

Chapter 9

Transnational Companies, Shareholder Value and the Chinese Innovation Policy

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Introduction

Non economic institutions are important determinants of economic success. Economic coordination takes place within firms at a domestic and transnational level. Production and management systems¹ do not only differ among countries and sectors, they are also influenced by variations in the social environment. Firms are embedded into a complex political and cultural context which places constraints on their economic activities. Coordinating mechanisms at a state and supranational level determines economic behavior by providing a set of norms, rules and privileges. It is the State that regulates the various non-state coordinating mechanisms and manipulates fiscal and monetary policy. In this sense, political institutions² can create economic conditions that attract technological progress and encourage foreign investment.

The power of States as coordinating actors tends to dissolve at the transnational level (Hollingsworth and Boyer 1997: 30). Moreover, collective forms of coordination, such as associations and unions, are rather weakly developed beyond the national level. At a low level of control, the market is the prominent form of transaction coordination among unrelated firms. At a higher level, economic coordination is carried out through hierarchies such as transnational corporations or collective forms such as international trade associations.

In this context, an often discussed question is whether globalization is necessarily heading towards an erosion of national barriers and an adoption of a uniform set of basic institutions worldwide (Miller 2008: 305). On the one hand, the expansion of Western values and standards as well as the dominance of capitalistic patterns of behaviour on the world markets seem to confirm the view that, in the long run, globalisation ends up in convergence. On the other hand, the remaining variety of political and cultural differences among countries resulting in different national institutions stand in contrast to a convergent path.

This raises the possibility that countries may derive comparative advantages from their institutional infrastructure (Hall and Soskice 2003). Within the global framework the selection of the most competitive site means scrutinizing and

¹ In recent years, neoclassical economic theory has tended to downplay the role of production and of firms (Hollingsworth and Boyer 1997: 19). A social system of production is a social configuration consisting of different levels such as industrial relations, the internal structure of corporate firms, the connections among firms and their relationship to financial markets, the state and its policies as well as norms, rules and laws.

² The competitiveness of a country's major social system also depends on international rules of the game. For example, the emergence of the World Trade Organisation and of the European Union has influenced coordinating mechanisms at the nation-state level through new institutional arrangements. This raises concern that integration at a supranational level undermines national institutions and socio-economic-political forms of coordination.

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challenging the national set-up. It affects virtually all realms of politics. We will analyze the reciprocal process of change at the corporations and institutions levels further.

This chapter will examine global trends towards achieving standardization of management concepts and will look at remaining national differences. In general, the various connections between the socioeconomic and political levels of market coordination are subject to our analysis. The aim is to survey the political and fiscal challenges resulting from the growing influence of value added concepts and shareholder value orientation in Europe and East Asia. In order to reduce complexity, we will focus on cross-border R&D investments and R&D policy in China. We will look at both:

- the role of transnational companies (TNCs) in offshoring research and development activities, and
- the state of R&D policy in China.

The rationale for choosing China lies in its increasing importance as an actor in the areas of production, finance and innovation. The country differs from the liberal market economy model of the UK and USA and from the German, Japanese and South Korean models.

At last, the effects of fiscal instruments such as direct funding and tax incentives on R&D investments in China are an important concern of this chapter. Various studies indicate that a mix of direct government's financing and tax incentives varies across OECD countries (Hall and Van Reenen 2000). While many manufacturing countries³ offer both, other OECD countries have low direct and indirect funding and high private R&D expenditure. However, studies on the effectiveness of tax incentives in the context of developing countries are rare. Analysing the effect of Chinese innovation policy will finally allow us to point out some elements of coordination and modernization which can inspire Western countries.

The chapter is structured into five sections. In section 1, we discuss basic business concepts and strategies of transnational companies. Section 2 describes recent developments in the role of transnational companies regarding cross-border R&D investments. Section 3 provides information on technology transfer to China and on Chinese R&D policy. Concluding remarks are contained in section 4.

1. The impact of shareholder value orientation on transnational corporate operations – comparing models of market economy

Although the institutional set differs from country to country, a strong trend towards economic convergence can be identified. Firms must respond to the pressure of the market. New challenges in the global market place are forcing corporations to re-evaluate traditional ways of doing business. Bartlett and Goshall (1990) discussed the trend towards transnational groups and integrated networks with respect to corporate

³ Recent proposals regarding the US tax plan also include the research tax credit that was to expire at the end of the year 2009. This US credit has been temporary for more than a decade and shall now be made permanent.

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governance. These models range from highly centralized to mostly decentralized conglomerates. The creation of global networks highlights their compatibility with the objectives of value management. Transnational corporations pool the resources of corporate headquarters and their foreign subsidiaries. Costs and proceeds are optimised to gain a competitive advantage.

With the new global economic crisis starting in the Autumn 2008, even president Obama vowed to pursue US American tax evaders and detect their offshore tax shelters. He announced a series of steps aiming at preventing US companies from sheltering foreign profits in tax havens like the Cayman Islands, where one single mailing address houses 18,857 corporations. Over a period of ten years his plan would generate \$210 billion, money needed to help reduce the swelling federal deficit. Under current law, US firms can write off domestic expenses for generating profits overseas.⁴ The proposal focuses on headquarters' expenses regarding foreign US subsidiaries. While currently the costs used to generate offshore profits are deductible immediately, US tax payments can be deferred till those profits are repatriated to the American parent company.

