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Export Dynamics in Taiwan and Mainland China, 1950s-2000: A Schumpeterian Approach

Hans H. BASS

Berichte des Arbeitsbereichs Chinaforschung im Institut für Weltwirtschaft und Internationales Management

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Contents

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Export Dynamics in Taiwan and Mainland China, 1950s-2000: A Schumpeterian Approach

Hans H. Bass

Introduction

To compare the economic history of Taiwan (TW) and Mainland China (MLC) may be considered strange for various reasons – such as unequal size, present state of development, system layout, etc. However, there are also interesting similarities: in particular, both economies host very successful exporters. A further rationale to deal with the TW and MLC economies in the same context is rooted in the fact that they now show a strong tendency towards economic interaction, through which they contribute to what is perceived as the "Greater China" growth pole of the world economy. In this paper, I will adopt a Schumpeter-inspired point of view, because in my opinion it allows for the consideration of dynamic developments, a synthesis of historical and theoretical arguments, and transdisciplinary considerations.

This paper will briefly introduce the use of two core concepts in the Schumpeter tradition, dynamics and innovation, and try to interpret empirical data in their light: growth in volume and structural change of exports. It will also discuss the role of institutions and government actions for export success. Within the regional context, economic linkages between TW and MLC as well as the performance of their companies on international markets will be discussed. Finally, the paper will attempt an investigation of the factors which contribute to the innovative potential of exports systems in TW and MLC, and consider the relevance of Schumpeter's hypotheses on firm size, entrepreneurship, responsiveness and flexibility.

Schumpeter defined a dynamic economy as deviating for economy-endogenous reasons from any temporary equilibrium, leading to new combinations of productive factors, and overall growth. In this tradition, we will refer to "export dynamics" as an upgrading in the structure of exports (i.e. the inclusion of more and more sophisticated commodities), and/or the developing of new markets, and, subsequently, growth in export volume.

Each step in upgrading of the export structure and each conquest of a new market can be interpreted as a wave of *innovations*. In the vernacular of policy makers and media this term is biased towards *spectacular* "new things" (products) or processes. And both in policy and in scientific literature (see, e.g., *GRUPP 1998,* an otherwise comprehensive book), the concept today is heavily biased towards *technological* innovations.

In the present paper, however, this term is applied in the original Schumpeterian sense, which is different as the *non-spectacular* innovations are given full consideration, or, as Schumpeter put it: "It need not be the Bessemer Steel or the explosion motor. It can be the Deerfoot sausage." (*SCHUMPETER, ESS [1947], p.*

218) – or the "President noodles", as far as modern Taiwan is concerned. Also *non-technological* forms of innovation are considered central. In particular, "the opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered" (*SCHUMPETER, TED, p. 66*) will be a focus of the present study.
Dealing with success on foreign markets as an innovation *sui generis* rather than as a result-oriented indicator of technological or organisational innovations in production implies a two-tier approach to the development of export capabilities: in our case, the development from agriculture-dominated economies to industrialised economies being the first layer, the international marketing of new products being the second one. This is not trivial, as "learning to market in the newer technologies can be and often is more difficult than learning to produce." (*FREEMAN 1996, p. 169*)[1]. At least in the case of MLC, also the enterprises involved in production and international distribution are generally not identical (this will be elaborated in more details below).
Modifying the original concept, however, we will not use the term innovation from the macro-economic point of view – as Schumpeter did in order to analyse the business cycle. In this paper, "world novelty" is not considered necessary to describe innovation, but features which are new to the firm will suffice. This approach, based on a micro-economic, or business economic's point of view (see *GRUPP 1998, p. 129*), seems more appropriate at least for catching-up economies, although we have to admit that the otherwise useful original discrimination between innovation and imitation becomes blurred.

1 Two Success Stories: Some Macro Data, 1950s to 1990s

1.1 Growth in Export Volumes

The success story of Taiwanese export growth dates back to the 1950s. From 1952 to 1965 Taiwanese exports grew on average by 11 % per year, and from 1965 to 1980 by a nearly incredible pace of 29 % per year (computed with data in *TSDB 1996*). Mainland China's economic planners started to focus on export growth only after 1978. In the 1980s, few areas witnessed an export performance as dynamic as Mainland China[2] and, once again, Taiwan (see Table A1 in the appendix). The average annual growth rate of export value 1980-1995 was

1 This argument is related to the debate on transmission between productivity growth and export performance. *IBRD 1993, p. 316-324* argues that exports helped East Asian economies to increase total factor productivity rather than *vice versa*: not only by static factors as economies of scale, but even more so by dynamic factors like overcoming information deficits and adopting international best-practice technologies. See also *CHOWDHURY/ISLAM 1993, pp. 79-87*, for an overview on this debate, and a contrasting opinion.

2 On the considerable data problems for MLC's foreign trade see e.g. *LARDY 1995*.

15 % in MLC and 13 % in Taiwan (computed with data in *WDI 1997, p. 154-6*).[3] In 1979, Taiwan ranked 22nd and MLC ranked 34th as areas of origin in world merchandise trade flows. Up to today, the two Chinese economies have by-passed many previously leading export areas and are now (1997) ranking 14th (Taiwan) and 10th (MLC), respectively (*GATT 1991* and *WTO 1998* statistics).[4] The following section will discuss the structural changes causing – rather than accompanying – the growth in volume.

1.2 Upgrading of the Commodity Structure

Taiwan. The history of post-colonial Taiwan's foreign trade can be divided into five phases (*FEI/OHKAWA/RANIS 1985; CHAPONNIÈRE/LAUTIER 1998*), each one representing a considerable diversification of the export structure and an upgrading in terms of capital-intensity in production and technology content of the commodities, ousting the previously exported ones – exactly the process, which Schumpeter called *creative destruction* (for more details on data see Table A2-A4, appendix):

i. export expansion based on agricultural commodities, while imports consisted of both manufactured consumer goods and producer goods (up to 1950);
ii. primary import substitution growth, based on export of (processed) agricultural commodities, with imports consisting of producer goods and a decreasing share of manufactured consumer goods (1950–1962);
iii. export substitution (export diversification) growth based on both processed agricultural and industrial commodities (clothing, yarns, toys, footwear, sport-related products), while imports consisted of food, manufactured consumer goods and producer goods (1962–70);
iv. second drive of import and export substitution growth, based on an increasing share of intra-industry trade in increasingly sophisticated commodities (especially electronics and NC-machine tools) (1970–1986);
v. after 1986, due to a strong upward revaluation of the currency and increasing average unit labour cost, decreasing exports of all labour-intensive commodities, and increasing exports of high-tech products, including newly-developed ones (like computer notebooks). While between 1990 and 1996 exports in office machines and automatic data processing machines (SITC 75) and electrical machinery (SITC 77) increased threefold, the analysis on

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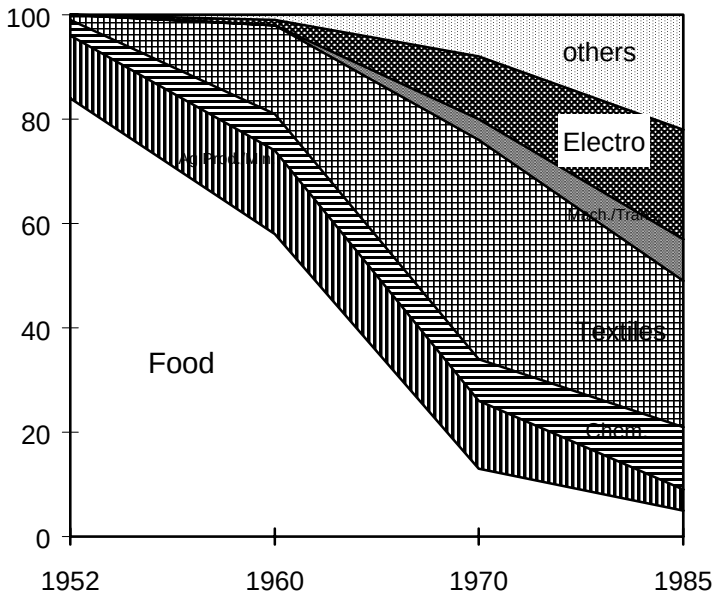
3 These figures of 1980-1995 were outstripped only by three other "High Performing Asian Economies": the Republic of Korea (14 %), Thailand (16 %), and Vietnam (18 %), and met by some European "newcomers" (or: newcomers to the new European economic core) – Portugal (12 %), Ireland (13 %), and Turkey (13 %).

4 The same is applicable for commercial services, where MLC is now ranking 16th, and Taiwan 19th, but this segment of world trade is not dealt with in the present paper as assessing the dynamics of international trade in service still poses considerable data problems (see *GRUPP 1998*, *p. 205*)

the 4-digit level of SITC groups reveals that integrated circuits and ADP, including CPU exports increased even fivefold (see Table A5). These subgroups even represent the upper level in these groups in terms of technology and knowledge content.

