with the industrialized countries in 1977 at an order of 7,5 billion dollars both ways, then North ⟶ South trade would increase to 192,5 billion or 23.0% and South ⟶ North trade would decrease to 212,5 billion or 74.6%.

4. From: Elisabeth Mann Borgese, *The Drama of the Oceans*, Harry N.Abrams, Inc., New York, 1975 (p. 119).

5. Data from:

- David Morawetz, *Twenty-Five Years of Economic Development 1950 to 1975*, The World Bank, Washington D.C., 1977.
- *World Bank Atlas 1977*, The World Bank, Washington D.C., 1978.

With these sources we have calculated the following:

	per capita income in 1974 US$	
	1950	1975
North, richest 10%	2440	6168
South, poorest 10%	88	120
10% world population in millions	252	396

Richest 10% in 1950, in order of per capita income, include: U.S.A., Switzerland, Luxemburg, Sweden, Canada, Denmark, New Zealand, Australia, Iceland, Norway, Belgium, Netherlands and France (part).

Poorest 10% in 1950 include: Somalia, Burma, Ethiopia, Mali, Malawi, Swaziland, Tanzania, Nepal, Afghanistan, Sri Lanka, Zaire, India (part).

Richest 10% in 1975 include: Switzerland, Sweden, U.S.A., Denmark, Canada, Germany (FR), Norway, Belgium, Luxemburg, France, Australia.

Poorest 10% in 1975 include: Laos, Ruanda, Upper Volta, Mali, Burundi, Somalia, Ethiopia, Burma, Nepal, Bangladesh, Chad, Guinea, Afghanistan, Niger, Benin, Pakistan, Sri Lanka, Malawi, Zaire, India (part).

Per capita incomes richest 10% have been divided by 4, to account for lower purchasing power of US$ in rich countries than in poor and for double counting in GNP rich countries (surgeon to operate victim of traffic accident, etc.).

6. See: Jan Tinbergen et al., *Reshaping the International Order, A Report to the Club of Rome*, E.P.Dutton & Co., Inc., New York, 1976 (pp. 87-88).

7. Ibid.

8. SIPRI, *Armaments and Disarmament in the Nuclear Age, A Handbook*, London and Stockholm, 1976 (p. 52).

9. See: Graciela Chichilnisky, *Disarmament in the Context of the International Economic Order*, Position Paper in: Dick A.Leurdijk - Elisabeth Mann Borgese Disarmament and Development, RIO Foundation, Rotterdam, 1979. In total US$ 6.31 billion in the '50-'65 period, equals US$ 421 million per year.

10. *SIPRI Yearbook (1978)*, Stockholm, 1978 (pp. 244-248).

11. Data from:
- David Morawetz, op.cit.
- World Development Report 1978, World Bank, Washington D.C., 1978.
- Demographic Year Book 1978, United Nations, New York.

12. From: *Children in the World*, Magda Cordell McHale and John McHale with Guy F.Streatfeild, Population Reference Bureau, Washington D.C., 1979.

13. According to *World Bank Atlas 1977*.

14. This section is, mainly, a summary of sections 3.1 and 3.2 (pp. 23-29) of: Antony J.Dolman, *The Like-Minded Countries and the Industrial and Technological Transformation of the Third World*, Foundation Reshaping the International Order (RIO), Rotterdam, 1979.

15. From: D.Ernst, *Strengthening the Technological Autonomy of the Developing Countries - Some Controversial Hypotheses Concerning UNCSTED*, Deutsche Gesellschaft für Friedens- und Konfliktforschung, University of Hamburg, 1978 (mimeo).

16. From: Research Policy Program, *Technological Transformation of Developing Countries*, RPP Discussion Paper no. 115, University of Lund, 1978.

17. UNIDO, *Towards a Strategy of Industrial Growth and Appropriate Technology*, document ID/WG.264a, 1977.

18. See: *Report of the Second General Conference of the United Nations Industrial Development Organization (A/10034)*, chapter IV, paragraph 28 of the Declaration.

19. From: UNCTAD, *The dimensions of the required restructuring of world manufacturing output and trade in order to reach the Lima target*, document ID/185/Supp. 1, 1976 (page 5).

20. Share in global manufacturing output:

	1975		2000
South	0.085		0.77 → 9.0-fold
			↑ x 1/3
World	0.915 / 1.00	2.51x →	2.30

21. See: UNCTAD, *Transfer of Technology, Technological Dependence: Its Nature, Consequences and Policy Implications*, document TD/190, 1975 (p. 2).

22. In a speech to the Ministerial Conference of the IEA, on 3 May 1979, the Secretary-General of the OECD, Emile van Lennep, pointed out that a 3.5 annual growth in the OECD countries until 1985 would increase the demand for oil with 5 to 6 million barrels a day. He seriously doubted whether such extra quantities would be available. (NRC-Handelsblad of 22 May 1979).

23.

description	growth rate in %			GNP per capita in 1974 US$	
	overall	population	per capita	1975	2000
Spain/Portugal					
Turkey/Greece	5.50	1.31	4.13	1,633	4,090
CMEA	4,50	0.78	3.69	2,350	5,814
'rest' OECD	3.00	0.43	2.56	5,238	9,845
North	3.50	0.72	2.76	4,019	7,938

24. South

	1975	2000		
population (billions)	2,841	4,598	1.62x	1.95%
GNP per capita (1974 US$)	389	1.325	3.41x	5.02%
GNP (billions 1974 US$)	1,105	6,092	5.51x	7.07%

20% ↓ ↓ 32,5%

manufacturing output	220	9x →	1,980
capital stock (3x)	660		5,940
	+5,280		

new capital per year 5280 : 25 ≅ 210 billion (1974 US$)
depreciation (10 x 50 + 15 x 210) : 25 ≅ 150
360

additional)
infrastructure)
(R & D capacity)) + 10% ≈ 40
(E & T capacity))
average investments/year 400 billion US$/year

average GNP/year $\frac{1,105 + 6,092}{2}$ = 3,599 billion US$/year

average investments/year as % average GNP/year $\frac{400}{3,599} \times 100\% = 11,1\%$

25.

