

Taiwan's Economic Development: The Role of Small and Medium-sized Enterprises beyond the Statistics*

Marco Veselka[†]

Abstract

Taiwanese enterprises are efficiently producing a great deal of goods they had no experience in at all a few years ago. Moreover, in modern economies an increased utilisation of more and more advanced technologies as well as the more intensive use of physical and human capital can be observed. In this regard, the economic development of Taiwan is considered to be a complementary process of capital accumulation, innovation and learning. This economic evolution primarily takes place within the corporate sector. However, in reality the real activities of enterprises cannot be separated from their financial counterpart. Therefore, it is assumed that financial general conditions influence the investment and innovation behaviour of companies and vice versa.

Regarding the above-outlined complementarities, it seems to be appropriate to include the heterogeneity of the company sector into the analysis. Here it has to be taken into consideration that small- and medium-sized enterprises (SMEs) contribute to a great deal of entrepreneurship, innovation and learning that play a decisive role in the process of economic development. In the spirit of Schumpeter (1912) it is argued that the importance of smaller enterprises is not adequately disclosed in statistical data. Furthermore, SMEs may have advantages as far as the implementation of new technology in general and new capital-embedded technology in particular is concerned.

There is evidence that Taiwanese SMEs are playing a decisive role in technology assimilation as well as in the implementation of further technological advancements because of their entrepreneurial characteristics. However, most economic contributions consider “entrepreneurship” to be exogenous. Therefore, a few characteristics of the Taiwanese economy are presented suggesting why entrepreneurship is so prevalent in Taiwan's economy. In this respect, the relationship between competitive environment and entrepreneurship seems to be a matter of special importance.

* This is a revised version of a paper presented at the Second Conference of the European Association of Taiwan Studies, Ruhr University Bochum, 1 - 2 April 2005, co-organized by the Taiwan Research Unit of the Ruhr University, Bochum and the Taiwan Studies Programme, London School of Oriental and African Studies. The author appreciates the helpful comments and suggestions made by the participants of the conference.

[†] PhD-Candidate at the Department of International Economics, South-Asia-Institute of Heidelberg University, Im Neuenheimer Feld 330, 69120 Heidelberg, Germany, phone: +49 6221 545377
marco.veselka@urz.uni-heidelberg.de, URL: <http://www.rzuser.uni-heidelberg.de/~pu4>

I. Introduction

Taiwan experienced a spectacular development with rapid growth as well as an ongoing transformation from a traditional agricultural-oriented to a modern industrial- and service-oriented economy. In the course of this economic development, a tremendous increase in living standards considering every social aspect such as education, transportation, and housing has been achieved. Improvements in the quality of life are characterized by change and innovation, because the knowledge of how to design, produce, and operate new technologies led to the affluence of modern times, more than anything else.¹

The economic success of Taiwan and the other Asian tiger economies attracted attention from many authors who offered plenty of alternative explanation attempts.² In this context, Nelson and Pack differentiate between two approaches. On the one hand, there are ‘accumulation’ theories that stress the role of accumulation of physical capital. On the other hand, the advocates of the so-called ‘assimilation’ theories are highlighting entrepreneurship, innovation, and learning to master the adoption of advanced technologies.³ According to the latter approach advanced technologies require the accumulation of human and physical capital, so that “the ‘marshalling of inputs’ is part of the story, but (...) if one marshals but does not innovate and learn, development does not follow”.⁴

Although the corporate sector contributes a great deal of capital accumulation as well as entrepreneurship, innovation, and learning, the contributions of enterprises to economic evolution are hardly taken into consideration. In this respect, Schumpeter emphasized the entrepreneur and his disequilibrating character which is assumed to set the economy in motion by introducing new products, production and transportation methods, as well as by establishing new markets and organizational forms.⁵ Nelson and Winter, among others, mentioned that this interruption in the circular flow of economic life (‘creative destruction’) is frequently associated with unpredictable uncertainties.⁶

¹ See Kuo, S. and Liu, C. (1999), pp. 40-41 as well as Aghion, P. und Howitt, P. (1998), p. 1.

² See e.g. Pack, H. and Westphal, L. (1986), Kuznets, P. W. (1988), Amsden, A. (1989), World Bank (1993), Young, A. (1992, 1994), Kim, J. and Lau, L. J. (1994), Krugman, P. (1994), Rodrik, D. (1994), Western, D. L. (1998); Timmer, M. and van Ark, B. (2000) and Rao, B. (2001)

³ See Nelson, R. R. and Pack, H. (2003), pp. 105-111.

⁴ See Nelson, R. R. and Pack, H. (2003), p. 107.

⁵ See Schumpeter, J. A. (1950), p. 134-142 as well as Schumpeter, J. A. (1912), p. 284 and McNulty, P. J. (1998), p. 536-537.

⁶ See Nelson, R. R. and Winter, S. G. (1982), pp. 30-33. See also Nelson, R. R. and Pack, H. (2003), p. 116-119.

Considering the uncertainties linked with innovations, theoretical and empirical evidence suggest that both smaller enterprises and new market participants (which often belong to the SME sector as well) possess advantages in introducing fundamental (radical) innovations.⁷ This may be astonishing at first glance, but it is particularly true in capital- and technological-intensive industries respectively, considering at least the early stage of a technological innovation. According to Freeman and Soete: „the nature of uncertainty associated with innovation is such that most firms have a powerful incentive most of the time (...) to concentrate their industrial R&D on defensive, imitative innovations, product differentiation and process innovation“.⁸ This conservative behaviour applies chiefly to larger, established firms that heavily invested in the predominant technology. Thus, a shift in the investment strategy leads to an accelerated depreciation of tangible and intangible assets that are already in operation because of their technological obsolescence. In contrast to this, SMEs are much more likely to challenge the established economic order by undertaking radical innovations because they have a lot to win, but not much to lose.

In respect of the importance of innovations, Hayek stressed competition as a method to discover procedures in order to solve economic problems.⁹ Accordingly, the advantage of a competitive environment must not be seen in the optimal allocation of resources. The ability to discover new superior solutions to solve economic problems is regarded as the major asset of the competitive market.¹⁰ In other words: Dynamic competition can be considered to be a discovery process of ongoing innovations that are necessary for technological progress, which in turn provide the basis for a flourishing economy. In the following, the role of the SME sector in the process of dynamic competition is analysed to highlight its contribution to Taiwan's development.¹¹

⁷ See e.g. Freeman, C. and Soete, L. (1997), pp. 232-240; Teece, D. J. (2000), p. 124 and Utterback, J. M. (1994), pp. 92-33 and pp. 160-165.

⁸ See Freeman, Ch. und Soete, L. (1997), S. 244-255.