Graph 1: Taiwan's Export Composition, 1952-85



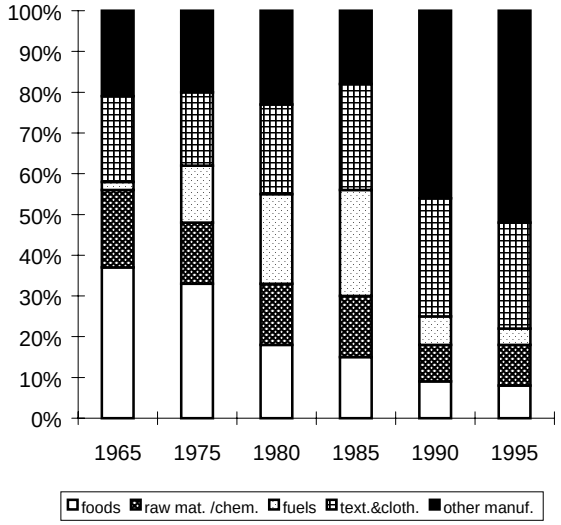
Source: see Table A2

Mainland China. Similarly, although time-lagged, post-war MLC's foreign trade can be interpreted as a series of upgrading steps (*LARDY 1992; BASS/WAUSCHKUHN 1995; IBRD 1997*; for more details see Table A6-A7, appendix):

i. an auto-centred economy importing only those producer goods which were necessary in the framework of a central plan, but could not be produced in the country itself, with exports, particularly textiles, raw materials, and agricultural by-products, being the dependent variable (1950–1978);
ii. increasing exports of petrol to finance China's outward turn (1978–1985): After the beginning of the opening policy in 1978, until 1985 MLC's trade expansion was mainly due to an expansion in the export of petrol (after having developed oil fields like Daqing in the 1970s), and other raw materials. Between 1981 and 1985 an increasing share of national petrol production was

exported (1981: 14 %, 1985: 24 % – see *BRENDER 1992, p. 35*). Yet world market prices of petrol declined sharply in 1986 (to 42 % of the 1983/85-average in 1986, and to 48 % in 1987). Although the Chinese economic planners first tried to overcome deteriorating earnings by an increase in exported quantities, they very soon shifted oil production to meet the increasing demand of domestic industries, and began to focus on manufactured export commodities;

Graph 2: Mainland China's Export Composition, 1965-95



Source: see Table A6

iii. primary export substitution growth based on exports of labour-intensive manufactured consumer commodities: textiles, shoes, plastic fabrics, particularly those manufactured in Sino-foreign joint ventures and rural collective industries, with imports consisting of producer goods (1985 – mid 1990s). A new drive of rural industrialisation in the early 1990s (imports of textile machinery of 10 bn US$) had triggered off overproduction of cotton, huge overcapacities in industry (as the state-owned enterprises should not be closed down), a flooding of world markets with Chinese textiles and, finally, import restrictions by the US, the EU, and Japan in 1996 (*BECKER 1997;* see Table A13 for repercussions of previous import restrictions). However, China's present situation is different from the situation in the late 1980s, when China had to face export market problems in the form of rapidly declining prices of oil exports, as oil production is capital-intensive while textile industry is labour-intensive. Due to the social problems involved, a similarly quick shift now does not seem possible.

iv. The most recent phase in the history of China's foreign trade can be described as industrial-policy guided attempts towards export of more sophisticated commodities (see *JING/YANG 1995*). Yet, whether these efforts towards a higher share of high-tech exports will be successful may be doubted.

The following section will link the investigation into growth in volume and change in structure by a decomposition of growth rates.

1.3 A Decomposition of Growth in Exports

Concept. Following a method developed by the GATT in the 1960s and refined by the World Bank's International Economics Department (see *WDI 1997, pp. 256-9*), growth of nominal exports can be decomposed into three multiplicative factors: the first one (f_1) measures the growth due to expansion of the world market for the country's "traditional exports"[5], which we will call *"passive expansion"*. The second one (f_2) measures the growth due to expansion of its market share for its traditional exports or *"active expansion"*. The third one (f_3), measured as a residual, captures the growth in exports due to *diversification* into non-traditional exports.[6]

Taiwan. Taiwan's exports between 1963 and 1969 – a relevant part of TW's first export substitution phase – grew by 21 per cent on average per year. Growth due to world market demand and market share expansion in traditional commodities contributed 55 % to this growth rate (due to lack of data, it is not possible to further split up these figures), while diversification contributed 45 % (computed with figures from *ITSY,* var. years).

Mainland China. A decomposition of growth of exports (data from *WDI 1997, pp. 257-9*) reveals that the bulk of MLC's overall export growth between 1984 and 1993/1994 (about 22 per cent per year) was due to an increasing share in world markets for the country's traditional export products: nearly two thirds of this export growth may be attributed to active expansion. Increase of world demand for traditional goods was responsible for less than one third, while only

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5 "Traditional" exports of a country are defined in this source as the three-digit commodity groups that made up at least 75 per cent of the value of the country's exports in 1983/84 and included at least the 10 largest commodity groups (*WDI 1997, pp. 259*).

6 The algebraic relation can be expressed as $X_1/X_0 = f_1 \cdot f_2 \cdot f_3$
$f_1 = W_1 / W_0$
$f_2 = (\tau_1/\tau_0) / (W_1 / W_0)$
$f_3 = (\tau_0 / X_0) / (\tau_1 / X_1)$
τ are the country's traditional exports, W are world imports in these commodity groups, X are the country's total exports, 0 and 1 designate the first and the last year of the period under consideration.

about 10-15 per cent of growth in export volume was due to export commodity diversification.

The difference between TW and MLC becomes obvious also from further comparison: The top-ten SITC 3-digit groups contributed 72 % to Taiwan's overall exports in 1963, while the top-ten SITC 3-digit groups contributed only 40 % to MLC's overall exports in 1980: Mainland China's export commodities were already considerably diversified at the beginning of its rapid export expansion phase. This can be seen as a clear result of China's world-market isolated industrialisation in the 1950s to 70s, a different, though not unspoilt Chinese success story, which has nowadays widely fallen into oblivion.
On the other hand, these findings imply that MLC's export expansion was considerably less innovation-driven than Taiwan's export expansion in the same phase of export development. The pattern of MLC's export performance is different also from other latecomers to industrialisation in East Asia, like Indonesia, Malaysia, and Thailand, whose export growth is mainly owed to growth in world demand *and* in export diversification (see Table A9, appendix). Furthermore, and self-evident, the MLC pattern is also different from the present pattern of more industrialised countries in East Asia, like Japan and the Republic of Korea as well as contemporary Taiwan, where, particularly in the period 1988/89-1993/94, diversification predominantly led into the service sector.

1.4 Export Promotion Policies

Concepts. The aggregate level of our considerations calls for developing a notion of the role of institutions and government policies in promoting exports. In this section, we shall first discuss what kind of government policies are consistent with a Schumpeterian theoretical framework, and secondly, using this as a heuristic yardstick, assess the export policies of TW and MLC.

i. The early Schumpeter (in his *TED*) was optimistic about the capabilities of markets to efficiently organise production, although not necessarily in the short run. This point of view definitely includes to tolerate the destruction of enterprises or branches which cannot adjust to a changing economic environment. Therefore, Schumpeter did not see much benefit in contra-cyclical interventions by the government. In particular, he objected to high government expenditures because taxation as its counterpart would paralyse the dynamic forces of the economy, the activity of the entrepreneur. Starting from this argument, economic policies in the Schumpeter tradition – with particular reference to catching-up economies like TW and MLC – basically should only provide better information for economic actors (like the "visions" published by the Japanese MITI), overcome institutional hindrances, and open up possibilities for the private sector: allowing high rates of profit for the entrepre-

neurs, as well as enforcement of "Schumpeterian competition processes" (see *LAUMAS 1962/1991*).

ii. The later Schumpeter (in his *CSD*), however, argued in favour of government policies which allowed, e.g. by institutional arrangements, for "orderly" structural change, as the metaphor *"Cars with breaks go faster than otherwise, because they have breaks"* (*SCHUMPETER, CSD*) suggests. What is proposed for sunrise industries ("orderly advance"), is also accepted for sunset industries ("orderly retreat"). Schumpeter can thus be understood as an ancestor of "industrial policies" targeting the development of individual branches.

iii. Finally, the recent developments in Schumpeter-inspired innovation theory provide a different starting point for economic policies. Developing Schumpeter's original idea from 1912 (in *SCHUMPETER's TED*), the simple, micro-based uni-linear model of economic development, going from *inspiration* to *invention, innovation, investment* and finally *imitation*, has been modified. First, the linearity of the model has been abandoned. The relation between inventions and innovations is no longer considered to be a one-way street, but a more complex process (see *FREEMAN 1987*). For instance, imitation is no passive copying of other people's ideas, but understood as an opportunity for learning by using, thus contributing to new (mostly incremental) innovations. Secondly, the importance of institutions is stressed: National Innovation Systems, "sets of institutions whose interactions determine the innovative performance of national firms" (*NELSON/ROSENBERG 1993, p. 4*), are considered crucial. Promoting the National Innovation System, i.e. the technological and institutional capabilities of a country to innovate, can thus be a third approach of Schumpeter-inspired economic policies.

This sequence of policy approaches is not only derived from the history of Schumpeter's and Schumpeter-inspired thought, but may also *cum grano salis* represent a sequence of adequate policies in the development process, developing from a "traditional" economy with a dominant agricultural sector and pre-modern economic institutions, to an industrialised economy at the frontier of internationally applicable knowledge.