The debate indicates that TNCs are taking advantage of low tax conditions overseas. Defense strategies of high-tax countries are not uniform. According to US tax law, foreign profits of domestic corporations shall be taxed in America. If a US firm invests in Ireland and earns Irish profits, it would have to pay up to 35 per cent minus a credit for the foreign tax paid (12.5 per cent). The total tax load would consist of both the domestic and foreign taxes and amount to 35 per cent. In comparison to a German firm the result would be quite different because Germany would apply the exemption method on foreign profits. Paying no corporation tax on foreign income, the total tax load for a German corporation would only total 12.5 per cent. Therefore, American firms tend to shelter their foreign profits in low-tax countries, while the repatriation of foreign profits is favorable for German firms.

The creation of multi-national production networks goes hand in hand with the formation of global financial markets. Since the 1980s financial globalization has accelerated. This is due to the deregulation of domestic securities and capital markets, the liberalization of borderless financial transactions and new technologies. Together, these have enabled economic activities to become global in that they can take place anywhere, at anytime, and can span different time zones. Not only has this intensified inter-corporate competition, it has also increased competition between different types of capital investments. Hence corporate management increasingly relies on value management.

In line with a growing shareholder orientation in corporate management, creating shareholder value (Rappaport, 1998) has become the prime responsibility of the market economy. This philosophy has gained widespread acceptance in the United States and Great Britain (Copeland, Koller and Murrin 2000: 3). In continental Europe and Japan, a broader view has long been more influential, ensuring participation and the continuity of the business rather than maximizing shareholder value. Reflecting upon the current financial and economic crisis, the question arises whether the shareholder value concept will more likely become the global standard for measuring business performance. After the recent financial shocks and the associated economic pain, there is a natural desire for a general reform of the regulatory system. After investors and financial institutions have simply outsourced their risk management it has become obvious that self-regulation has its limits.

⁴ Multinational corporations in the USA had an effective tax rate of 2.3 per cent in year 2004.

Shareholders measure success in terms of increased dividend yield. The assumption is that returns are comprised of dividend pay outs and added value of a particular stock. From a shareholder's perspective, added value consists of the difference between the purchase price and the realized sales price of a particular stock. The return thus represents interest on invested capital. In this model, sound financial management commences only when the interest yield of invested capital surpasses the expectations, *i.e.* the opportunity costs of the investor.

In value based management, the yield expectation of shareholders is the decisive benchmark for investments. The yield entitlement, in a way, represents the calculated rate of return of the investor. The calculated rate of return is based on the weighed average cost of capital, which consists of the cost of equity and the cost of debt. The key term 'cost of equity' contains three components:⁵ base yield (risk free yield), a general market risk premium and the systematic risk (beta factor).

A corporation's weighted average cost of capital represents the standard measure for corporate investment projects. Based on this corporate point of view, if operating cash flow exceed the weighted average cost of capital, then the result is an increase in the value of the corporation. The reverse scenario would lead to a decrease in the valuation of the corporation. This point of view assumes that value based management results in an efficient allocation of capital.

The emphasis on shareholder orientation is a response to a heightened pressure of competition and the dominance of financial markets. In essence, we can highlight a new structure of investors. This development has also influenced businesses in Asian and continental European countries. Ownership of widely held stock has changed. Institutional investors such as investment funds, pension funds, banks or trusts and private shareholders own widely held stocks. Even in Germany and particularly in Japan there has been a significant increase in institutional investors. Next to domestic funds, American pension funds dominate with respect to international exposure. Siemens and Veba make an excellent case in point. Between 1993 and 1999, Siemens has registered an increase in institutional investors from 15 per cent to 45 per cent. At Veba, this increase has jumped from one per cent in 1987 to 71 per cent in 1999 (Streeck and Höpner 2003: 251).

Institutional investors are not tied to individual corporations when deciding on their investment options. Instead, their concern is purely financial, based on the rate of return and the degree of risk. According to a survey commissioned by the Deutsche Bundesbank⁶ the average investment duration spans approximately one year. Competition between investment funds intensifies the pressure on corporate management. Sanctions or penalties range from under-allocation, the complete pull-out of capital all the way to rewards and incentives like over-allocation in portfolios.

The danger of a hostile takeover is minimized by focusing on a corporate policy, which is based on shareholder interests. Offers to acquire shares which are directed at shareholders of the target company directly represent the driving force of a capital market based corporate policy (Rappaport, 1998: 1). Governance of widely held stocks by institutional investors with an international focus results in greater transparency with respect to selling to hostile takers.

⁵ For a more detailed analysis see: Copeland, Koller and Murrin (2000: 201-232), or von Wuntsch, Knacke, and Neumann (2005: 31-34).

⁶ For a more detailed analysis cf. Deutsche Bundesbank (2001, 46 *et seq.*).

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In this perspective, the dominance of financial markets has led to an increased integration of operating and financial corporate functions. Players at the financial market level impact on corporate operations via friendly and hostile takeovers as well as through corporate acquisitions, which are financed with borrowed money. Corporate management on the other hand has to stand up to mergers and acquisitions, to stock buy-backs and restructuring of the financial markets while keeping an eye on the markets benchmarks.

A lot of managers in Germany and other continental European countries had to get used to the idea of making hostile takeovers part of their *modus operandi*. The late 1990s featured a steady stream of rumors pertaining to hostile takeovers of German corporations. This development came about as a result of the increased importance of institutional investors. With the new focus on value added management, performance based diversification was eliminated in favor of concentrating on core business to improve earnings. In essence, diversified corporations deal with a proportionally larger danger of a hostile takeover and the danger of being traded below the sum of all its parts. That is because the larger the corporation, the larger the possibilities of cross subsidization for unprofitable sub entities from profitable ones. The effective market value thus is assumed to be below the sum of the potential value of all the individual subsidiaries, *i.e.* the conglomerate discount.