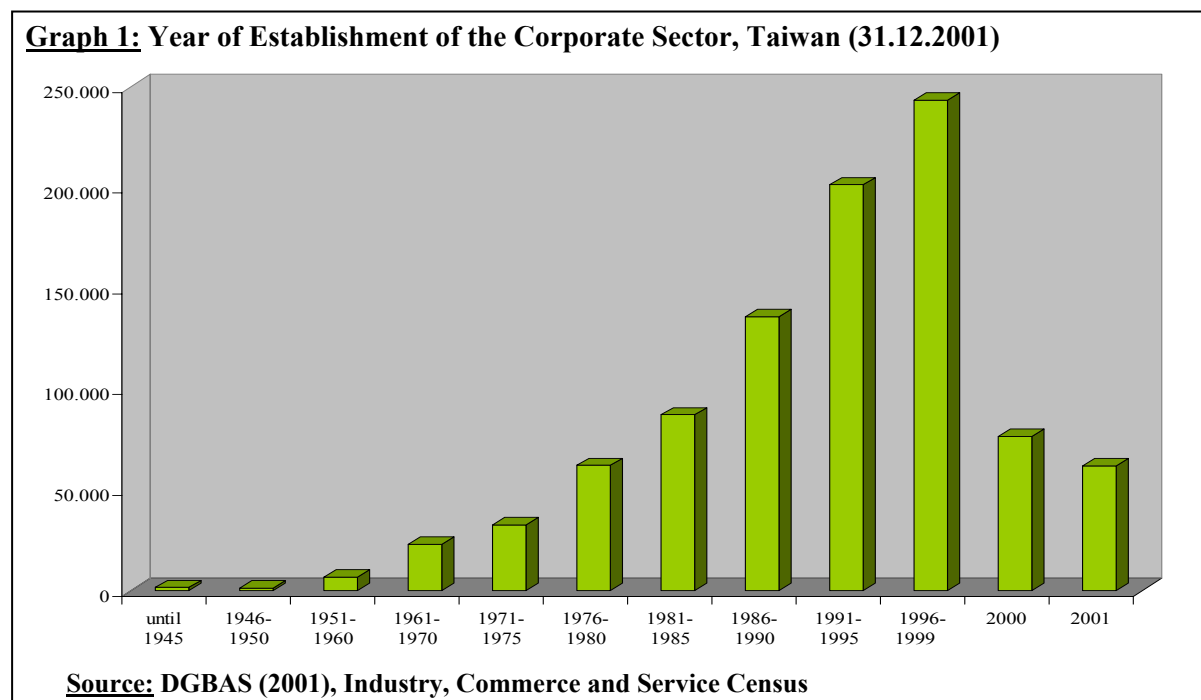
⁹ See Hayek, F. A. (1968), p. 3

¹⁰ See *ibid* and Hayek, F. A. (1952), pp. 139-140. See also Kirzner, I. M. (1973) who stressed the entrepreneurial alertness to exploit so far unnoticed business opportunities.

¹¹ In the case of the manufacturing sector, construction industry, and mining and quarrying industry, SMEs in Taiwan are defined as those enterprises with paid-in capital of NT\$80 million or less, or with fewer than 200 employees. For other industries, SMEs are defined as enterprises that had on operating revenue of NT\$100 million or less in the previous year, or which have 50 or fewer employees. See S.M.E.A. (2004), p. 31. See S.M.E.A. (2004), p. 342 for the evolving definition of SMEs in Taiwan. [NT-\$/ US-\$ closing rate (15 March 2005): 31.000. See <http://www.cbc.gov.tw>.]

II. A Statistical Sketch of Small and Medium-sized Enterprises in Taiwan

SMEs are playing an important role in the development process of Taiwan. In 2003, almost 98 % of the approx. 1.2 million enterprises were classified as SMEs, which realised 31.5 % of the total sales and employed 77.5 % of the workforce.¹² Besides, SMEs accounted for 99.4 % of the 112,154 newly established enterprises in Taiwan.¹³ The last-mentioned issue may sound trivial, but without the ongoing process of market entries and exits, the maintenance of competition as well as structural change seems to be impossible. In consideration of the age structure of the Taiwanese corporate sector, shown by the graph below, the lively turnover of enterprises seems obviously.



Although SMEs did not perform uniformly over time and various industries, their contribution to Taiwan's economic development has been considerable. Table 1 illustrates both the sectoral and temporal development of SMEs. Predictably, smaller businesses are of minor importance in industries with considerable economies of scale and/or scope such as Electricity, Gas and Water as well as Transport, Storage and Communication. Nevertheless, considering the whole economy, SMEs contributed a great deal in terms of employment and production value throughout the observation period.

¹² See S.M.E.A. (2004), p. 41.

¹³ See S.M.E.A. (2004), p. 53.

Table 1: Share of SMEs, Taiwan, 1971-2001 (in %)												
	Employment						Value of Production					
<i>Industry</i>	<i>1971</i>	<i>1976</i>	<i>1986</i>	<i>1991</i>	<i>1996</i>	<i>2001</i>	<i>1971</i>	<i>1976</i>	<i>1986</i>	<i>1991</i>	<i>1996</i>	<i>2001</i>
Mining & Quarrying	11,96	23,78	42,18	68,57	78,32	71,40	5,88	20,95	32,83	55,37	75,43	61,69
Manufacturing	35,62	38,55	47,86	56,48	57,94	50,05	26,72	27,32	33,83	37,67	37,86	28,11
Electricity, Gas & Water	13,33	1,66	3,71	3,81	4,75	5,47	3,16	0,83	1,17	1,24	1,63	2,86
Construction	53,25	40,17	47,96	58,21	76,88	80,06	51,19	38,51	46,56	53,8	76,16	75,57
Subtotal (Industry sector)	36,69	37,84	47,26	56,04	60,50	54,03	26,96	27,02	33,17	37,86	41,10	31,47
Commerce	96,31	92,99	91,71	88,69	88,19	84,78	49,10	88,48	84,94	83,57	84,07	74,80
Transport, Storage & Comm.	-	42,36	52,68	55,88	52,52	58,62	-	26,42	27,67	29,29	29,03	26,39
Financing, Insurance, Real Estate & Business	-	71,56	55,03	54,81	47,4	25,41	-	39,31	28,64	33,78	33,21	13,54
Subtotal (Service sector)	77,37	78,06	74,95	73,05	72,44	68,49	48,34	52,82	47,39	48,88	52,58	43,97
Total	52,52	53,00	57,89	63,82	66,75	62,29	37,09	32,27	36,46	41,23	45,41	36,83