Taiwan. Generally speaking, industrial policies, geared towards developing new production lines, and trade policies, geared to targeting new export markets, have been closely interrelated in Taiwan. Particular instruments providing better export opportunities for enterprises in Taiwan included (cf. *IBRD 1993, pp. 259-346; CHOWDHURY/ISLAM 1993; HERDERSCHEE 1995, pp. 69-102*):

– tariff rebates on inputs for exports (in the early 1950s);
– establishment of export processing zones (EPZ, starting 1965 in Gaoxiong) with less regulations in production – the share of EPZ production in total exports amounting to a maximum of 9 % in the early 1970s;
– (institutional or legal) restrictions to entry into the domestic market, while production for exports was open to new entrants thus also contributing to up-

grade the production and export commodity structure (see *KRUGMAN 1983* for theoretical considerations);
- intra-industry subsidies, particularly by taxes on domestic sales;
- reduction of labour costs for export industries;
- export loans (see *IBRD 1993, pp. 282*);
- promotion of small and medium enterprises;
- marketing and information assistance (like fairs or individual linking up of enterprises with counterparts overseas etc.).

In TW, there has been a combination of private-sector dynamics with supportive rather than directive government (*CHAPONNIÈRE/LAUTIER 1998*): government has promoted exports by using firm's export performance (thus using markets as a selection device) as a basic criterion for judging access to imports. This policy not only introduced a self-enforcing process, but also temporarily secured pioneer achievements (similar to patents, which Schumpeter described as a basic necessity for the drive to innovate).
While direct support for export enterprises seemed to have been relatively strong in the 1950s, most commodity-based export incentives have been phased out by the beginning of the 1990s. There are indicators (interestingly enough: after the beginning of Taiwan's impressive democratisation process) that most recently more subtle interactions between government agencies and private enterprises, which also mobilised resources from overseas (like "ABC"–(i.e. American born and educated Chinese) human capital) or MLC-software research institutions, contributed to even "world novelties" in the automatic data processing industries: the notebook, for instance (although still many components have to be imported from the US; see *HERRMANN-PILLATH 1994, p. 226-9*). On the other hand, the widespread drive to invest overseas (an "adaptive" rather than a "creative response", see below) may indicate a lack of potential of the Taiwanese innovation system to help produce technologically more sophisticated commodities (this will be discussed also below in the framework of investment linkages between TW and MLC).

Mainland China. Definitely the most important economic policy in MLC contributing to the export success was the liberation of enterprises from the central plan. While the focus of reforms in Mainland China's foreign trade organisation in the beginning of the reform and opening policy was the extension of office autonomy, only in the second half of the 1980s the agency system allowed for taking over export commissions by competing Foreign Trade Corporations (FTCs) (*HERRMANN-PILLATH 1995, p. 149*). Until the mid-1980s, potential exporters were offered fixed prices by the FTCs. For the majority of the commodities these prices were the same as on the domestic market, thus providing no incentives to export for individual enterprises but channelling any gains from exports into central funds. Price reforms, which allowed exporters to gain from world demand, contributed to the export expansion. Although these elements of systemic transformation are also important step towards more efficiency, the

market structure in mainland China's external sector today is still far from being an equal-footing competition. While foreign-finamced enterprises may import for their own purposes and export their own products, for the domestic funded enterprises FTCs still play the key role for international marketing (although some large corporations do not have to use these intermediaries). The number of FTCs is very small in comparison to other economies: about 0.3 FTCs per 100,000 inhabitants, compared to 8 in Japan, 31 in Germany, and 190 in Taiwan.

The second crucial (albeit: indirect) instrument in MLC's export promotion policy was the attraction of foreign direct investments (FDI), especially by regional investment incentives, e.g. reduction of corporate tax in the Special Economic Zones and other particular investment promotion zones (like the Open Coastal Cities). FDI significantly contributed to the upgrading of MLC's production structure.

Other instruments of export promotion in MLC in the 1980s further included selective input subsidies and the gradual devaluation of the currency, thus reducing a general bias against exports (see *BASS 1996*).

Since 1995 policy planners tried to attract FDI not on a regional incentive basis but with technology-oriented selection criteria, along with the establishment of new institutions, e.g. the Import/Export Bank, to develop capabilities for High-tech exports (see *BASS 1996*). We will later refer to this attempt, when discussing prospects of flexibility in responses to a changing international economic environment (in terms of stagnating markets and income-inelastic demand for traditional Chinese manufactures, like textiles) and national needs (in terms of labour intensive production).

Conclusion. In the framework of the three Schumpeter-inspired approaches to public policy, we may place TW's present export promotion policy in the second and third category, while MLC's policy is still in the first and the second one.

The net benefit of these policies, however, is much disputed (see, for instance, *IBRD 1993, p. 312*). Here, we would only point to the fact that this "guided capitalism" or "governing markets" (*WADE 1990*) has been successful in the early, or easy periods of the catching-up – when both governing *and* markets could play their respective roles. Whether this approach will continue to be successful in the much more complex economic environments for the newly industrialised and newly industrialising economies at the beginning of the 21st century, may be doubtful, as information processing capacity of state administrations may not be able to keep pace.

2 Twisting the Cord in the 1990s

2.1 Economic Linkages Between TW and MLC

Concept. According to *AKAMATSU'S* well-known Flying Geese Pattern (*HOBDAY 1994; HWANG 1998*), economic development in East Asia is partly perceived as a transmission process between countries: if industries lost cost competitiveness in one country, particularly because of rising unit labour costs, production is transferred to an economically less advanced country. At the same time, the more advanced country builds up new, usually more capital- and technology-intensive production lines. This framework connects a micro-economic or sectoral product life cycle theory and a theory of foreign trade as based on specialisation. However, it can also be understood as a Schumpeterian process of innovation and imitation – the "newly industrialised economies" of the second generation (including Taiwan) and the third generation (including MLC) being interpreted (at the beginning of the catching-up process) as imitators and (later) even as "Schumpeter-countries" (*WELFENS 1989, p. 46*), taking over a leading role in new industries.

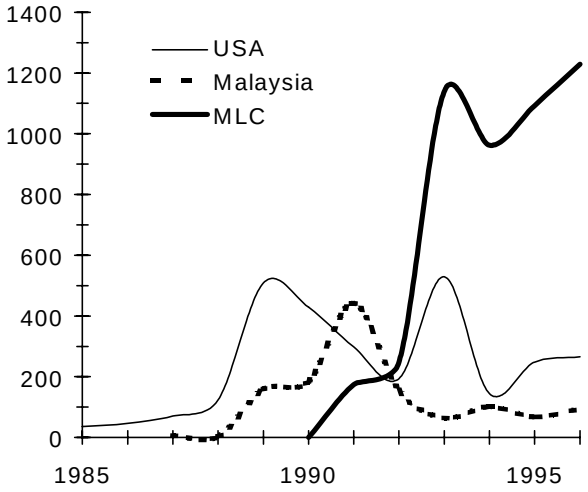
Investment Flows from TW to MLC. In *Section 2.2* of this paper we argued that, with due consideration of all differences, some similarities in the development process of Taiwan's and Mainland China's export are obvious: the foreign trade pattern of MLC can be understood as lagged one phase compared to TW. This fact contributes to explaining, why the export performance of both economies is now linked by a *dynamic* regional interaction[7].

The basic linkage instrument is FDI. MLC policy planners after 1978 based their development strategy on the inflow of foreign direct investment (FDI), and enforced policies to attract FDI in the early 1990s, as pointed out in the previous section. Various reasons contributed to a particular interest of MLC planners in investment from Taiwanese sources:

i. Taiwanese experiences in supplying world markets with light-industry products;
ii. Taiwanese enterprises being in the 1980s perceived as targeting markets in the industrialised economies rather than the domestic MLC market;
iii. intentions to strengthen non-political relations across the Taiwan Strait (*HERRMANN-PILLATH 1994, p. 131*, referring to *MARUYAMA NOBUO (ED.), Kanan keizai-ken, 1992*).

7 Whether interaction, interdependence, or integration are the appropriate terms to describe what is happening between the two economies, may be disputed: see e.g. *CRANE 1993, HONG 1996, BASS 1998a*.

Graph 3: Taiwanese Direct Investment in Various Countries, [outflows per year in mill. US$], 1985-1996



Sources: TSDB 1996; INVCOM, Statistics... (Tongji Yuebao), Dec. 1996. 1993 data for MLC adjusted with an estimation by LONG 1994.

On the other hand, Taiwanese enterprises were interested in investing overseas, and after 1990 – when Taiwanese restrictions on investing in MLC were withdrawn step by step – to invest in Mainland China. Reasons included:

i. unit labour costs had been rising due to changes in relative scarcity of labour, capital, and ecological resources during industrialisation;
ii. since 1985, both as a result of permanent trade balance surpluses, especially vis-à-vis the main export market, the United States, and pressure by the US to adjust the trade balance, the Taiwanese currency was upvalued;
iii. lower transaction costs in an environment with a certain cultural affinity (although there are some caveats worth raising, see *BASS 1998a*);
iv. finally, particular investment incentives for the Taiwanese *tongbao* (compatriots) may have played a role, like the positioning of the four original Special Economic Zones in Fujian and Guangdong, or allowing Taiwanese-invested enterprises earlier than foreign-invested enterprises also to supply the domestic market. However, the net effect of these incentives, if compared with the detrimental effect of lacking bilateral investment protection agreements, may be dubious.