These developments also mark important institutional changes in different countries. A perspective on institutional change can be outlined and applied to Germany and Japan. We can view the German and Japanese models of capitalism as systems of incentives and constraints. In contrast to the UK and the US, neither model is considered market based in the classic liberal sense. Both Germany and Japan are heading in that direction, *i.e.* approaching the model of shareholder value. The control that banks exert on corporations has diminished, especially in Germany within the last fifteen years. German corporations used to be highly dependent on their main banking institution. The bank would provide financing and at the same time would also hold a stake in the corporation itself. The highly lucrative investment banking system is progressively incompatible with the German main bank based financial system. Corporations which are listed on the stock exchange have begun to be more dependent on equity investors (Vogel 2003: 317), who are more driven by the markets. That is why German banks have relinquished their industrial shares significantly since the late 1990s.

The restructuring of the bank-based financial system in Japan progressed along different lines. After World War II, administrative guidance developed into a system of informal relations between regulators and financial institutions. This involved a mix of formal restrictions and unwritten instructions on bank lending and branching policy. One was the practice of issuing new shares at par value rather than market value. Additionally, the state and leading financial institutions regulated access to capital markets through the approval of size and timing of new bonds. As a result of the 1997 Asian crisis, which brought weak Japanese banks to the brink of insolvency, the pressure to deregulate intensified and with it, the pressure to establish a politically independent central bank (Vitols, 2003: 257).

Although Japanese corporations have eased their dependence on bank loans, new networks between banks and corporations have emerged. This holds true especially for small and medium-sized companies. Banks continue to hold large

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industrial shares. The sale of these shares typically occurs with prior consultation with the companies involved. If a corporation incurred losses due to a financial crisis, it would be forced to shift back from equity financing to borrowing (Vogel, 2003: 319).

In contrast to the liberal market economies such as North America and the UK, Germany, Japan and South Korea are generally viewed as coordinated market economies based on their institutional framework. Coordinated market economies can be further subdivided into industry-based coordination as in Northern Europe and group-based coordination (Hall and Soskice 2003: 34). In Germany, companies often cooperate within the same industry in the areas of training and technology transfer. Business associations and trade unions are organized along industry-specific skills and wage coordination. By contrast, business networks in Japan are built on families of companies (*keiretsu*; see Chapter 10 in this volume) with interconnections across industries. Therefore, workers are encouraged to acquire firm or group specific skills. Workers are motivated to invest in skills because large firms offer life-time employment. While liberal market economies tend to concentrate their power in the political executive, coordinated market economies are rather governed by coalitional regimes. Fluid market settings can enhance investment in different kinds of assets or industries. By comparison, investment in specific industry assets or industries is more encouraged in coordinated market economies.

The inclusion of China into this assessment poses a challenge from the point of view of comparative institutional advantage.⁷ This concept needs to be inclusive of all the varieties of market systems. Notwithstanding the idiosyncrasies of the Chinese way, it is clear that the Chinese focus has been on the economy. The Chinese emphasis on economic success as manifested since the late 1970s represents a shift towards an efficiency approach, very much in the sense of Max Weber. The new law of ownership enacted on October 1, 2007 for the very first time, ever provides for equal protection of private, state and collective ownership.

In accordance with the WTO protocol, China agreed, at the end of 2001, to put foreign banks on a par with Chinese domestic banks. Although China has yet to fully comply, China is increasingly opening up her financial sector. This policy of liberalization is evident at different levels (Von Wuntsch, 2008: 246).

(i) By the end of December 2006, the banking sector was gradually being made accessible to foreign competition. Ditto for purchasing shares of Chinese banks. For example, the majority share hold of 20 per cent in the Guangdong Development Bank was purchased by a Citigroup-led consortium. The complete liberalization of the banking sector will enable foreign banks to establish branch offices in China and also enable them to sell insurance products.

(ii) State-owned investment banks are to change into a modern banking system with sufficient equity capital, strict internal controls and a high competitive edge. Banks will be allowed to establish investment funds as well. This will force valuation of investments in accordance with global value based management.

⁷ The approach to comparative political economy examines how national legal and political institutions reinforce specific patterns of economic coordination and generate distinctive forms of market economies (Hall and Soskice 2003).

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(iii) The market for corporate bonds will be transferred to the more market based financial regulatory agency. The National Development and Reform Commission sets annual quotas and authorizes the issue of bonds on a case by case basis.

(iv) China is a player in international stock markets and utilizes her steadily increasing reserves for strategic purchases. China Development Bank for instance strengthened the Barclays offer in the take-over spectacle for the Dutch ABN Amro bank by purchasing Barclays shares worth 13.4 billion Euro. This resulted in a higher offer on the part of Barclays for ABN Amro. In addition, China recently provided her state-owned investment company with 200 billion dollar to invest in foreign industry and financial products. This led to China buying into the US financial investor Blackstone.