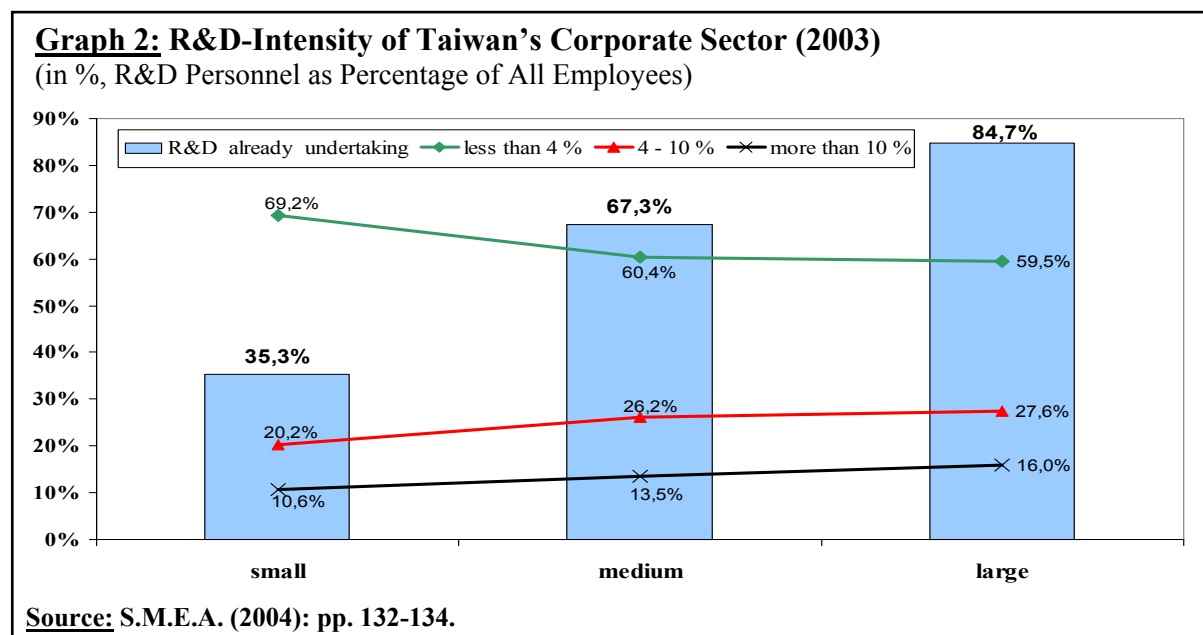
Source: See Hu, M.-W. (2000), p. 59 and DGBAS (2001): Industry, Commerce and Service Census 2001.

SMEs undertake remarkable efforts to upgrade their stock of human and physical capital as well as to intensify their innovative activities. Nevertheless, the production structure of SMEs is generally less capital-intensive compared to large-scale enterprises, while sector specific differences have to be taken into account.¹⁴ With regard to the above-mentioned complementarities of advanced production methods and the accumulation of physical and human capital, the less capital-intensive production of SMEs may indicate their technological backwardness. In this respect, research and development (R&D) is often emphasized in order to maintain corporate competitiveness in terms of the range of products on offer, their product qualities, the efficiency of product methods, and so forth. The supposed backwardness of SMEs might possibly be confirmed by their small activities in R&D. Although private R&D expenditures more than tripled within a period of only ten years from NT\$ 39.2 billion in 1991 to NT\$ 129.2 billion in 2001, the following figure shows that SMEs are rather reserved in their spending.¹⁵ Small and medium-sized enterprises are much less involved in R&D than large

¹⁴ See DGBAS (2001), Industry, Commerce and Service Census

¹⁵ See C.E.P.D. (2003), p. 97.

enterprises. This is true considering the overall share of enterprises doing R&D as well as the scale of activities.¹⁶



Besides, there are also differences with regard to the reasons, why to do without R&D. SMEs are emphasizing in particular their small size (43.2%), their financial restrictions (32.8%) and the lack of qualified personnel (28.1%). Large enterprises are stressing the lack of qualified personnel (39.0%) as well, but financial restrictions (15.9%) and their company size (7.5%) are of secondary importance.¹⁷

Moreover, there are concerns expressed, that Taiwan's SMEs face challenges, which may jeopardize their competitiveness.¹⁸ For example, considering the difficulties in recruiting skilled staff and obtaining other production factors such as capital, Wang concludes that the trend in the high-tech industry seems to be toward oligopoly and against SMEs.¹⁹ The lack of financial and management resources, insufficient R&D capabilities and changes in the market environment are supposed to weaken their market position accordingly. These remarks and the relatively low R&D intensity of SMEs raise the question, whether Taiwan's further development will be handicapped by the predominance of SMEs.

¹⁶ See S.M.E.A. (2003), pp. 131-132.

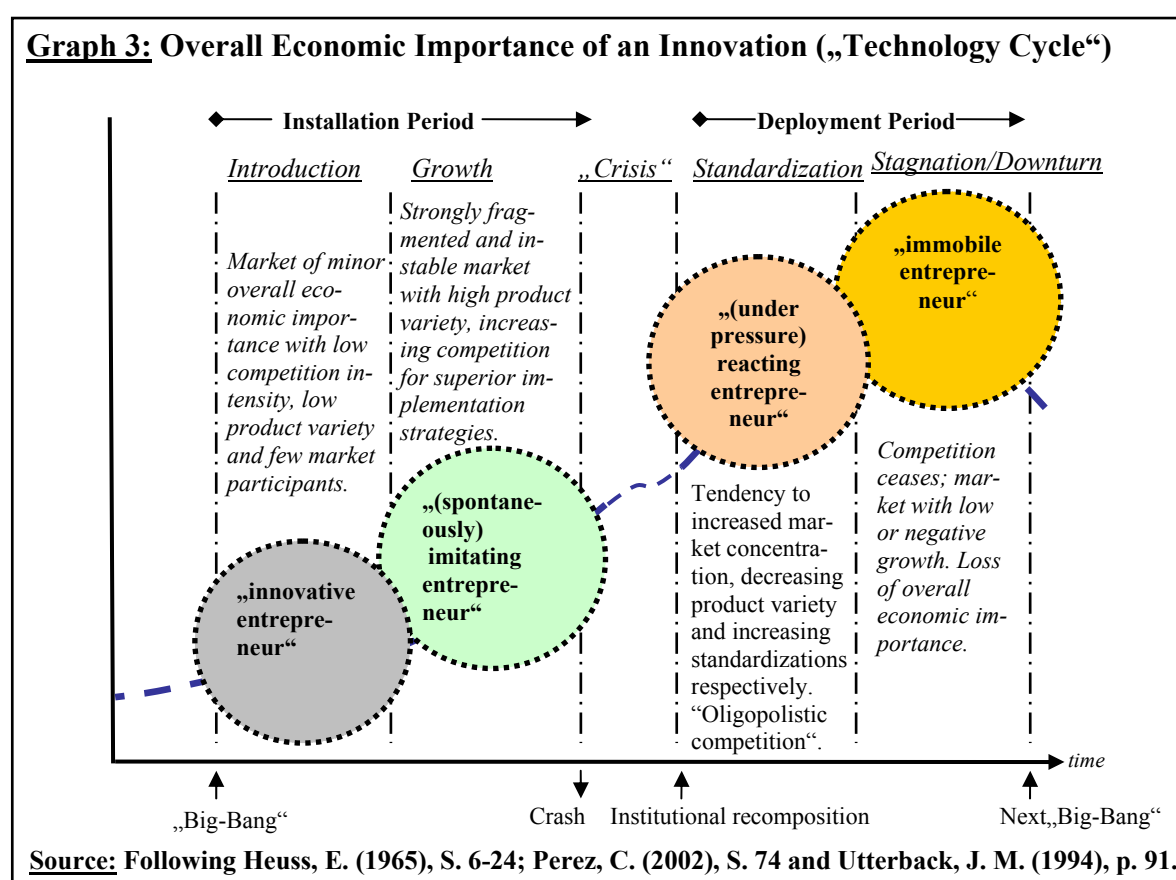
¹⁷ See S.M.E.A. (2003), p. 138.