Cost reducing direct investments of Taiwanese enterprises especially (or: officially recorded) since 1990 (see Graph 3) have heavily contributed to the export potential of mainland enterprises. Most recently, also market-seeking invest-

ments have become important. According to MLC data, nearly 60 per cent of 1995 cumulative foreign investments came from Hong Kong sources – many of which actually represented disguised Taiwanese investments, as Hong Kong based dummy investors have been used by Taiwanese companies to overcome legal hindrances to invest in MLC, particularly prior to 1990 – while 10 per cent officially came from Taiwanese sources (for details see *BASS 1998a*). In 1995, about 18 per cent of gross investment in MLC came from abroad[8], but 30 percent of MLC's exports came from foreign-invested companies.
Thus we can conclude that Taiwanese investments in MLC have significantly spurred export volumes and have contributed to the upgrading of MLC's export structure. On the other hand, there was definitely a lack of product and process innovation in some relevant sectors, which would have contributed keeping production lines in Taiwan in spite of rising unit labour costs.
These observations now set the stage for investigating the joint performance of Chinese exporters on geographically defined commodity markets in the following section.

2.2 Market Share Development of TW and MLC Enterprises

While *Section 4* compared analogue phases at different points in history[9], the present section compares the export performance of different development phases at the same time. Detailed data from the three largest world markets, the USA, Japan and Germany (see appendix, Table A13) suggest three different patterns of Chinese market share development in the 1990s: the flying geese pattern, as already referred to above, a "dragon pattern", and a "tiger pattern".

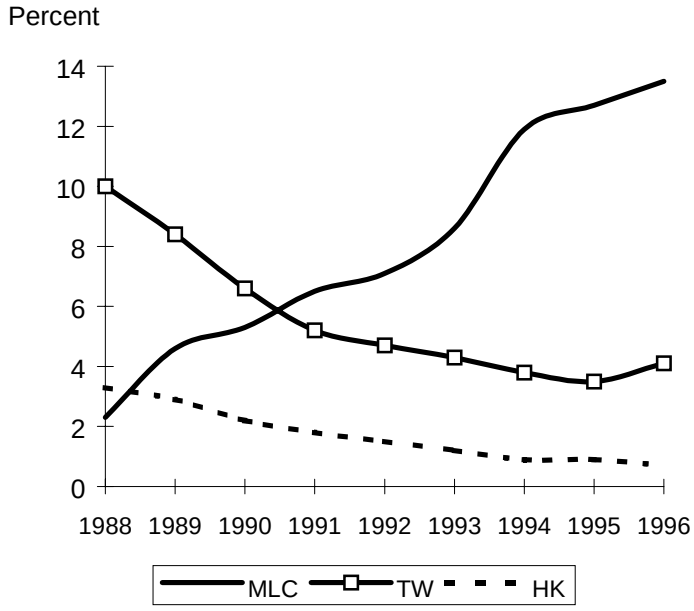
Flying Geese Pattern. The first pattern depicts a situation where the market share of Taiwanese exporters (and those from Hong Kong) fell, while MLC's share increased. This is a distinctive development in the framework of the Flying Geese Pattern: the more advanced economy looses comparative advantages in labour-intensive industry, while the less advanced one is able to overtake these markets, an effect particularly triggered off by transfers of Taiwanese industries to MLC, e.g. in electronics (see Table A12).
Thus, a good example is telecommunication (SITC 76), which includes television and radio receivers, sound recorders, and television recorders. As can be seen in Graph 4, the Taiwanese market share on the US import market for these products fell from 8 % to 4 % in the early 1990s, Hong Kong's share fell from 3 % to 1 %, while MLC exporters did increase their share from 5 % to 13 %

8 As with figures on foreign trade, caution is also reasonable with figures on FDI in China: firstly, there is the problem of re-routing indigenous capital via Hong Kong in order to get subsidies and other benefits for foreign investors; secondly, there are many pro forma joint ventures in China established to get hold of import (and export) licenses.

9 For a comparable approach, using data from MLC and *Japan*, see *SEKIGUCHI 1990*.

– but the overall increase of the "Greater China" Economic area is not really significant. The products of this pattern can be characterised as "Heckscher-Ohlin-type goods" (*GIERSCH 1984*), where factor prices determine export performance. Although this may not be the complete picture, as industries were not only transferred from Taiwan to the Mainland, but also from Taiwan to particularly Malaysia, while, on the other hand, also indigenous Mainland industries were able to gain increased market shares, the picture does provide us with a tentative impression.

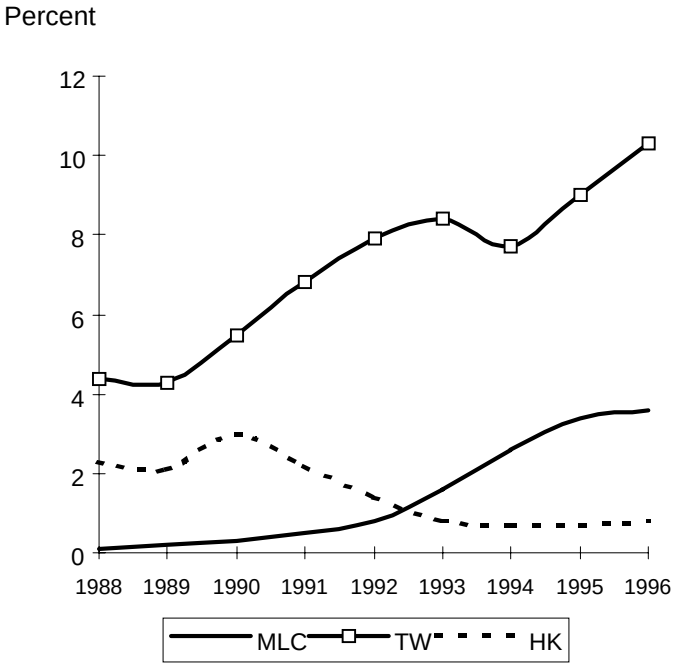
Graph 4: Chinese SITC-76 Import Market Shares in USA, 1988-96



Source: see Table A13

Tiger Pattern. In this pattern, both Taiwan and MLC exporters increased their market share. However, MLC may have gained only what Hong Kong lost because of transfer of workshops from Hong Kong proper to MLC Shenzhen. Examples for this pattern are the import markets for office machinery and automatic data processing, both in Germany and in Japan.

Graph 5: Chinese SITC-75 Import Market Shares in Germany, 1988-96



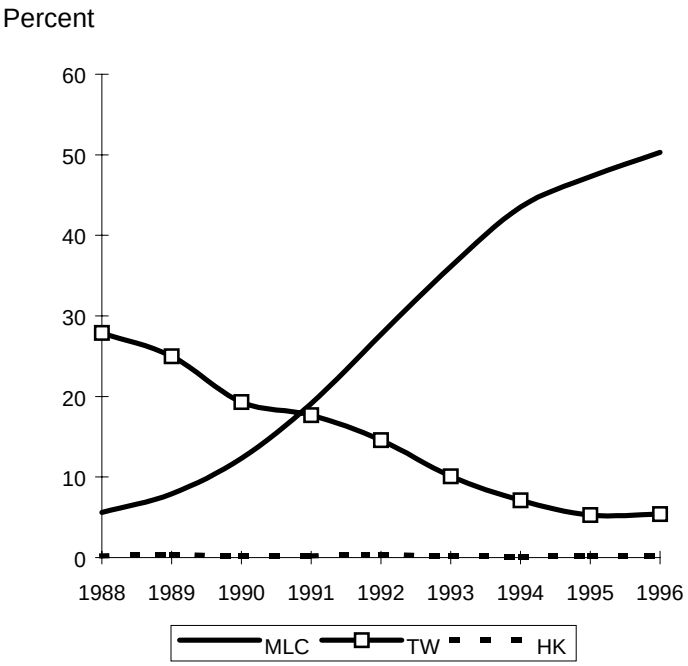
Source: see Table A13

SITC 75 (office machinery) includes typewriters, word-processing machines; calculating, accounting machines; photo-copying apparatus; analogue or hybrid data processing machines; digital automatic data processing machines, CPUs; digital processing units with storage, input, output. Most of these products can be classified as "Schumpeter-type products", experiencing a high share of R&D expenditure and a high speed of product and process innovation. These products are not only successful by price competition, but also by leadership in technology ("the Schumpeter-type competition"). Taiwanese notebooks – a particular case in point – constitute 1/3 of world exports, mice even 80 %, and scanners 70 % (*GÄLLI/FRANZEN 1995, pp. 163-6; CHAPONNIÈRE/LAUTIER 1998, p. 244*). For these products, TW is not only a leading exporter, but also a leading producer and developer. Therefore, it would not be adequate to interpret this case only in the framework of a different part of the flying geese model, viz. the transfer of production and export capabilities from Japan to Taiwan (and other NICs).

Dragon Pattern. The third pattern of market share behaviour describes a situation, where the gain of MLC exporters heavily outweighed Taiwanese loss in market share. Striking examples are footwear (SITC 85) exports to Japan and the US, and marketing apparel in Japan. These products, although also of a

Heckscher-Ohlin-type, are different from the first type, as they are easy to imitate, and product cycles are extremely short.