China's increasing economic clout is evident in the valuation of Chinese companies. Already out of eighteen of the most valued companies in the world, based on market capitalization, six are Chinese. The expansion of the stock markets in China will inevitably further financial based value management with the primary assessment of cash flows and risk (market risk premium and systematic risk). Whether China can be categorized as more liberal or more group-oriented requires further investigation. China's remaining elements of state regulation seem to suggest that China's development represents a unique variety of the coordinated market economy model.⁸

We have pointed out that the shareholder value based way of doing business has gained more ground worldwide since the 1980s, although, this trend is still far more developed in the Anglo-Saxon countries. As far as the financial dominance of markets has been questioned during the recent crisis, it will be interesting to find out whether businesses in Germany and Japan might tend to follow old paths again. This scenario can only be a result of turning back to former institutional standards. Currently, policy makers are considering regulatory actions to be taken to reflect on the lessons from this crisis. Although it should be clear that self-regulation has its limits, the political reflection on the extent of market regulation differs from country to country.⁹

2. TNCs role in offshoring¹⁰ research and development

After we have pointed out the impact of corporate value management on the strategy and design of transnational companies, we will describe how corporate R&D activities are embedded in their global value chain. The concentration on R&D investments and policy allows us to reduce complexity and to describe a specific area of economic and political coordination. The aims of this section are to:

⁸ The regulatory framework is officially proclaimed as a "socialist legal system".

⁹ Hedge fund managers and policy makers in London and New York have already warned that excessive regulation would stifle innovative qualities of the financial markets. They only voiced support for minimal requirements such as greater standardization regarding reporting, registration and disclosure. German policy makers rather believe that no institution, no market and no jurisdiction should be without proportionate regulation and supervision.

¹⁰ Offshoring is defined as the transfer of activities abroad. It can be done internally and/or externally. Internally, it involves moving services from a parent company to its foreign affiliates (captive offshoring). However, the involvement of a third party provider abroad refers to the external concept.

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- describe recent developments regarding cross-border R&D investments by TNCs,
- discuss opportunities and risks from the viewpoint of developing countries, and finally,
- survey the effect of R&D policy and fiscal instruments on R&D activities in China.

According to recent data provided by the United Nations, the current crisis has put an end to a growth cycle in international investment (UNCTAD, 2009). Starting in year 2004, foreign direct investment (FDI) flows reached a record of \$ 1.8 trillion in 2007. Global FDI declined by more than 20 per cent in year 2008 and a further decrease in year 2009 is expected. The fall in FDI is resulting from a lower availability of capital, higher cost of capital and a cut in corporate profits. The access to financial resources has been hit by a severe recession. While developed countries have been most affected in 2008, developing countries were still able to attract further FDI, but at a lower rate.

Although the current financial crisis began in the second half of 2007 in the United States, sub-prime mortgage markets did not affect cross-border mergers and acquisitions (M&As) already in that year. Due to relatively favorable financing conditions for debt-financed M&As and despite a changing lending behavior since mid-2007, large deals have been completed in that year. The mega acquisition of ABN-AMRO Holding NV by the consortium of Royal Bank of Scotland, Fortis and Santander through RFS Holding BV took place. The liquidity crisis in money and debt markets began to depress M&As in 2008. As far as buyout activities by private equity investors have slowed down rapidly, the sustainability of private equity funds raises doubts. Risks related to high leverage of firms, the increasing cost of debt and a possible regulation might weaken private equity activity. Although economic growth in developing countries could compensate for weaker growth in developed countries, a further slowdown in 2009 is a reasonable scenario.

However, the current crisis does not alter the fact that the development of international production indicated by exports of foreign affiliates, value-added activities, employment and other factors has increased during the last years. TNCs aim at benefiting from market liberalization and deregulation in host economies. The 2008 World Investment Report mentions that 79,000 TNCs control an estimated 790,000 affiliates worldwide. Gross product of foreign affiliates is still growing by a rate of 19.4 per cent and accounted for 11 per cent of global GDP in 2007. One fifth of their sales represented exports and the number of employees amounted to 82 million.

FDI inflows to developing countries reached a new record level of \$ 500 billion in 2007. South Asia, East Asia and South-East Asia accounted for half of these FDI, with China (and Hong Kong) remaining the largest FDI destination in the region, followed by India (OECD 2008a: 8). Progress towards regional integration and policy developments contributed to this performance. Rising costs of production are, however, increasing competition with South and South-East Asian regions. The 2008 World Investment Report is pointing out that some foreign firms are turning to areas with lower wages in Bangladesh, Vietnam or inland China (OECD 2008a: 51). On the other hand, it is interesting to see that South Asia, East Asia and South-East Asia have also become a remarkable source of FDI for other developing countries. FDI outflows

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from South, East, and South-East Asia have reached a level of about \$ 150 billion in 2007.

A broad trend towards the offshoring of research and development can be reflected. As far as the global environment is characterized by shorter product life cycles, rapidly developing technologies and increasing costs for R&D, firms aim to access the skills of foreign locations and adapt products to local markets. TNCs are playing a major role in offshoring R&D through FDI and technology alliances (UNCTAD 2006: 2). Although the expansion of R&D across borders has already been indicated in the past, the rising scale of offshoring R&D and the selection of developing countries as destinations is remarkable and can be seen as a part of the broader process of offshoring services (table 9.1).

Table 1: Geographical distribution of R&D foreign affiliates*, 2004

Region/Economy	Number of Affiliates
Total World	2584
Developed Countries	2185
of which:	
Western Europe	1387
United States	552
Japan	29
Developing Countries	264
of which:	
Asia	216
South, East and South-East Asia	207
Latin America and the Caribbean	40
Africa	4

Source: UNCTAD 2006, p. 7

On the basis of 2,284 majority-owned foreign affiliates identified in the Who Owns Whom database that are engaged in commercial, physical and educational research, commercial economics and biological research, non-commercial research and testing laboratories.