¹⁸ See for example Wang, J.C. (2000), pp. 204-209.

¹⁹ See also Khan, H.A. (2004), p. 80.

III. Technical Progress, Competition and Entrepreneurship

The development of Taiwan's economy can be characterized by structural change in favour of more capital- and technology-intensive industries as well as the continued upgrading of the economy in general and these industries in particular. Regarding the concept of localized technological progress introduced by Atkinson and Stiglitz, this aspect seems noteworthy. Under these circumstances, Taiwan's catching-up seems an even harder task, because "[w]here technical progress is 'localised', technical progress in the advanced countries, (...) will leave relatively unaffected the (...) underdeveloped countries".²⁰



In the light of the well-known product-life-cycle concept as well as corresponding considerations of market cycles, the dynamics of technological breakthroughs can be similarly characterized.²¹ Graph 3 outlines such a “technology cycle”; here it seems appropriate to differentiate between an installation period and a deployment period separated by a “crisis” or “turning point”. In the following, phase-specific market structures, levels of information and entrepreneurial tasks are briefly characterized.

²⁰ See Atkinson, A. B. and Stiglitz, J. E. (1968), p.576.

²¹ See Heuss, E. (1965), Kotler, P. (1997), and Perez, C. (2002). Compare also Utterback, J. M. (1994), pp. 80-101.

The launch of a new technology is typically involved with unpredictable uncertainties, since the market players are not aware of both the technological and economic aspects at large. In addition to the technology's unclear range of application, the technology is often basic, expensive and unreliable at its early stage of development. Nevertheless, it is able to serve a purpose in a way that is highly desirable in some niche markets.²² The innovative technology is thus of minor overall economic importance and there is almost no competition between the entrepreneurs. At this stage, the main task of enterprises is to offer a basic model and to convince early customers to adopt the new technology. In this introduction phase, SMEs are playing a major role because of their ability to enter a niche market that seems unimportant to large businesses. In consideration of all the failures that can be observed repeatedly, the establishment of a new niche market does not seem very spectacular. However, in view of the fundamental consequences of a few technological breakthroughs, such as the IT technology, this apparent 'negligible' event and the entrepreneurs involved are worth to attract more attention.

Although most innovations fail, there will be some technologies with the potential of further developments by exploiting technical and/or managerial improvements as well as the uncertainties concerning the possible range of applications. The more application and implementation strategies are available, the better the diffusion of an innovation will succeed. As a result, the prospects as well as the limits of an innovation are discovered in a process of trial and error. In summary, more and more enterprises are entering the market and the technology's overall importance is deepened at this growth phase. In contrast to larger businesses, small and medium-sized enterprises are still favoured at this phase of technological evolution because serving niche markets still takes centre stage. Although the range of application broadens considerably, the technology is still far away from being sophisticated.

The process of trial and error is associated with market entries as well as market exits. The latter are an important aspect to discover the technical and the economic limits of an innovation; as a result corporate failures will emerge more frequently in the course of time. The incorporated disappointments and corrections of unjustified expectations respectively, indicate a turning point that is regularly accompanied by a more or less severe crisis. Perez (2002) emphasized that after an institutional recomposition, the installation period will be replaced by a deployment period. This development is associated with a major shift in the competitive envi-

²² See Utterback, J. M. (1994), p. 92.

ronment. Subsequently, more and more standards of the innovation are developed whereas trail and error cease. Consequently, a tendency to increased concentration can be observed and competition is hardly characterized by the rivalry for superior implementation strategies anymore. Now, squeezing out of existing market participants by means of price or quantity competition comes to the fore. After a dominant standard is determined, the key features of a technology will be widely agreed on and relatively stable market shares will generally imply the existence of only a few significant and dominant players. In this respect, it is no surprise that almost every mature industry is characterized by an oligopoly to a greater or lesser extent.

Although SMEs are suffering comparative disadvantages during this process of standardization, it is not justified to blame large enterprises for exploiting their market power. These enterprises, which are controlling the former niche markets, were successful in their implementation strategy and thus contributed to technical progress. In the course of this technological evolution, markets as well as enterprises are gaining in size and importance. Thus, the analysis of a company's supremacy depends on the cause leading to this market structure. Considering the previous remarks there will be no reason to complain about dominant market positions, if the market structure results from dynamic competition.²³ Besides, the chance of experiencing a tremendous firm growth and achieving a substantial market share implies a strong incentive to enter a new market and/or technology in spite of unpredictable uncertainties at its early stage of development.

The competitiveness of SMEs cannot be analysed without considering the competitive environment characterized by the stage of technological development that in turn has a strong influence on information quality and market structure. In technology- and capital-intensive industries large enterprises have little incentive to challenge the predominant order because they are deeply involved in this way of doing business. In challenging the established order by means of fundamental innovations, SMEs are much more suitable agents. Their development shows less path dependencies and additionally they will be encouraged by the low-scale of implementation at the beginning of a technology cycle. It seems remarkable that the main contribution of SMEs to the overall development is their ability to break down the existing order and to force an economy into following new development paths.²⁴

²³ See Hayek, F. A. (1952), pp. 138-140. Compare also McNulty, P. J. (1994), p. 536.

²⁴ See Schumpeter, J. A. (1912), p. 189.

IV. Entrepreneurs and “Historical Opportunity”: Engines of Taiwan’s Development?

Taiwan’s economic miracle has often been explained with reference to the industrial policy that in turn is considered to have initiated the ongoing process of industrial upgrading.²⁵ Although this policy certainly influenced the corporate behaviour as well as the overall economic development, there is hardly any evidence that this industry policy of “picking the winner” has been sufficient to start the industrialisation process and to keep it going. Thus, several incentives have been targeted mainly at technology- and capital-intensive industries while such eligible industries changed from time to time to head the structural change of the economy.²⁶ However, many other industries like the car industry did not succeed despite the strong policy support they received.²⁷

In this regard, Hobday stressed the strategies and abilities of entrepreneurs, engineers, and managers for the success of the Taiwanese electronic industry. “Without such capabilities, no macroeconomic policies, however well designed, could have produced Taiwan’s economic miracle.”²⁸ As previously mentioned, many authors have recognized the impressive performance of Taiwan’s economy, while the achievements in the electronic industry are probably most striking. Starting in the 1950s and 1960s, the successful evolution of Taiwan’s electronic industry has accelerated since the 1970s. In the meantime, several Taiwanese enterprises have established themselves among the world market leaders considering both technological and economic aspects. In this respect, the question is raised, why Taiwan managed to become competitive in the electronic industry whereas other attempts in establishing competitive industries failed.

The development of the electronic and information technology sectors is analysed in detail by Hobday.²⁹ It is interestingly to see that he is apparently describing an evolutionary process, which seems to fit the above mentioned technology cycle quite well. Many high-tech enterprises that entered in the 1970s and 1980s began as niche market players and focused on a narrow range of products. Nevertheless, some of them grew large, such as ACER that employed roughly 39,000 people and generated sales revenues of more than US-\$ 15 billion in

²⁵ See e.g. Wade, R. (1988, 1990a, 1990b) and Amsden, A H. (1999). Compare also Smith, H. (1997, 2000).