Graph 6: Chinese SITC-85 Import Market Shares in Japan, 1988-96



Source: see Table A13

We may conclude that only patterns (2) and (3) are true examples of market innovation, because much of the shift from one area of origin to the other in pattern (1) seems due to foreign direct investment from Taiwanese enterprises to MLC locations – representing locational innovation in production rather than market innovation of exporters. But neither the dragon pattern nor the tiger pattern fits neatly into the general approach of "innovators" and "imitators" of the flying geese pattern, and rather suggest to conjure a certain innovative potential in its own right.

In the following section, we will discuss some factors which may be relevant for the *future development* of such innovative potentials in MLC and TW. The question about further innovative potential can be discussed with consideration of the two most striking differences of the MLC and the TW export system: the typical size of enterprises in the export business, and the behavioural flexibility of companies.

3 A Strong Common Future? Some Micro-based Conjectures

3.1 Typical Size of Enterprises and Innovative Potential

Concepts. While the early *SCHUMPETER* (in his *TED*) saw the newcomer-entrepreneur (necessarily starting small scale) as the driving force of innovation, the later *SCHUMPETER* considered big business as the most innovative form of enterprise, because large enterprises can allow for R&D departments, buy specialist knowledge etc. The "neo-Schumpeterian hypothesis" thus conjures that capability to (technologically) innovate is a function of size[10] with positive returns to scale (*WAKELIN 1995*; for an overview of the vast literature about the related issue of market structure and proneness to innovate – and its ambiguous results[11] – see *BALDWIN/SCOTT 1987*; *ROTHWELL/DODGSON 1994*). Some neo-Schumpeterians (e.g. *WAKELIN 1995*) not only tested by econometric cross-country studies the statistical relation between firm size and technological capabilities, but also the influence of technological capabilities (including embodied and disembodied technology – like workforce qualifications) on the economies' export performance. Little surprise that the impacts are strong when industrialised countries are considered. Much simpler, in this section we will only consider the potential influence of the strikingly different size of enterprises involved in foreign trade in TW and MLC on innovativeness in this sector.

Taiwan generally is apostrophised to be the paradise of small enterprises: according to the official definition, more than 95 per cent of Taiwan's enterprises are of small or medium size (SME), providing two third of total employment. Although economic planners in Taiwan, impressed by Japanese experiences with *soogo soosha*, in the past also attempted to develop *dà màoyìshâng*, these large trading companies never really took off. Incentives were very modest, compared to what was offered to Korean *chongap sangsa*; competition by foreigners (Japanese trading companies) was fierce; and large trading companies got only little support from local business groups (*IBRD 1994, p.112*). The dominant form of trading companies (presently about 40,000) is extremely small and specialised. These enterprises and the small local manufacturers handled 2/3 of Taiwanese exports in the 1980s, but now their share has declined to app. 1/2 of Taiwanese exports (see Table A8 in the appendix).[12] In other words: with in-

10 More precisely, the size hypothesis in this formulation should be attributed to *J. K. GALBRAITH* (see *GRUPP 1998, p. 56*).

11 The authors conclude: "There is no unambiguous evidence of an important, generally valid, relationship between competition and innovative activity. Case studies provide thought-provoking possibilities. But where statistically significant relationships have been found, the explanatory power is small." *BALDWIN/SCOTT 1987, p. 145.*

12 According to a guess introduced into literature by *GÄLLI* (*1980*, cited in *WADE 1990, p. 147*), 30 or even 50 per cent of Taiwan's foreign trade is said to be handled by Japanese *soogoo shoosha* in the late 1970s. This figure is also referred to by the

creasing sophistication of commodities, small enterprises in TW may have lost some of their competitiveness in exports.

Mainland China. At the 1978 economic-policy watershed MLC had an extremely concentrated structure of foreign trade companies. All foreign trade was carried out by a dozen of Foreign Trade Companies (FTCs) with monopoly power in the trade of non-overlapping commodities. After 1978, in the framework of China's move from a centrally planned economy towards an economy, where markets govern most economic decisions, however, new FTCs were created: provincial branches of national FTCs became independent, and new FTCs were created on the provincial or municipal level.
Presently several thousand FTCs exist, the same sort of commodities being traded by different companies. We can distinguish a two-layer structure of exporters: actual traders (the FTCs), and the producers (and some producers who trade their own production). On the production level, a high share in exports derives from foreign-invested enterprises and rural collective enterprises (see *TAUBMANN 1996, DENG/WANG 1997*), i.e. – apart from the petty commodity production – the most decentralised sectors of the Chinese economy. However, the domestic-funded small and medium scale enterprises normally do not have an export license, so that exports are still channelled by the bigger trading companies (see Table A10-A11, appendix). There is still the dominance of the large ones: the 10 largest foreign trade companies in MLC traded about 37 bn US$ of imports and exports, i.e. app. 15 % of Mainland China's total foreign trade in 1995 (*HTTP://WWW.CHINATODAY.COM/TRADE/A00.HTM*).[13]
The institutional innovations up to now seem to have been a precondition of the changes in MLC's export structure: Primary products are homogenous goods sold on international markets at world prices – and little marketing knowledge is needed to sell them. Manufactured goods are more heterogenous and require a more sophisticated understanding of consumer tastes, quality standards etc. (*LARDY 1992, p. 697*). In future, MLC may have to carry out even more institutional reforms in order to optimise its export system, e.g. by further expanding the "agency system".
Relying on the realisation of economies of scale helps to expand a company's market share in traditional export commodities; diversification, however, seems to call for a more decentralised marketing structure.

Conclusion. The later Schumpeter's conjecture that *"the perfectly bureaucratized giant industrial unit ... ousts the small and medium-sized firm ..."* (*CSD, p. 134*), does not seem plausible in our context: under the circumstances of increasing sophistication of export commodities, the most favourable type of en-

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World Bank (*IBRD 1994*), but is contradicted by more detailed data from Taiwanese sources (see appendix, Table A6).

13 However, compared to countries like Brazil this may not be considered a huge concentration *(see VON KIRCHBACH/AGUADO 1996).*

terprise in the foreign trade sector neither seems to be the very small enterprise, nor the very large one. Bureaucratic management structure of large companies can counteract benefits from economies of scale and scope[14], and lack of endogenous resources counteracts benefits of the small-scalers' flexibility. Yet, the issue of flexibility in economic behaviour is far more complicated than a simple correlation with the size of a company may reveal. This issue will be discussed below.

3.2 Capabilities for Adjustment

Concepts. In this section, we will discuss the adjustment processes, which exporters have to face, primarily due to changes in world demand. We will start with a review of two concepts helpful in this context, "creative/adaptive responsiveness" and "flexibility".

In an article in the *Journal of Economic History*, *SCHUMPETER* distinguished "different kinds of reaction to changes in 'condition'" "Whenever the economy or an industry or some firms in an industry do something [...] that is outside of the range of existing practice, we may speak of creative response" in contrast to the "adaptive response". There are three characteristics of creative responses:

i. "it cannot be predicted by applying the ordinary rules of inference from the pre-existing facts";
ii. "creative response shapes the whole course of subsequent events and their long-run outcome [...] or, to put it differently, it creates situations from which there is no bridge to those situations that might have emerged in its absence";
iii. creative response has to do with "quality of the personnel" available in a society, and in the particular field of activity, and with "individual decisions, actions, and patterns of behavior". (*SCHUMPETER, ESS [1947], p. 217)*

A related concept is *flexibility*, narrowly defined as adaptation to changing demand by reorganisation of production (*PIORE/SABEL, 1984/1989*). The precondition for economic flexibility is a not too high specialisation of resources (hence: "flexible specialisation"). A wider definition refers to the ability to quickly react to new circumstances, or to keep intellectual and other assets in a relatively liquid form, i.e. to have a great number of options available (*KLEIN 1988, p.105*).

Schumpeter argued that innovation needs long-term planning and planning security, i.e. a stable economic environment, a temporary monopoly, or patent protection. However, this may create rigidities for short-term reaction, a trade-off between short-term and long-term-flexibility exists: "using less specific assets

14 This is the general reason why in the 1980s and 1990s large enterprises divisionalised, used "outsorcing", or even broke down into smaller semi-independent ones – and thus neither the visions of *GALBRAITH* nor *PIORE/SABEL* did materialise.

may increase flexibility in the short run, but may reduce it in the long run" (*CHANG HA-JOON, 1995, p. 204*) – high short-term flexibility may create unnecessary failures.
Generally speaking, economic flexibility is dependent on the level of development of an economy. Re-active flexibility of an economy decreases, while innovative flexibility increases with economic development. The reason for a high reactive flexibility of low-income countries is that for price shocks for their most important export commodities there are no or only few alternative strategies, and they have to adjust quickly and strong, even with net costs of adjustment, while middle- and high-income countries can cushion shocks by diversification (in high-income countries this may even lead to a temporary refusal of structural change). The higher innovative flexibility of middle- and high-income countries is a function of management capacity. As TW and MLC are on two different levels of economic development (just compare a per capita GNP of 500 US$ to 12.000 US$!), it is not surprising that both economies have different capabilities for flexibility.
Here, however, we would like to additionally elaborate on institutional reasons, applying a transdisciplinary approach, to cover the interaction of economic and non-economic factors, as suggested in Schumpeter's *HEA* (*p. 12*).