Between 1993 and 2002, R&D expenditure of foreign affiliates worldwide rose from 10 per cent to 16 per cent of global business R&D (or from \$30 to \$60 billion). Compared with developed host countries the increase was significant in developing countries, where the share rose from 2 per cent to 18 per cent between 1996 and 2002 (UNCTAD 2005: 125). The geographical distribution of foreign affiliates involved in R&D worldwide in 2004 stresses the share of developing Asia. While more than 10 per cent of foreign affiliates worldwide engaged in R&D are located in developing countries, 207 from 264 foreign affiliates in developing countries are registered in South, East and South-East Asia. Other data on recent greenfield R&D projects also indicate that the majority of new jobs have been created in developing countries, mainly in China and India and in the information and communication sector (UNCTAD 2006: 7). The offshoring of R&D in developing

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countries involves internationally well known firms such as IBM, Intel, Microsoft, Nokia, Oracle and SAP.

On the other hand, keeping up with new technologies is a major challenge for developing countries. By introducing a favorable set of economic conditions and fiscal incentives for attracting international R&D investments, these countries are aiming at accelerating their economic development. There is a broad consensus among economists that R&D and human capital are two of the most influential drivers of productivity (Romer 1990). The rationale is that technological knowledge, created through R&D activity, enhances the production and diffusion of innovations and promotes productivity growth. According to theoretical growth models (Coe and Helpman 1995) total factor productivity depends on both the stock of R&D accumulated in a country and in other countries, hypothesizing that knowledge spills over from the other countries proportionally to aggregate import flows. This correlation between cross-border spillovers and productivity seems questionable. Only a small amount of imports are able to expand productivity across countries. A plausible approach to productivity spillovers must consider that only imports of capital goods will be effective in transferring technical knowledge across countries (Xu and Wang, 1999).

While TNCs are taking advantage from the offshoring of R&D, the opportunities and risks must be discussed additionally from the viewpoint of the developing countries. The participation of developing countries in the globalization of R&D has so far been rather uneven regarding growth and value creation (UNCTAD, 2006: 2). Their policies should therefore focus on achieving technology spillovers from TNCs R&D. Spillover effects can be generated by:

- encouraging scientists and engineers to focus on patentable research and to form start-ups,
- building up an indigenous R&D and innovation culture among local companies,
- commercializing R&D results at the same location and,
- expanding R&D activities globally in order to access world knowledge.¹¹

The benefits of R&D for host countries depend on the level of technology transfer. Indigenous technology units are closely linked to manufacturing units and are established to adapt a parent's product and process to local conditions in host countries. Also, regional technology units are established to serve regional markets and to develop links with local innovation levels. However, global and corporate technology units are far more centralized in order to serve the interests of the parent company and to protect the competitiveness of the firm (UNCTAD 2006: 11). The amount of a TNCs control reduces the scope for host countries to access key knowledge and new technology.

In this sense, benefits from R&D investments within transnational company groups depend on many factors and are far from automatic. The productivity potential will be rather low if R&D activities are an integrative part of a merger and acquisition. These kinds of transactions focus on the simple change of ownership.

¹¹ The Chinese company "Huawei" has set up five research institutes in the United States, India, Sweden and Russia (OECD 2008b: 146) Please check section references. In addition, Beijing Automotive Industry Corporation is currently trying to take over German "Opel AG". The idea is to transfer worthy technology and know how from the German developed automotive industry to China.

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Especially, takeovers can create a negative effect on local capacities by scaling down R&D investments in the acquired firms (UNCTAD 1999). In other cases, TNCs may mainly be interested in transferring the results of innovation performed in the developed countries than developing the innovatory capacity in a developing country itself. To compare and weigh the opportunities and risks in respect of R&D investments by TNCs in developing countries is therefore a necessary discussion for policy makers.

3. Technology transfer to China, the Chinese R&D policy and tax considerations

3.1. Technology transfer to China – a critical insight into the Chinese R&D policy

Although FDI has been regarded as a prominent means of technology transfer by the Chinese authority, studies on it have tended to remain very much at the macroeconomic level, given the difficulty of obtaining appropriate and reliable data at the regional level (Andreosso-O'Callaghan and Qian, 1999). Some recent research based on the case study approach is also notable. Chen et al (1995) argued that the transfer of low and intermediate technology is dominating because China relied primarily on Hong Kong and Taiwan FDI. Based on a case study of 84 Hong Kong garment firms in China, Thompson (2002) disclosed that there is technology transfer and inter- and intra-industry spillover from Hong Kong to China. However, both Li and Yeung (1999) and Andreosso-O'Callaghan and Qian (1999) found that firms from the European Union (EU) have tended to play an important role in transferring technology in some high-tech industries such as automotive and telecommunication in China.

The EU has traditionally been the largest source of technology for China (Andreosso-O'Callaghan et al, 2005: 3). In contrast, US firms have been more cautious than their EU counterparts when they transfer technology to China. European IT & Telecom companies are the main couriers of technology transfer in the telecommunication industry. R&D investment in this sector had reached € 2.5 billion by 2007. The important role played by EU firms in transferring technology to China has also been stressed in empirical studies (Benett et al 2001). The analysis of EU Technology Transfer in the automotive industry (Zhang and Taylor 2001) has provided evidence indicating that transfers of low and intermediate technologies to Chinese indigenous companies are found in the context of learning by doing. By focusing on the case of Shanghai Volkswagen Automotive Company and Shanghai Bell Telephone Equipment Manufacturing Company, Li and Yeung (1999) found inter-firm technology transfer and knowledge spillovers in both cases.