²⁶ See Li, K. T. (1988), p. 139.

²⁷ See Chen, P. (1999), p. 244.

²⁸ See Hobday, M. (1995), pp. 98-99.

²⁹ See Hobday, M. (1995), pp. 95-133. See also Tu, Y. (2001), pp.267-292.

2003.³⁰ It seems particularly noteworthy that the capabilities of the enterprises gradually evolved in the course of time. Therefore it is argued in the following that the establishment of an industry, its ongoing upgrading as well as the corresponding policy measures requires time, a suitable sequencing and most of all an appropriate opportunity.

Hobday illustrates the transition within the electronic business quite plausible emphasizing foreign direct investments as a vehicle of technology transfer. Moreover, the evolving process from relying on “original equipment manufacture” (OEM) to switching via “own-design and manufacture” (ODM) over to “own-brand manufacture” (OBM) is showing the growing technological knowledge as well as managerial abilities of Taiwanese enterprises.³¹ This transition can be characterized by the table below.

Table 2: Transition of latecomer firms: from OEM to ODM to OBM		
	Technological transition	Market transition
OEM	Learns assembly Process for standard, simple products	Foreign transnational corporation (TNC)/ buyer packages, brands and distributes
ODM	Local firm designs Learns product innovation skills	TNC buys, brands and distributes TNC gains post-production value added
OBM	Local firms designs & conducts R&D for complex products	Local firm organizes distribution, own-brand name and captures post-production value added

Source: Hobday, M. (1995), p. 114.

Here it should be apparent that this development strategy follows a similar pattern outlined above. Several firms enter niche markets, offer a simple good, then gain experience and improve their skills, and finally some of them become large and produce more and more sophisticated products. Nevertheless, the question remains, how Taiwan has managed to become a major player in the electronic and IT business. Taking into account that there seems no plausible reason to suppose that Taiwan possesses a special comparative advantage in these industries, this is even more astonishingly. However, the international division of work is not only determined by comparative advantages, such as excess to natural resources, but also by other aspects, such as “historical accidents”. For a latecomer country like the Taiwan of the 1960s it seemed an overwhelming task to move up to the group of industrialized countries. In this respect, one of our above-mentioned considerations is to be picked up again. The interruption of the circular flow of economic life caused by a radical innovation is associated with unpredict-

³⁰ See <http://global.acer.com/about/news.asp?id=6436>.

³¹ See Hobday, M. (1995), pp. 114-133.

able uncertainties, but offers unpredictable opportunities, too. As a result, everything indicates that Taiwan's tremendously accelerated prosperity has been closely related with the increased importance of the electronic and IT industries since the 1970s.

Firms cope with these uncertain conditions by developing satisfying solutions on organizational and managerial level, which they adopt in the course of time as they collect new information, learn from experience, and imitate other firms.³² This consideration should be applicable to industries and economies, too. Firms, industries, and economies thus move along particular trajectories, which are difficult to change suddenly. Moreover, the stock of past capabilities and routines provides the basis of further development.³³ The limited flexibility of previous production methods hence complicates the handling of "technical disruptions" by advanced economies. Latecomer countries like Taiwan or more precisely its enterprises were less likely to be constrained by incumbency factors, such as the reluctance to compete with one's own technology.³⁴ In an analogous manner, Utterback (1994) revealed that latecomers overturn the existing order with greater frequency than do other incumbents.

Graph 2 outlines the development of a technology by dividing this process into four sub-phases while the type of competition alters during this evolutionary process. Obviously, it is a more or less difficult task to enter a "technology cycle" according to the development stage already reached. Therefore, the probability to catch-up depends on the "historical opportunity" as well. Under these circumstances, it is much more likely to enter the just emerging IT technology at the introduction phase than to enter an industry at a more advanced stage. In this regard, Taiwan's attempt to establish a competitive car industry in the beginning of the 1960s had little prospects of success because of the industry's already advanced stage of development.³⁵

As a matter of fact, "historical opportunity" in terms of a technological disruption cannot explain Taiwan's economic success entirely, but it provides an explanation approach how it is feasible in principle that a relatively backward economy so rapidly climbs the ladder up to the most advanced economies. In addition to a "historical opportunity" that cannot be influenced individually, there are aspects, which a single country can influence in order to enhance its

³² See Nelson, R. R. and Winter, S. G. (1982), pp. 30-33.

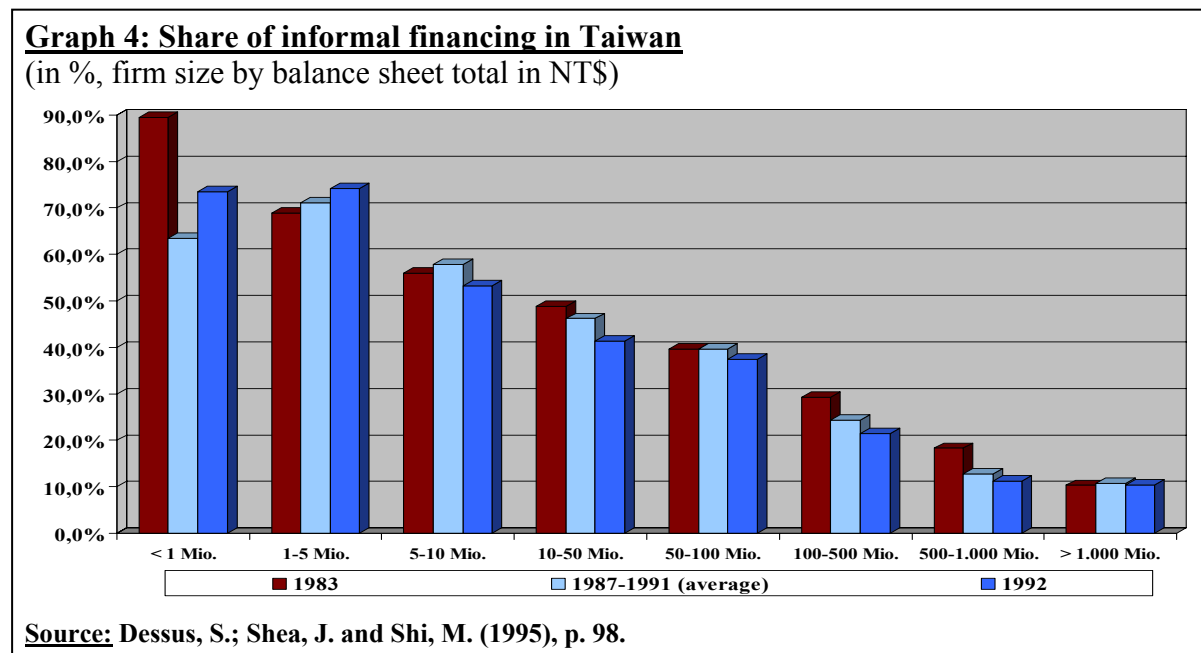
³³ See Lall, S. (2000), pp. 17-18.

³⁴ See Teece, D. (2000), p. 124.