Taiwan. Chinese family businesses (CFB), as prevalent in Hong Kong and Taiwan, typically are very specialised in scope. Normally they focus on one market or one product only. Decision making is strictly hierarchical. According to studies in (business) sociology (*REDDING 1990; FUKUYAMA 1995*), CFB are characterised by a high degree of centralisation, i.e. personal directions. Ownership, control and family are closely interrelated – they are, by the way, the prototype of *SCHUMPETER*'s bourgeois family background for capitalist enterprises.
Generally speaking, growth in size of organisation leads from centralisation to structuralisation: specialisation, i.e. division of labour between the persons and organisational departments concerned; standardisation, like formal job descriptions; formalisation of work procedures. According to *REDDING*, however, this is not the case in the CFB, because there are socio-psychological restrictions on trust. Power is person-embodied (cf. *MAX WEBER's* (1972, pp. 134 passim) definition of *patrimonalism* as a form of tradition-based rule with decreasing barriers to person-based legitimisation, thus freeing itself from the barriers of traditional inflexibility), authority is only with the owner's family. Another characteristic is *paternalism,* i.e. big *and* small problems are decided by the boss. In the external dimension, networking is the adaptive response: there are, for instance, few formal subcontracting arrangements between enterprises, but personal relations are important, consequently ensuring also higher flexibility or adaptability. This type of organisation definitely has its advantages, like rapidity in decision making, a high degree of confidentiality in business information. With regard to cross-border trade, *FUKUYAMA (1995, p. 106*) emphasises that (Chinese) family

businesses have advantages in certain world market segments, which are characterised by:

- high labour intensity;
- rapid change;
- strong segmentation, which means that it is easy to get an overview on this market segment, e.g. textiles, apparel, toys, plastics (see also *PIORE/SABEL 1984* for an assessment of market segments particular suited for small-scale enterprises).

There are, however, several disadvantages, particularly occurring in the process of growth of enterprises: nepotism (family relations being more important for promotion than expert knowledge), frustration of the middle management. According to *REDDING*, organisations with these restrictions do not have the option to divisionalise, but can only stay small or continue to grow in the same organisational structure, which makes the CFB a non-permanent structure (regularly breaking up in the third generation, as argued by *FUKUYAMA*).

Although the (Confucian) family tradition is an important cultural heritage, the new global economic environment may be a stronger challenge. Getting into more sophisticated commodities needs adaptation, e.g. the incorporation of family-exogenous expertise. According to PORTER (*1996*) the idealtypical Chinese-Asian enterprise, still has some advantages, which, however, fade in the present world economic environment:

Advantages and disadvantages of Asian enterprises under different framework conditions

Framework Conditions	*Advantages*	*Disadvantages*
many chances: positive climate of world economy	▷ long-term orientation in goals ▷ intuitive action	
many changes: complex problems demanding high co-ordination capability		▷ no focused strategies but opportunistic operations ▷ repetition of formerly successful strategies in less developed regions ▷ over-diversification, lack of continuity (e.g. no brand names, no control of marketing channels)

Source: adopted from Porter 1996.

While Taiwan is a clear case of family-oriented business ethics and economic rationality, MLC during most of its post-war history – in sharp contrast to China's social heritage – had not given much if any room for family orientation in business.

As is well known, Schumpeter's definition of the entrepreneur is different from conventional definitions: it is not the capital owner, nor the manager of day-to-day tasks, but the one who carries out innovations. *Schumpeter* constructs the model entrepreneur as an *WEBER*ian idealtypus. This may on the one hand meet with sociological approaches to "Chinese entrepreneurship" as a distinctive, historical form of entrepreneurship and entrepreneurial motivation, which adds a cultural-historical relativation to the mono-economical Schumpeterian approach. On the other hand it also allows to form more abstract concepts about the "entrepreneurial function", i.e. to carry out innovations – as the late Schumpeter had argued: *"Every social environment has its own ways of filling the entrepreneurial function"*, *(SCHUMPETER, ESS [1949], p. 255*). Thus, the entrepreneurial function can also be occupied by a team – even by the government (*SCHUMPETER, ESS [1949], p. 262*). This approach we will adopt when speaking about responsiveness and flexibility in economic behaviour in MLC.

Mainland China. *Prima facie*, Mainland China is no economy from which to expect a high degree of flexibility. During the time of intensive political campaigns due to the unpredictability of the political circumstances, risk avoiding behaviour was rewarded (see *REDDING 1993: 235*) – and thus inflexibility. On the other hand, some authors point to the fact that the Sino-stalinist development path also allowed for flexibility niches – even that flexibility was a basic condition of life – as the failure of formal institutions demanded flexible informal relations for survival (*HERRMANN-PILLATH 1996, p. 13*). In sectoral terms, rural industrial enterprises were considered to act in an autarc (or: cellular, see *DONNITHORNE 1972*) framework and, in fact, were never covered by central planning. Also today's managers – the one-time activists of the cultural revolution – may not have learned to internalise stable institutional conditions (*HERRMANN-PILLATH 1995, p. 129*).
Apart from personnel, economic flexibility is also dependent on information. The quantitiy of information definitely increased with MLC's opening towards the outside world, as it is a clear function of the relevance of market mechanisms: the price vector contains more information on market demand and supply than a central plan can contain, as argued by *VON HAYEK* (e.g., *1967).* Also the capacity to process these information did increase in the 1980s with more and more Chinese managers being trained in understanding the market mechanisms.
A third aspect of flexibility becomes obvious when discussing the relation between individual FTCs and the central authorities. In MLC, three categories of external trade can be distinguished with reference to the information, allocation and control mechanisms: centrally planned, government-guided, and "free" (i.e. following decentral planning on the enterprise level and market conditions). For the 1980s the volume of the three categories is estimated to be 50-60 per cent centrally planned, 20 per cent guided, and 20-30 per cent free (*GERHALD*, cited in *SEKIGUCHI 1990, p. 397*), while *SEKIGUCHI* estimates exports under directorship plan (direct state trading) in 1988 amounting to 30 per cent, those under

foreign exchange quota (guided trade) as 20 per cent of total exports. In the 1980s, FTCs oriented their export supply volume at international prices rather than costing in order to fill their foreign-exchange delivery quota. More independence for individual FTCs, granted in the course of economic reform taking ground in the industrial sector after 1984, also allowed for more flexible behaviour of FTCs. In the 1990s, deregulation has further progressed. In particular, exporters in the 1990s could retain a certain portion of their earnings of foreign exchange.

Finally, however, there is a strong impediment on flexibility of the whole export structure by the structure of domestic production and the national political imperative to retard "destruction" as long as alternatives do not provide the necessary mass income opportunities. As is well-known, state-owned enterprises in China are in a desperate condition. This is particularly true for the textiles industry. Over the past decades central authorities only insufficiently re-invested profits from these enterprises, causing severe under-capitalisation and non-competitive technological standard. The implications of this situation were already discussed in *section 2.2*.

Conclusion. This brief overview suggests needs for further institutional innovations in both economies in order to cope with the new challenges of world trade. This may demand a more structured organisation of enterprises in Taiwan, and more individual responsibility in MLC enterprises – the notion of a convergence in business organisation does not seem out of place, thus giving additional impetus to the interaction potential between both economies.

Appendix

Table A1: Percentage Change in Merchandise Exports, TW and MLC, 1979-1997

	1979/1989	1989/1997
TW	+ 311 %	+ 185 %
MLC	+ 279 %	+ 352 %
Top-25 Exporters*	+ 103 %	+ 178 %

Share of the Top-25 exporters in world trade: 83 % (1989) and 84% (1997).
Sources: GATT 1991; WTO 1998. LARDY (1992, p. 694), however, reports MOFTEC data which even indicate a percentage change of 316 % for the first period for MLC.

Table A2: Volume and Composition of Taiwan's Exports, 1952–1985

Year	Value (US$ mill.)	Agr. Prod., Min., Basic Metals	Food	Textiles etc.	Mineral & Met. Prod., Chemicals	Machinery, Transport equipment	Electr. Mach.	Others
1952	117	12%	84%	1%	3%	0%	0%	0%
1960	164	16%	58%	17%	7%	0%	1%	1%
1970	1,481	13%	13%	42%	8%	4%	12%	8%
1985	30,726	4%	5%	28%	12%	8%	21%	22%

Source: TSDB 1988.

Table A3: Main Export Products of Taiwan (Representing 75 % of Export Value), 1951-1969

1951		1960		1962		1969	
sugar	53 %	sugar	44 %	061 sugar	21 %	841 clothing	12 %
rice	12 %	fruits	9 %	651 textile yarns	7 %	724 telecom. app.	9 %
tea	8 %	cotton fbr.	7 %	652 cotton fabrics	6 %	631 plywood	6 %
fruits	7 %	tea	4 %	054 vegetabl., fresh	5 %	051 fruits, fresh	5 %
		rice	3 %	053 fruits, prep.	5 %	652 cotton fabrics	5 %
		steel bars	3 %	841 clothing	5 %	651 textile yarns	5 %
		citr. oil	2 %	051 fruits, fresh	4 %	061 sugar	4 %
				551 essential oils	4 %	893 art. of plastic	4 %
				074 tea	3 %	055 vegetable, prep.	4 %
				042 rice	3 %	054 vegetabl., fresh	3 %
				661 cement	3 %	053 fruits, prep.	2 %
				24x wood	2 %	894 toys	2 %
				332 petrol. products	1 %	851 footwear	2 %
				581 plastic materi-als	1 %	653 text. fabr. nes.	2 %
						69x manf. of metal	2 %
						243 wood	2 %
						074 tea	1 %
						031 fish	1 %
						73x transport equip.	1 %
						899 manf. art., nes.	1 %
						661 cement	1 %
						717 textile machines	1 %

nes = not elsewhere specified. Source: own computations from United Nations, Yearbook of International Trade Statistics, var. years, New York. Classification according to SITC, Rev. 1, is available for 1962-1969 only. After 1969, Taiwan's trade is no more reported by this source.