According to the European Chamber of Commerce in China, more than 20 of the largest EU companies such as BP, BASF and Bayer, in the petrochemical, chemical, oil & gas sectors are actively involved in oil and gas exploration and production, oil products retail and downstream development, gas infrastructure and Liquefied Natural Gas (LNG) import into the Chinese market.

Young and Lan (1997) examined the problems facing FDI-linked technology transfer to China. By conducting a case study of Dalian, a city within one of China's economic and technological development zones, the authors conclude that, based on

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the level of technological and economic development in China, FDI-linked technology transfer was at an expected level but that there was a greater potential for the utilization of FDI as an instrument of technological development than theory would suggest. Zhang and Taylor (2001) examined China's economic growth over the twenty year period following Deng Xiaoping's 1978 policy of open-door economic reform. This period is marked by China's transition from labor-intensive to capital and technological-intensive production. Their research focused on the First Automobile Works in Changchun, Jilin Province. The authors suggested that in order to successfully compete in a global market and sustain FDI-linked technology transfer, the Chinese government must continue to issue SOE policy reforms and that by maintaining an open-door policy that facilitates technology transfer, both Chinese and foreign enterprises would benefit and thus so will the consumer. Liu (2002) investigated the effects of FDI on technology transfer experienced by external firms and sectors. Empirical data was gathered from twenty-nine manufacturing industries among six ownership sectors located in the Shenzhen Special Economic Zone of China over a five year period from 1993 to 1998. Based on empirical results, the study found that FDI generates technology transfer and raises the level and growth rate of productivity of recipient manufacturing industries; the benefits of which being felt most significantly by state-owned and joint-owned domestic sectors.

A recent article by Marcotte and Niosi (2005) studies the influences of enterprise size on the effectiveness of technology transfer and learning by recipient Chinese partners. The authors surveyed twenty-eight Canadian manufacturing firms involved in technology transfer to China and carried out seven case studies to serve as a complement to their empirical data. The authors' study sample revealed that effective technology transfer and learning in recipient partner firms was not significantly associated with Canadian transferor size. The authors also point out that the predominance of state-owned recipient firms in China may yield different results than other developing countries where most recipient firms are private.

With regard to spillover effects associated with technology transfer, Liu et al (2001) and Wei and Liu (2001) also showed that foreign presence is associated with higher labor productivity in the Chinese electronics industry. Wu (2000) and Zhao (2001) both noted that FDI can raise wages of skilled labor in China. Singh (2004) argued that investment expenditure on innovation projects is likely to be low if it is left in the hands of private economic agents as they have a tendency to under-invest due to the 'public good' nature of the outcomes of R&D. Based on empirical research, Xue (2001) analyzed the factors that influenced TNCs to set up independent R&D institutions in the angle of demand, efficiency and environment. The increasing competition in the market and the access to specialized staff were important factors considered.

Although, thanks in large parts to technology transfer, the Chinese innovation system is increasingly dynamic, R&D investments by Chinese firms have not reached an advanced level in terms of funding and personnel. According to the OECD review of China's innovation policy (2008b) the innovation capacity of the Chinese business sector is still weak regarding the level of technological development. However, Chinese firms are also aiming at strengthening their technology capacity by developing international alliances. This is not only favorable for foreign companies. Some leading Chinese companies have already acquired technology-based foreign

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companies or their divisions. Some examples can be pointed out. Huawei has formed joint laboratories with Motorola, Intel, Agere, Altera, Sun and Microsoft. The Chinese company is also expanding globally by setting up research institutes in Silicon Valley and Dallas in the United States, in Bengaluru in India, in Sweden and in Russia. IBM's PC division has been acquired by Chinese Lenovo company for USD 1.75 billion, representing the largest deal for a Chinese company so far. The objective is to become a high-end global PC maker by acquiring core technology and a brand name (OECD 2008b: 146).

Companies in countries all over the world deal with a set of institutional requirements over which they do not have complete control. Hence, in analyzing comparative institutional advantages, public policy making must be addressed. While specific legal regulations influence the economic arena in which stakeholders compete in the market, multinational companies apply this legal framework in order to improve their performance and to increase their value.

Globally active corporations take advantage of the respective cost conditions and incentives in different countries. Capital-market based pressure to increase corporate value brings about a rigorous emphasis on cost efficiency. The importance of site selection based on local cost conditions and the exploitation of international taxation differences is vital to value management. Corporations more than ever base their investment and site decisions on fiscal incentives (Wei et. al. 2007: 164). In the same vein, R&D related FDI depends on the policy environment in the host countries. Important factors for such TNCs are therefore:

- macro-economic progress and political stability (including protection to foreign affiliates),
- protection of intellectual property rights (Xue, 2005),
- skilled labor and a well developed innovation system (clustering of firms and research institutions), and
- incentives (direct funding and tax reductions).

According to the OECD (2008b), academics and policymakers have criticized the fact that foreign firms are charging unduly high license fees for their patents. They are crowding out domestic firms, monopolizing technology standards and thwarting technology transfer as well as knowledge spillovers. As a result, the Chinese government is aiming at promoting domestic companies to develop indigenous innovation. After China's entry into the WTO, R&D capacities of TNCs swarmed into China and became a vital part of China's technological innovation system. In order to attract TNCs to set up R&D institutions in China, the government has taken appropriate measures such as:

(1) Improving the intellectual property system. Xue (2001) has shown that inadequate protection of intellectual property rights in China is the main obstacle to the development of R&D institutions. China's weak protection of intellectual property rights is regarded as a major factor to block R&D development. The state of intellectual property rights of TNCs in China has an important impact on the establishment of R&D institutions.