³⁵ See Piechottka, A. (2000), pp. 269-272 and Hsueh, L.; Hsu, C. and Perkins, D. H. (2001), pp. 44-46.

chances of development. To be ready to accept the challenges associated with unfamiliar technologies and uncertain market perspectives seems a necessary component for a catching-up process. At a time of technological discontinuity, the probability to catch up should be positively related to the entrepreneurial characteristics of the SME sector. In reference to this view, in the following a few political aspects are briefly discussed based on their ability to support the entrepreneurial spirit in the context of the dynamic competition process.

The realization of investments depends particularly on the availability of financial resources. Therefore, real activities cannot be separated from their financial counterpart, since general financial conditions influence the investment and innovation behaviour of companies and vice versa. Taiwan's government has always interfered with the financial system. Nevertheless, far-reaching liberalization efforts have encouraged market orientation by strengthening profitability considerations in the banking system as well as by facilitating access to capital markets. However, obtaining funding from the formal financial system still proves difficult for SMEs. Lauridsen remarked that SME-financing by the banking system intensified until 1991, but dropped behind its pre-liberalization level afterwards.³⁶



However, financing of SMEs seems a priori rather difficult, provided that dealing with innovations is really one of their major assets. Fundamental innovations are associated with uncertainties even unknown to the entrepreneurs themselves. Consequently, there are information

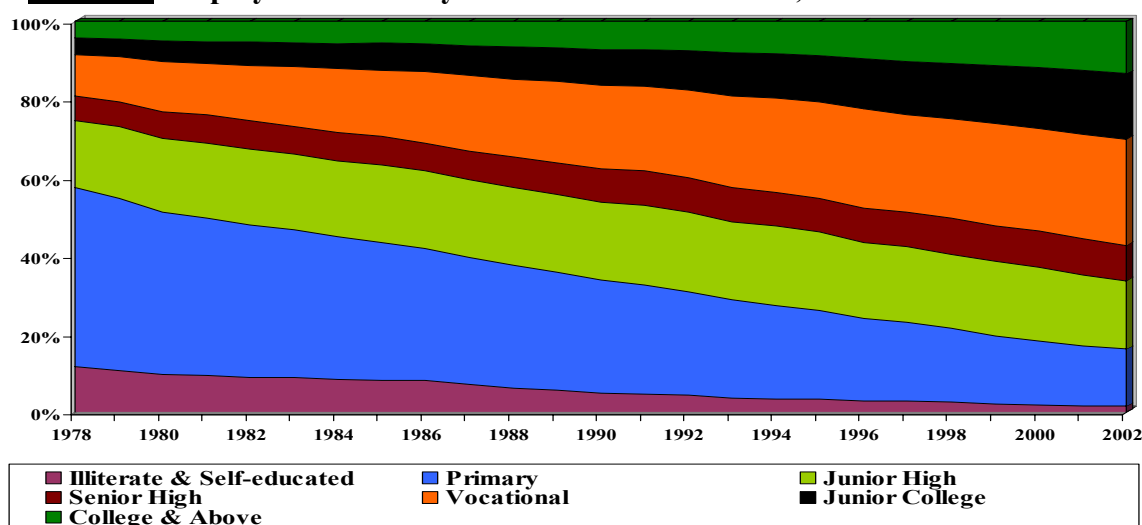
³⁶ See Lauridsen, L. S. (1999), 20-23.

problems to be considered that complicate bank financing enormously. Banks are also regularly involved in the financing of previous technologies. In the course of these transactions, banks piled up information considering the characteristics of these technologies as well as the enterprises involved. Thus, banks hesitate to finance technologies that challenge the existing order. Capital market financing on the other hand is not really an alternative because of SMEs' limited market access. Moreover, the high transaction costs in view of their relatively small amount of financing lead to unfavourable capital market conditions for SMEs.

Despite many efforts to liberalize the financial system, the graph below shows that the SME sector still relies considerably on informal financing.³⁷ In respect to information and incentive problems, informal financing often turns out to be the only alternative to finance an innovation (compare Graph 4). In contrast to the standardized financial instruments of the formal financial system, informal financing can be adapted more precisely to the information characteristics of an investment project. A liberalized and deregulated financial system may broaden the range of financial services, which in turn is able to foster economic development. However, there will be a continuous need for informal financing, especially as far as the financing of innovative activities of small entrepreneurs is concerned.

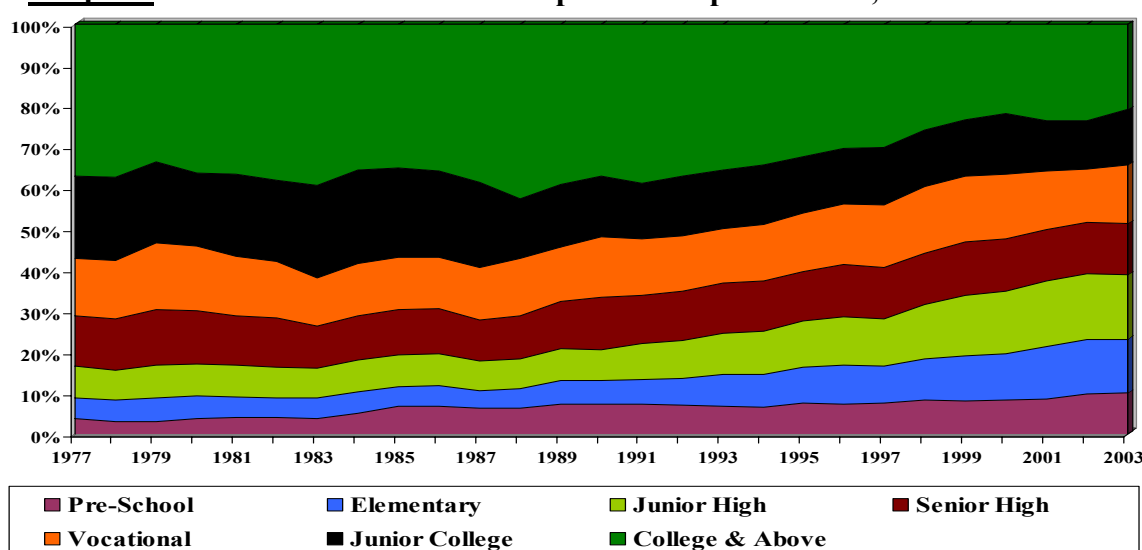
In addition to the financial system policy, the education and competition policy have influenced economic development significantly. A well-educated workforce is imperative to adapt advanced technologies successfully and to provide a basis for further progress. In this respect, gradual improvements in line with the corporate requirements that in turn will evolve according to the economy's technological upgrading seem most desirable. However, how can this be implemented in practice? For example, at the beginning of a technology cycle, the production of relatively simple and basic products as well as to become familiar with the new technology takes centre stage. This task will not require a college or university degree, but will probably cause a greater economic demand for semiskilled human capital. This feature can be illustrated by the following graph. In this respect, the increased number of employees who completed a vocational-school education seems to be most remarkable.

³⁷ A survey carried out by the Central Bank of China provides a similar result showing that in 1997 private households and non-financial enterprises contributed roughly thirty percent of SME-financing. See Chan, V. und Hu, S. (2000), p. 431.