Table A4: Main 20 SITC-3digit Level Export Products of Taiwan, 1990-1995

SITC	1990	Share	SITC	1995	Share
752	Automatic data proc. machines	6 %	776	Cathode valves & tubes; diodes; integrated circuits	9%
851	Footwear	5 %	752	Automatic data proc. machines	7%
894	Baby carriages, toys, games & sporting goods	5 %	759	Parts, accessories for machines of groups 751, 752	7%
764	Telecommunication equipment	4 %	764	Telecommunication equipment	4%
776	Cathode valves & tubes; diodes; integrated circuits	4 %	785	Motorcycles & cycles	3%
759	Parts, accessories for machines of groups 751, 752	3 %	653	Fabrics, woven, of man-made fabrics	3%
893	Articles of plastics	3 %	894	Toys, games & sporting goods	3%
653	Fabrics, woven, man-made	3 %	699	Manufactures of base metal	2%
785	Motorcycles & cycles	2 %	893	Articles of plastics	2%
699	Manufactures of base metal	2 %	651	Textile yarn	2%
651	Textile yarn	2 %	772	Apparatus for electrical circuits	2%
821	Furniture & parts	2 %	657	Special yarn, special textile fabr.	2%
761	Television receivers	2 %	778	Electrical machinery & apparatus	2%
778	Electrical machinery & apparatus	2 %	655	Knitted or crocheted fabrics	2%
655	Knitted or crocheted fabrics	2 %	761	Television receivers	2%
772	Apparatus for electrical circuits	2 %	821	Furniture & parts	2%
899	Misc. manufactured articles	2 %	728	Other machinery for particular industries	2%
657	Special yarn, special textile fabrics & related	1 %	771	Electric power machinery, and parts	1%
724	Textile & leather machinery	1 %	12	Other meat and edible meat offal	1%
728	Other machinery for particular industries	1 %	694	Nails, screws, nuts, bolts, rivets of metal	1%

Source: computation from OECD, ITCS Rev. 3, 4/1998.

Table A5: Main SITC-4digit Level Export Products of Taiwan in Office Machinery and Electrical Machinery (SITC 75 and 77) (in ,000 US$), 1990-1995

SITC		*1990*	*1996*	*Increase (%)*
7599	Parts of typewriters, calculating mach. etc.	2,284,025	8,035,994	352
7764	Electronic integrated circuits & microassemblies	1,350,388	7,705,943	571
7522	Dig. autom. data proces. machines, CPUs	1,013,701	5,449,240	538
7526	Input or output units, whether or not with storage	1,851,699	4,195,210	227
7712	Other electric power machinery	597,945	1,581,003	264
7722	Printed circuits	406,370	1,545,897	380
7788	Electrical machinery & equipment, n.e.s.	577,246	1,394,639	242
7761	Television picture tubes, cathode ray	373,422	1,061,833	284
7763	Diodes, transistors, semi-cond.devices	418,972	918,841	219
7731	Insulated wire, cable & other insulated conductors	463,197	765,031	165
7527	Storage units	599,379	596,596	100
7725	Apparatus for elect. circuits < 1000 volts	312,689	540,285	173
7529	Data processing equipment, n.e.s.	202,496	526,213	260
7786	Electric capacitors	295,933	470,573	159
7762	Other electronic valves and tubes	226,045	450,412	199

Source: computation from OECD, ITCS Rev. 3, 4/1998.

Table A6: Volume and Composition of MLC's Exports, 1965–1995

Year	Value (US$ mio.)	agric. raw mat.	foods	fuels	ores etc.	chemic.	text. & clothing	other manuf.
1965	1,718	11 %	37 %	2 %	4 %	4 %	21 %	21 %
1975	6,303	7 %	33 %	14 %	3 %	5 %	18 %	20 %
1980	18,237	6 %	18 %	22 %	3 %	6 %	22 %	23 %
1985	27,764	7 %	15 %	26 %	3 %	5 %	26 %	18 %
1990	80,541	3 %	9 %	7 %	2 %	4 %	29 %	46 %
1995	148,780	2 %	8 %	4 %	2 %	6 %	26 %	52 %

Sources: 1965-1990: IBRD 1994, p. 5; 1995: computed from OECD, ITCS Rev. 3, 2/1997. Foods: SITC 0+1+22+4; Agricultural raw materials: 2 less 22, 27, 28; mineral fuels: 3; ores etc.: 27+28+68; textiles and clothing: 65+84

Table A7: Main Export Products* of MLC, 1980-1995

1980		1985		SITC	1995	
crude oil	15 %	crude oil	19 %	851	footwear	4%
processed oil	7 %	processed oil	5 %	841	men's clothing (tex)	4%
knitted goods	6 %	knitted goods	4 %	842	women's clothing (tex)	4%
cotton cloth	4 %	cotton cloth	3 %	845	apparel (tex)	4%
rice	2 %	cotton	1 %	894	toys, sporting goods	4%
coal	1 %	canned goods	1 %	764	telecom. equipment	3%
tea	1 %	mixed yarn	1 %	652	cotton fabrics, woven	2%
slaughter hogs	1 %	coal	1 %	899	misc. manuf. articles	2%
silk goods	1 %	silk goods	1 %	831	travel goods, handbags	2%
rattan manuf.	1 %	tea	1 %	848	apparel excl. textile	2%
"Top Ten"	***40 %***	***"Top Ten"***	***40 %***		***"Top Ten"***	***32 %***
				658	Articles of textile	2%
				762	Radio receivers	2%
				893	Articles of plastic	2%
				653	Woven Fabrics (man-made)	2%
				778	Electrical machinery	2%
				752	Automatic data process-ing mach.	2%
				333	Petroleum	2%
					plus 41 additional positions between 0.5 % and 1.5 % each	***= 75 %***

Sources: 1980, 1985: YABUKI 1995, p. 156 (from: China's Commercial and Foreign Economic Statistical Materials 1952-1988, pp. 464-475). For COMTRADE statistics, using reported partner country data and being quite different from these data, see YEATS 1992: 46-7. 1995: computed from OECD, ITCS Rev. 3, 2/1997.

Table A8: Economic Relevance of Small Enterprises in Taiwan, 1985-1995

Indicator	1985	1990	1995
share of enterprises	99 %	97 %	96 %
share of employment	68 %	...	79 %
share of export value	65 %	57 %	53 %

Sources: CHAPONNIÈRE/LAUTIER 1998, p. 248 (Data from 1985); *IBRD 1993, p. 162* (Data from 1990)*; CA 1995, p. 1108-9.* (Data from 1995). A different source (*IBRD 1994, p. 112),* however, indicates that the share of local trading companies is much smaller because of a large share of Japanese General Trading Companies in Taiwan's foreign trade.

The most recent official Taiwanese definition of SME includes enterprises

- with a paid-in capital of less than NT$ 40 mio;
- or total assets less than NT$ 120 mio.;
- or in the case of exporters/importers: annual sales revenues of less than NT$ 40 mio. (*CHAPONNIÈRE/LAUTIER 1998,* p. *248).*

Table A9: Decomposition of Nominal Export Growth, various East Asian Economies, 1983/84-1993/94

	1983/84 - 1988/89 ann.avg. %	*from world demand %*	*from market share %*	*from export diversific %**	***1988/89 -1993/94 ann.avg . %***	*from world demand %*	*from market share %*	*from export diversific. %**
China	***22.8***	*4.3*	*14.1*	*3.2*	***21.9***	*6.3*	*12.4*	*2.0*
Indonesia	***1.1***	*–4.7*	*1.0*	*5.0*	***12.1***	*4.3*	*0.3*	*7.1*
Malaysia	***10.2***	*0.8*	*5.4*	*3.7*	***17.0***	*8.7*	*1.9*	*5.6*
Thailand	***21.9***	*14.0*	*1.1*	*5.8*	***17.4***	*8.7*	*1.0*	*6.8*

** Note: only commodity exports; diversification into service exports, which is particularly relevant for High-Income Economies like Japan, is not considered here! For the respective countries' "traditional imports" (i.e. 75 % of basis year exports) as of 1983; China: basis 1984. Source: WDI 1997, pp. 257-9.*

Table A10: MLC's exports by type of exporting enterprise (1994)

Type of exporting enterprise	Number of enterprises	Export Share
Regional-level FTCs	...	40 %
State-owned producing enterprises	...	17 %
National-level FTCs	...	12 %
State-owned enterprises	*8.800*	*69 %*
Joint ventures	16.000	19 %
wholly foreign-owned enterprises	4.600	9 %
Collective enterprises	400	1 %
others	500	1 %
non-state owned enterprises	*21.500*	*30 %*

Source: DIW/ITC 1997, p. 59; VON KIRCHBACH/AGUADO 1996, p. 71. Although using the same source quite different data on number of firms: IBRD 1997, p. 13. The number for FTCs given in this source is 9,400!