(2) Strengthening the information infrastructure, since it mainly affects the efficiency of R&D institutions. With continuously shortened product cycles, performance depends on technical development, first-mover advantage and on expanding global markets. At present, the establishment of R&D institutions

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regarding TNCs in China are concentrated in Beijing and Shanghai due to a better infrastructure. This tends to widen the gap between the developed Eastern part of the country and the rest.

(3) Establishing a multi-level financial system in order to leverage firm investment in R&D. New policies enforce policy-related finance and commercial finance. Besides implementing new financial funds, high-technology enterprises are encouraged to list on the Chinese stock market (OECD 2008b).

3.2. R&D based investments and tax considerations

Apart from the importance of locational factors such as public infrastructure or labor costs, tax considerations are gaining significance in the selection of location and investment. The statutory tariff burden and the effective marginal tax rates are highly relevant. Statutory tax rates on corporate profits are available over time and across countries. They represent a simple but incomplete measure of the real tax conditions faced by multinational companies. In addition to the pure statutory rate, the effective marginal tax rate also includes special tax credits, accelerated depreciation schemes and other tax incentives. This leads to a lower taxable income on which firms are actually charged under the tax code in a country.

Discussions on the rationale for FDI may therefore be undergoing a shift. While less than ten years ago Markusen's survey on the motives for FDI (Markusen 1995) concluded that there is little support for the idea that tax avoidance is important, a substantial body of empirical work has since provided evidence indicating that high taxes have a significantly negative effect on the ability of a country to attract FDI (Gorter and Parik 2001; Haufler, Stöwhase 2003). According to Devereux (1992), a distinction between competition for physical capital and competition for (paper) profits must be drawn. Transnational companies tend to follow a two-step strategy.

In a first step, location advantages, including a good infrastructure and incentives such as write-off methods, are highly relevant for attracting physical capital and hence production activities. In this sense, investment undertaken for production purposes primarily reacts to the measure of the effective tax rate. In a second step, the TNC may shift taxable profits to a country offering a low statutory tax rate. In this setting the amount of production capacity can be very low in the country to which profits are shifted. Both types of capital competition allow TNCs to take advantage of the best of two worlds, benefiting from non-tax factors and tax incentives on the one hand and, transferring the economic rent of the investment to a tax haven on the other hand.

Investments in different sectors respond to tax incentives with different elasticities. Haufler and Stöwhase (2003) found¹² that especially service-related FDI depend on the level of the statutory tax rate. Tax incentives seem to influence investment more undertaken for production purposes. A reason might be that write-off methods can only be fully applied and developed in presence of relevant industrial capacities. However, service-related FDI tends to be more independent of the real variables of a host economy. In this sector, traditional location advantages are less influential and, the selection of a location is more determined by the goal of minimizing the worldwide tax load of a TNC.

¹² The survey conducted by Haufler and Stöwhase (2001) covered foreign activities of German TNCs in eight European countries (Austria, Belgium, France, Ireland, Italy, the Netherlands, Spain and the UK).

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A traditional instrument of profit shifting among countries are transfer prices for intermediate goods traded between the parent and subsidiary. Transfer pricing for purchasing and selling products within the firm conglomerate is a major instrument of achieving cost advantages. Corporate fixing of transfer pricing for miscellaneous sales offers tremendous potential for full exploitation. The corporate strategy is clear. The value added chain is structured in such a way so as to allow companies settle in low cost and low taxation regions that earn high yields. Intra-company transfer-pricing accompanies and further augments this effect.

Transfer Pricing affects the transfer of services as well. Profit shifting seems to be increasingly related to internal trade in services, including payments for overhead services, royalties and interest paid on intra-firm loans (Mintz, 2001). In general, intangibles are witnessing a strong growth, leading to an expansion of special rights such as licensing rights and patents. Firms in low tax countries have an incentive to overprice services and goods sold to high tax countries. The high tax country importer takes a loss and thus reduces taxable earnings and local tax liability. Proceeds accumulate in the low tax country, thus providing a great tax advantage for the conglomerates. Some 84 per cent of all developing countries believe that profit transfers are solely intended for the purpose of reducing company tax loads (UNCTAD, 1999:31).

The offshoring of R&D is linked to the transfer of patents, licenses or other rights regarding the usage of intellectual property.¹³ To determine the fair market price of this kind of intangibles is a difficult task. So far, tax authorities of developed and emerging countries have been adopting the OECD Transfer Pricing Guidelines (OECD, 1995). This especially applies to the “dealing at arm`s length` principle”, which emphasizes external comparison. The principle states that prices set on transactions between related parties should be determined as though these parties were independent.