South	billions 1974 US$					
	1975	1980	1985	1990	1995	2000
GNP	1,105	1,555	2,188	3,079	4,332	6,092
Investment needs	123	173	243	342	481	677
40% of gross	106	154	223	323	468	677
savings+net inflows	(9,6%)	(9,9%)	(10,2%)	(10,5%)	(10,8%)	(11,1%)
additional Northern transfers	17	19	20	19	13	0

$5x\frac{17+19}{2} + 5x\frac{19+20}{2} + 5x\frac{20+19}{2} + 5x\frac{19+13}{2} + 5x\frac{13+10}{2} \cong$ 400 billion US$

26. OECD - DAC	ncome per capita		population		
	5,238	x	679	=	3,557 billion
					x 0.7
				≈	25.0 billion
(World Development Report, 1978)				-/- present	12.5 billion
				extra	12.5 billion
CMEA	2,350	x	362	=	850 billion
					x 0.7
				≈	6.0 billion
				-/- present	1.0 billion (?)
					5.0 billion

12.5 + 5.0 = 17.5 billion US$

27. In 1975 the OECD-DAC countries had a per capita income of US$ 5,238. Assuming an employment rate of their population of 0,35, this means US$ 5,238 : 0,35 = US$ 15,000 per employee. US$ 12,5 billion, therefore, equals 12.5 billion : 15,000 = 833.000 jobs.

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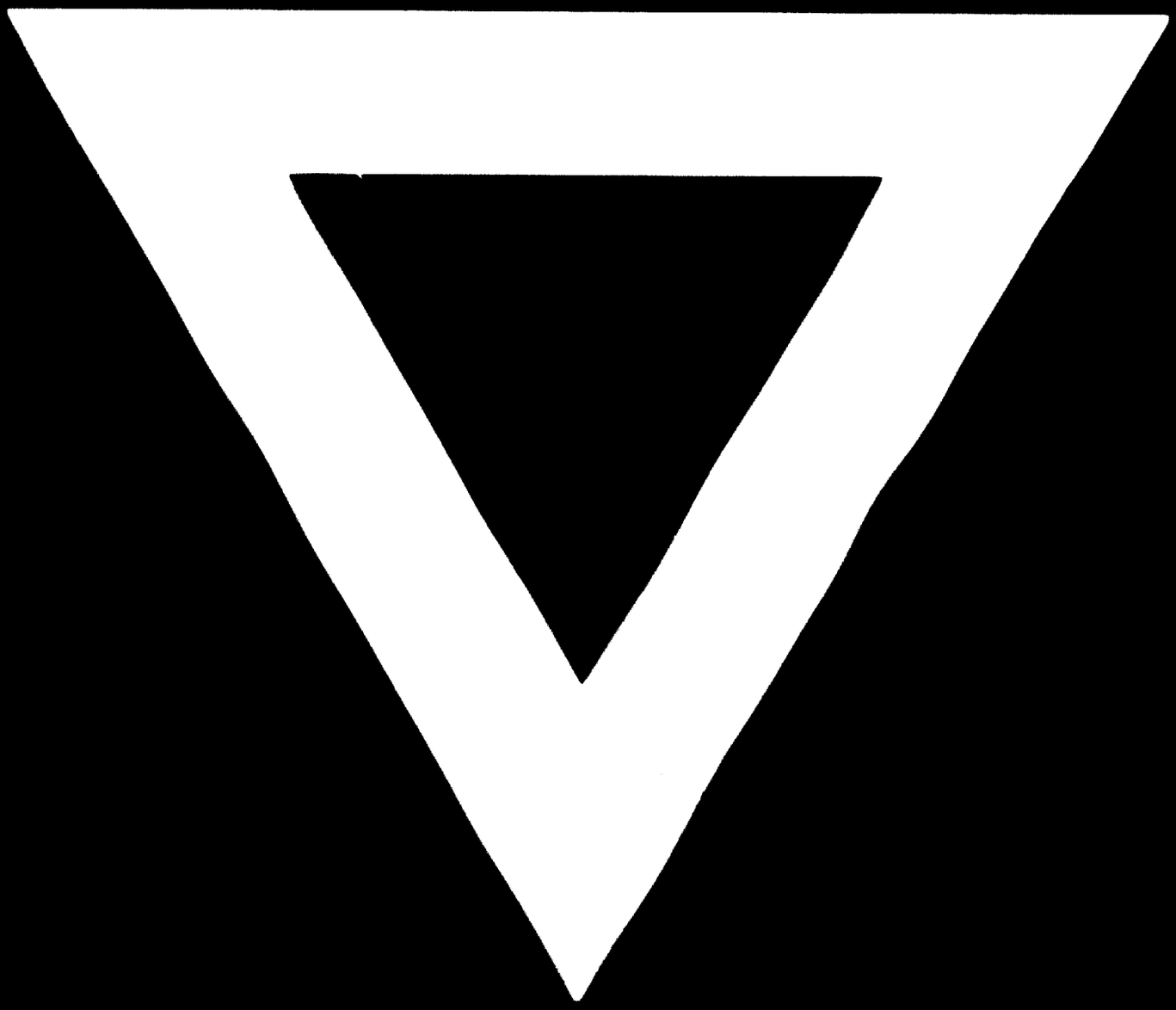

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