Table A11: MLC's exports by type of producing enterprise (1994)

Type of producing enterprise	Export Share
Rural enterprises (TVE)	33 %
State-owned producing enterprises	39 %
Joint ventures	19 %
Wholly foreign-owned enterprises	9 %

Source: computed with data from CHINA CUSTOMS STATISTICS; TAUBMANN 1995.

Table A12: Volume and Distribution of Taiwanese Investment in MLC by Branches, Taiwanese Data, 1991-1996

	1991-1993	1994-1996
Volume in mio. US$	3.590	3.284
Share of branches:		
Elektro/Electronics	14 %	20 %
Food processing	11 %	12 %
Plastic fabrics	12 %	6 %
Metal	8 %	10 %
Chemistry	6 %	9 %
Precision instruments	9 %	3 %
Textiles	6 %	6 %

Source: computed from *INVCOM*, *Statistics... (Tongji Yuebao),* Dec. 1996.

Table A13: Greater China's Import Shares in Major Markets of Industrial Economies

1.1 MLC → USA	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996
SITC 75 Office mach.	0.0	0.2	0.3	0.4	1.0	1.5	2.2	3.1	4.7	5.4
SITC 76 Telecom/Rec.	0.2	2.3	4.6	5.3	6.5	7.1	8.6	11.9	12.7	13.5
SITC 77 Electr. mach.	0.1	1.4	1.7	2.0	2.6	3.5	3.8	4.1	4.2	5.3
SITC 84 Apparel	6.5	9.6	12.0	13.7	14.8	16.5	18.4	17.2	14.9	15.3
SITC 85 Footwear	1.0	4.2	8.8	15.7	26.8	33.8	40.7	45.2	48.4	50.3
1.2 TW → USA										
SITC 75 Office mach.	7.5	10.1	10.3	11.6	12.6	12.7	12.4	11.8	11.8	12.5
SITC 76 Telecom/Rec.	9.5	10.0	8.4	6.6	5.2	4.7	4.3	3.8	3.5	4.1
SITC 77 Electr. mach.	7.2	8.5	7.3	6.6	6.4	6.8	7.0	6.9	6.9	7.2
SITC 84 Apparel	15.4	13.2	11.4	9.7	10.2	7.9	6.9	6.2	5.5	5.0
SITC 85 Footwear	30.6	28.8	23.8	15.9	12.2	8.3	5.2	3.9	2.9	2.0
1.3 HK → USA										
SITC 75 Office mach.	4.5	3.4	3.6	3.0	2.6	2.3	2.1	1.5	1.2	0.9
SITC 76 Telecom/Rec.	3.2	3.3	2.9	2.2	1.8	1.5	1.2	0.9	0.9	0.7
SITC 77 Electr. mach.	4.3	3.6	2.5	2.4	2.4	2.2	2.2	2.0	2.2	2.3
SITC 84 Apparel	21.8	17.1	16.2	15.7	15.5	14.0	12.0	12.0	11.0	9.7
SITC 85 Footwear	1.7	1.8	1.5	1.2	1.1	1.2	1.2	1.1	0.9	0.6
1.4 "Gr. China"→ USA										
SITC 75 Office mach.	12.0	13.7	14.2	15.0	16.2	16.5	16.7	16.4	17.7	18.9
SITC 76 Telecom/Rec.	12.9	15.7	15.9	14.1	13.5	13.3	14.1	16.8	17.1	18.3
SITC 77 Electr. mach.	11.6	13.5	11.5	11.0	11.4	12.5	13.0	13.0	13.3	14.8
SITC 84 Apparel	43.8	39.9	39.6	39.1	40.4	38.4	37.3	35.5	31.4	30.0
SITC 85 Footwear	33.2	34.8	34.1	32.7	40.1	43.3	47.2	50.1	52.2	52.9

2.1 MLC → Japan	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996
SITC 75 Office mach.	0.0	0.4	0.4	0.5	1.0	0.9	2.7	3.3	4.6	7.0
SITC 76 Telecom/Rec.	1.1	2.4	4.5	5.2	5.9	9.2	11.6	12.7	14.5	15.6
SITC 77 Electr. mach.	0.3	0.7	1.4	2.1	3.1	4.1	5.2	5.9	7.1	9.0
SITC 84 Apparel	22.9	21.6	24.7	27.4	34.6	43.4	49.8	53.9	56.6	59.4
SITC 85 Footwear	8.9	5.6	7.9	12.3	19.1	27.7	36.1	43.5	47.3	50.3
2.2 TW → Japan										
SITC 75 Office mach.	2.7	6.2	4.8	3.9	3.7	3.8	5.5	8.6	14.4	14.7
SITC 76 Telecom/Rec.	14.0	19.2	16.8	12.1	10.4	9.5	6.8	5.3	4.5	4.4
SITC 77 Electr. mach.	7.3	9.3	9.5	9.0	9.3	8.5	7.5	7.0	7.2	7.1
SITC 84 Apparel	13.2	10.8	8.4	5.3	4.6	3.7	2.6	2.0	1.6	1.5
SITC 85 Footwear	26.8	27.9	25.0	19.3	17.7	14.6	10.1	7.1	5.3	5.4
2.3 HK → Japan										
SITC 75 Office mach.	1.0	2.6	1.8	1.9	2.8	4.0	2.7	2.0	1.6	1.0
SITC 76 Telecom/Rec.	1.2	2.3	2.0	2.4	1.3	0.6	0.7	0.7	1.0	0.9
SITC 77 Electr. mach.	0.7	1.1	1.3	1.0	1.0	1.0	1.4	1.5	2.2	1.9
SITC 84 Apparel	11.8	8.1	7.3	6.3	5.2	4.1	2.9	2.3	2.0	2.0
SITC 85 Footwear	0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.1	0.2	0.2
2.4 "Gr. China"→ Japan										
SITC 75 Office mach.	3.7	9.2	7.0	6.4	7.5	8.7	10.9	13.9	20.7	22.7
SITC 76 Telecom/Rec.	16.4	23.9	23.4	19.7	17.6	19.4	19.1	18.7	20.0	20.8
SITC 77 Electr. mach.	8.2	11.1	12.1	12.1	13.4	13.6	14.0	14.4	16.5	17.9

SITC 84 Apparel	47.9	40.4	40.4	39.0	44.4	51.1	55.3	58.1	60.3	62.8
SITC 85 Footwear	35.7	33.6	33.2	31.8	37.0	42.6	46.4	50.8	52.8	55.9

3.1 MLC → Germany*	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996
SITC 75 Office mach.	0.0	0.1	0.2	0.3	0.5	0.8	1.6	2.6	3.4	3.6
SITC 76 Telecom/Rec.	0.1	2.1	3.0	4.8	4.0	4.8	6.7	7.2	7.1	8.1
SITC 77 Electr. mach.	0.0	0.1	0.3	0.5	1.1	1.4	2.3	2.2	2.5	3.1
SITC 84 Apparel	2.8	4.5	5.0	6.9	9.5	8.5	9.6	10.1	8.8	9.7
SITC 85 Footwear	0.7	1.5	1.5	2.5	4.6	6.9	10.9	9.6	6.1	7.9
3.2 TW → Germany										
SITC 75 Office mach.	1.4	4.4	4.3	5.5	6.8	7.9	8.4	7.7	9.0	10.3
SITC 76 Telecom/Rec.	2.9	3.4	3.2	3.5	3.2	2.9	3.1	2.7	2.5	2.4
SITC 77 Electr. mach.	1.9	2.5	2.2	3.1	3.1	2.6	2.6	2.5	2.5	2.5
SITC 84 Apparel	2.6	2.4	2.0	1.4	1.6	1.3	1.0	0.9	0.7	0.7
SITC 85 Footwear	5.3	6.7	5.8	4.0	4.3	2.2	1.5	1.3	1.3	1.3
3.3 HK → Germany										
SITC 75 Office mach.	1.1	2.3	2.1	3.0	2.2	1.4	0.8	0.7	0.7	0.8
SITC 76 Telecom/Rec.	1.8	2.0	1.6	2.0	1.8	1.4	0.9	0.6	0.5	0.6
SITC 77 Electr. mach.	1.3	1.5	1.4	1.1	1.2	1.0	0.9	0.9	0.8	0.9
SITC 84 Apparel	9.6	9.2	8.3	7.6	7.2	6.3	6.7	5.9	5.3	4.7
SITC 85 Footwear	0.4	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.1	0.1
3.4 "Gr. China" → Germ.*										
SITC 75 Office mach.	2.4	6.8	6.6	8.8	9.5	10.1	10.9	11.1	13.1	14.6
SITC 76 Telecom/Rec.	4.8	7.5	7.7	10.2	8.9	9.1	10.8	10.4	10.0	11.1
SITC 77 Electr. mach.	3.2	4.1	3.9	4.7	5.4	5.0	5.8	5.6	5.9	6.4
SITC 84 Apparel	15.0	16.1	15.3	15.9	18.3	16.0	17.3	16.9	14.8	15.1
SITC 85 Footwear	6.4	8.4	7.5	6.7	9.3	9.3	12.7	11.1	7.5	9.3

*Source: computation from OECD, Foreign Trade by Commodities 1990, vol. 3-5, Paris 1991; OECD, ITCS Rev. 3, 1-5/1997. * Starting 15.03.1994, EU restriction came in force for imports of many consumer goods from MLC, allowing only a 10 per cent growth of imports compared to the average of 1990-1992 imports.*

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