Graph 5: Employed Persons by Educational Attainment, Taiwan 1978-2002

Source: C.E.P.D. (2004), Taiwan Statistical Data Book 2004, p. 35.

Consequently, gradual improvements in the education system from the bottom up seem most desirable. In Taiwan's educational policy such sequencing can be observed indeed. In the 1960s and 1970s primary and secondary education was strengthened significantly. This development in the education system becomes most aware, considering the shift in the allocation of public education expenditures in favour of pre-school, elementary and junior high school education. Taking into consideration the move along the technology cycle, higher education will probably become the focus of attention in the future.³⁸

Graph 6: Allocation of Educational Expenditures per Student, Taiwan

Source: C.E.P.D. (2004), Taiwan Statistical Data Book 2004, p. 285.

³⁸ See Tsiang, G. R. (1999), pp. 251-257.

A corresponding pattern is reached by considering students wanting to obtain advanced degrees from abroad. For example, in 2003 there were more than 26,000 Taiwanese students enrolled in U.S. colleges and universities.³⁹ However, the number of students dropped significantly from more than 37,000 in 1992, which in turn could reflect the growing efforts to improve higher education at home. Considering the desired gradual improvement of the overall educational system, higher education abroad offers an opportunity to focus on the establishment of a sound domestic primary and secondary educational system at first without neglecting higher education completely. The development of the decreasing share of low-educated employees and the correspondingly increased importance of higher education are shown by the graph below.

Human capital and technologies can only be transformed in business activities when entrepreneurs are able to market their knowledge easily. Therefore, a competition policy offering a quite easy market entry and exit is another component of a dynamic development. In this spirit, Taiwan's frequently mentioned export-orientation has also to be analysed. Open international markets keep the enterprises innovative by keeping the markets competitive and by facilitating the transfer of technology. In this respect, education abroad additionally offers the chance to benefit from returning students who became acquainted with foreign ideas, preferences and markets.⁴⁰ This aspect certainly enhanced Taiwan's export performance whereas one cannot survive international competition with a lack of entrepreneurial alertness. Finally, on the background of the so-called "historical opportunity" as well as dynamic competition, it seems obviously that open international markets have guaranteed Taiwanese entrepreneurs much more "opportunities" than domestic markets alone.

V. Conclusion and Outlook

The ability to use the "historical opportunity" of a technological disruption in favour of rapid catching-up depends most likely on the entrepreneurial capabilities of the corporate sector. SMEs are indeed a heterogeneous group and not always eager to challenge the current incumbents. Nevertheless, in comparison with large enterprises they are much more likely to follow new paths. Hence, technical progress would take place significantly slower without their entrepreneurial activities and the initiating of dynamic competition is considered to be the major

³⁹ See <http://opendoors.iienetwork.org/?p=50137>

⁴⁰ See Tsiang, G. (1995), p. 266.

contribution of SMEs to Taiwan's spectacular development. Consequently, the government is often asked to establish a level playing field to enable SMEs to compete on an equal basis. At first sight, this argument seems to fit the Taiwanese case notably, because the dynamic competition process has been frequently distorted by favouring special industries, corporate characteristics (such as firm sizes), and so on. However, this argument must not be misused by providing the government an additional justification to interfere in the economy once again. The major contribution of the government to a flourishing economy is to provide a sound basis for a dynamic competition process. This process should indeed start on a level playing field. Nevertheless, the rivalry between the competitors will result in an uneven playing field that must not be disturbed by the government. Otherwise, the dynamic competition process and thus economic development would be hampered.

Assuming that the revolution of information and communication technologies since the 1970s has enabled Taiwan to catch-up rapidly and considering the crisis of the "New Economy" in the 1990s, the Taiwanese electronic and IT industries are slowly but surely entering the deployment period. Consequently, SMEs will gradually face serious competitive disadvantages due to the increased trend to a higher market concentration. Although these industries still offer respectable business opportunities, the "gold-fever mentality" cooled down and entering the market becomes more and more difficult. SMEs will possibly play a less prominent role in the electronic and IT industry, but this will not have to apply to the whole economy. If the IT sectors consolidate, other sectors have to take over the task of a dynamic engine of innovation and to keep the economy in motion. Otherwise, the economy will enter a "static-state" and consequently lose its international competitiveness. Considering the important part SMEs play in detecting new "historical opportunities", it suggests itself that the SME sector will have to contribute furthermore to the dynamic evolution of the Taiwanese economy.

VI. References

- Aghion, Philippe und Howitt, Peter** (1998): *Endogenous Growth Theory*, Cambridge et al.
- Amsden, Alice** (1989), *Asia's Next: South Korea and Late Industrialization*, New York.
- Amsden, Alice** (1999), *Taiwan's Industrialization Policies: Two Views, Two Types of Subsidy*, in: Thorbecke, E. und Wan, H. (ed.): *Taiwan's Development Experience: Lessons on Roles of Government and Market*, Boston et al. pp. 231-248.

- Atkinson, Anthony B. und Stiglitz, Joseph E.** (1969), A New View of Technological Change, in: *The Economic Journal*, vol. 79, no. 315, pp. 573-578.
- Chan, Vel-Lin und Hu, Sheng-Cheng** (2000), Financial Liberalization in Taiwan, in: *Review of Pacific Basin Financial Markets and Policies*, vol. 3, pp. 429-449.
- C.E.P.D.** (2003), *Taiwan Statistical Data Book 2003*, Council for Economic Planning and Development, Republic of China.
- C.E.P.D.** (2004), *Taiwan Statistical Data Book 2004*, Council for Economic Planning and Development, Republic of China.
- Chen, Pochih** (1999), The Role of Industrial Policy in Taiwan's Development, in: Thorbecke, E. und Wan, H. (ed.): *Taiwan's Development Experience: Lessons on Roles of Government and Market*, Boston et al. pp. 231-248.
- DGBAS** (2001), *Industry, Commerce and Service Census*, Directorate General of the Budget Accounting and Statistics (DGBAS), Taipei, Taiwan.
- DGBAS** (2003), *Statistical Yearbook of Republic of China*, Directorate General of the Budget Accounting and Statistics (DGBAS), Taipei, Taiwan.
- Dessus, Sébastien; Shea, Jia-Dong und Shi, Mau-Shan** (1995), *The Origins of the Economic „Miracle“*, OECD Development Centre Studies, Long-term Growth Series, Paris
- Freeman, Chris und Soete, Luc** (1997), *The Economics of Industrial Innovation*, 3rd edition, London and Washington.
- Harvie, Charles** (2002), The Asian Financial and Economic Crisis and Its Impact on Regional SMEs, in: Harvie, C. and Lee, B. (ed.): *Globalisation and SMEs in East Asia*, Studies of Small and Medium Sized Enterprises in East Asia, Cheltenham et al.
- Hayek, Friedrich August von** (1952), *Individualismus und wirtschaftliche Ordnung*, Erlenbach-Zürich.
- Hayek, Friedrich August von** (1968), Der Wettbewerb als Entdeckungsverfahren, in: *Kieler Vorträge*, Neue Folge 56, Institut für Weltwirtschaft an der Universität Kiel.
- Heuss, Ernst** (1965), *Allgemeine Markttheorie*, in: *St. Galler Wirtschaftswissenschaftliche Forschungen*, Band 21, Tübingen und Zürich.
- Hobday, Michael** (1995), *Innovation in East Asia – The Challenge to Japan*, Aldershot et al.
- Hu, Ming-wen** (2000), The Evolution and Adaptability of SMEs: The Case of Taiwan, in: *Economic Papers*, vol. 19 (2), pp. 57-73.
- Khan, Haider A.** (2002), *Innovation and Growth: A Schumpeterian Model of Innovation*, CIRJE Discussion Paper F-150, Tokio.

- Kim, Jong-il und Lau, Lawrence J.** (1994), The Sources of Economic Growth of the East Asian Newly Industrialized Countries, in: *Journal of the Japanese and International Economies*, vol. 8, pp. 235-271.
- Kirzner, Israel M.** (1973), *Competition and Entrepreneurship*, Chicago and London.
- Kotler, Philip** (1997), *Marketing-Management: Analysis, Planning, Implementation, and Control*, 9. ed., Upper Saddle River, New Jersey.
- Krugman, Paul** (1994), The Myth of Asia's Miracle, in: *Foreign Affairs*, vol. 73, pp. 62-78.
- Kuo, Shirley W. Y.** (2000), New Financial Politics in Taiwan, Thailand, and Malaysia, in: *CGOTS Working Papers in Taiwan Studies No. 43*, American Political Science Association Conference Group.
- Kuo, Shirley W. Y. und Liu, Christina Y.** (1999): The Development of the Economy of Taiwan, in: *Asia-Pacific Economic Literature*, vol. 13, pp. 36-49.
- Kuznets, Paul W.** (1988), An East Asian Model of Economic Development – Japan, Taiwan, and South Korea, in: *Economic Development and Cultural Change*, vol. 3, pp. 11-44.
- Lall, Sanjaya** (2000), Technological Change and Industrialization in the Asian Newly Industrializing Economies: Achievements and Challenges, in: Kim, L. und Nelson, R. R. (ed.), in: *Technology, learning and innovation: experiences of newly industrializing economies*, pp. 13-68; Cambridge, New York et al.
- Lauridsen, Laurids S.** (1999), Policies and institutions of industrial deepening and upgrading in Taiwan II – the small-scale industry policy with particular emphasis on downstream plastic parts and mould industries, in: *Working Paper No. 12*, Roskilde University
- Li, Kuo-ting** (1988). *The Evolution of Policy Behind Taiwan's Development Success*, Yale University, New Haven and London.
- McNulty, Paul J.** (1998), Competition, in: Eatwell, J.; Milgate, M. und Newman, P. (ed.): *The New Palgrave: A Dictionary of Economics*, London et al., pp. 536-537.
- Nelson, Richard R. und Pack, Howard** (2003), Factors Behind the Asian Miracle: Entrepreneurship, Education and Finance, in: Paganetto, L. und Phelps. E. S. (ed.), *Finance, Research, Education and Growth*, Basingstoke et al, pp. 105-132.
- Nelson, Richard R. und Winter, Sidney** (1982), *An Evolutionary Theory of Economic Change*, Cambridge.
- Pack, Howard und Westphal, Larry E.** (1986), Industrial Strategy and Technological Change: Theory vs Reality, in: *Journal of Development Economics*, vol. 22, pp. 87-128.
- Perez, Carlotta** (2002), Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages, Cheltenham et al.

Piechottka, Achim (2000), *Industriepolitik in Ostasien*, in: *Europäische Hochschulschriften: Reihe 5*, Bd. 2607, Frankfurt a. M. et al.

Rao, Bhanoji (2001), *East Asian Economies – The Miracle, a Crisis and the Future*, Singapore, Boston et al.

Rodrik, Dani (1994), *Getting Interventions Right: How South Korea and Taiwan Grew Rich*, in: NBER Working Paper No. W4964, National Bureau of Economic Research, Cambridge.

S.M.E.A. (2003), *White Paper on Small and Medium Enterprises in Taiwan, 2003*, Small and Medium Enterprise Administration, Ministry of Economic Affairs, Taipei, Taiwan.

S.M.E.A. (2004): *White Paper on Small and Medium Enterprises in Taiwan, 2004*, Small and Medium Enterprise Administration, Ministry of Economic Affairs, Taipei, Taiwan.

Teece, David J. (2000), *Firm Capabilities and Economic Development: Implications for Newly Industrializing Economies*, in: Kim, L. und Nelson, R. R (ed.), in: *Technology, learning and innovation: experiences of newly industrializing economies*, pp. 105-129; Cambridge, New York et al.

Timmer, Marcel und van Ark, Bart (2000), *Capital Formation and Productivity Growth in South Korea and Taiwan: Realising the Catch-Up Potential in a World of Diminishing Returns*, mimeo, Groningen Growth and Development Centre.

Tsiang, Grace Ren-juei (1999), *Human Capital Creation and Utilization in Taiwan*, in: Thorbecke, E. und Wan, H. (ed.): *Taiwan's Development Experience: Lessons on Roles of Government and Market*, Boston et al. pp. 249-267.

Tu, Ying-yi (2001), *The Electronics and Information Technology Industries*, in: Hsueh, Li-min; Hsu, Chen-kuo und Perkins, Dwight H. (ed.): *Industrialization and the State: The Changing Role of the Taiwan Government in the Economy, 1945-1998*, in: *Harvard Studies in International Development*, Harvard University, pp. 267-292.

Utterback, James M. (1994), *Mastering the dynamics of innovation – how companies can seize opportunities in the face of technological change*, Boston, Massachusetts.

Wade, Robert (1988), *The Role of Government in Overcoming Market Failure: Taiwan, Republic of Korea and Japan*, in: Hughes, H. (ed.): *Achieving Industrialisation in East Asia*, Cambridge. pp. 129-163.

Wade, Robert (1990a), *Governing the Market: Economic Theory and the Role of Government in East-Asian Industrialization*, Princeton.

Wade, Robert (1990b), *Industrial Policy in East Asia: Does it Lead or Follow the Market?* in: Gereffi, G. and Wyman, D. (ed.): *Manufacturing Miracles: Paths of Industrialisation in Latin America and East Asia*, Princeton, pp. 231-266.

Wang, Jiann-Chyuan (2000), The Past and Future Role of Small and Medium-sized Enterprises in Taiwan's Economic Development, in: Masuyama, S.; Vandenbrink, D. und Yue, C. S. (ed.), Restoring East Asia's dynamism, Tokio, pp. 197-212.

Western, D. L. (1998), Where to go from Crisis, in: Far Eastern Economic Review, vol. 161, pp. 31.

World Bank (1993), The East Asian Miracle: Economic Growth and Public Policy, A World Bank Policy Research Report, Washington, D.C.

Young, Alwyn (1992), A Tale of two Cities: Factor Accumulation and Technical Change in Hong Kong and Singapore, NBER Economics Annual, pp 13-54.

Young, Alwyn (1994), Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience, NBER Working Paper No. 4680.