Examples for the relevance of tax considerations in respect of investment decisions and FDI can also be found in China. Until the end of 2007, the Chinese tax policy aimed at attracting FDI by adopting a dual corporation tax system. While Chinese funded companies were subject to a statutory tax of 33 per cent, foreign funded firms enjoyed a preferential tax of only 15 per cent. Although foreign firms experienced a strong growth in their share of total tax revenues in China from 1995 to 2005, their share in gross industrial output exceeded their tax contribution by nearly 10 percentage points. On the one hand, this policy encouraged the inflow of foreign capital. On the other hand, it provoked tax avoidance and tax evasion of Chinese

¹³ Issues related to FDI in R&D are also addressed in Double Taxation Conventions (DTCs). The majority of these agreements regarding the avoidance of international double taxation provides protection to TNCs intellectual property and to tax revenues regarding royalties derived from the ownership of a patent, trademark or other right. The contracting state where the owner of a patent or other right is resident has the exclusive right to tax royalties. Since the owners of these kinds of payments are mostly resident in developed countries, article 12 of the OECD-Model (OECD, 2003) discriminates developing countries. However, some divergent DTCs are favouring the position of developing countries by allowing a parallel tax on royalties in the state in which they arise. An example is the DTC between China and Germany. China as the source state may tax royalties by a rate of a maximum of 10 per cent according to art. 12 sect. 2 DTC China-Germany. This DTC rather follows the UN model.

companies. These companies tended to transfer their capital to foreign countries and to reinvest it in China. Most of these investments came from off-shore financial centers like Hong Kong. In trying to equalize the tax treatment of domestic and foreign firms, China has been applying a new unified tax rate of 25 per cent since 2008. The effective corporation tax rate of foreign companies will be increased gradually over a period of five years till the new standard is reached. However, specific high-tech industries can continue to apply a preferential 15 per cent rate in order to encourage innovation (Kong et al., 2007).

According to the National Plan for Science and Technology Development (2006-2020) and China's National Science and Technology Development Plan (2006-2010) a number of tax incentives have been proposed such as a 150 per cent tax credit on R&D expenditure by enterprises and tax exemptions for low value equipment and for qualified firm laboratories and university parks (OECD 2008b: 614).

Most studies on R&D incentives have analyzed the impact of direct government's funding and tax credits in developed countries. However, there is only little empirical evidence from industrial sectors in China. The first empirical studies conducted in Shanghai show interesting results. On the one hand, government's direct funding has positive effects on industrial R&D investments. Government direct funding can stimulate the firm's own investment and minimize technical and market risks by promoting inter-company R&D cooperation. The expenditure on R&D in China has grown rapidly from 0.6 per cent of GDP in 1996 to 1.1 per cent in 2002. With an amount of nearly US\$60 billion in 2001 it already ranked third in the world. The industrial sectors' own funding is the most important source of R&D investment in the Shanghai area. Firms account for 72 per cent of the funding for science and technology activities (Zhu et al., 2006: 55). This might already demonstrate the regional strength of the industrial sector regarding innovation.

On the other hand, tax incentives affect the composition of R&D.¹⁴ As far as firms tend to reduce their cost level, fiscal incentives are rather favoring projects generating high profits in the short run. A substitute effect between two kinds of innovation activities has become evident. Expenditure has been shifted from research to development activities. During the period from 1993 to 2002 investments in applied research have decreased from 8.3 per cent to 5 per cent, while investments in development increased from 91.7 per cent to 95 per cent (Zhu et al., 2006: 56). The trend towards experimental development instead of research seems to be in line with the firm's cost and market strategies. Developing applications for existing technologies rather than creating new technologies is less cost intense and reduces market risks. From this point of view, the adoption of foreign technology is an appropriate innovation strategy.

This section has illustrated how a country relying solely on foreign technology in the early decades of its modern economic take-off has started to develop its own innovation and technology policy so as to develop indigenous technology-based industries. In line with the discussion in the earlier sections, tax considerations are

¹⁴ Tax cuts are not appropriate for adjusting the composition of industry R&D, but they can increase the amount of such investment. Tax incentives rather stipulate applied or short term research while direct funding affects basic or long-term research more. Tax cuts favor firms with a high profit potential. A consistent innovation strategy calls for an integrated long-term policy framework applying various types of support for big, small and middle sized companies.

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given a key role in stimulating R&D based Chinese TNCs. The next stage, which has already commenced as seen here, involves the offshoring of Chinese research entities.

3. Concluding remarks

The corporate strategies of transnational companies tend to converge on a global scale and TNCs take advantage of their conglomerate structure. The international set-up enables them to transfer profits to foreign subsidiaries with lower tax rates and to achieve value added results. The strategic objectives of value management are thus in perfect agreement with this concept. On the one hand, political and fiscal challenges are resulting from the growing influence of value added concepts and shareholder value orientation. On the other hand, coordinating mechanisms at a state and supranational level determine economic behavior by providing a set of norms, rules and privileges. This raises the possibility that countries may derive comparative advantages from their institutional infrastructure.

In this chapter, the specific emphasis on Chinese R&D investment and policy allowed us to describe a specific area of economic and political coordination and to survey the effect of fiscal instruments on R&D activities in China. Under a strong global market competition, firms aim to access the skills of foreign locations in order to cut their R&D costs and to adapt products to local markets. A broad trend towards the offshoring of research and development can be reflected and we have pointed out that TNCs are playing a major role in offshoring R&D through FDI and technology alliances.

The general finding is that the Chinese government's funding as well as industrial sectors' own funding in science and technology activities have positive effects on the industrial R&D investment. The effect of tax incentives, however, is not straightforward. The reason is that R&D activities have focused on development more than on basic research. As firms in China are mainly driven by market demand, the adoption of existing technology created elsewhere turned out to be a low-risk strategy.

China's economic policy has undergone a major transition over a period of more than 25 years. While the government withdraws from micromanagement of economic activities step by step, there has been a gradual move from governing by executive order towards the rule of law. Parallel to economic reforms, China follows a modernization strategy which emphasizes science and technology. This is seen as the cornerstone of modernization and a new development model directed towards greater social, ecological and environmental sustainability. China faces the challenge of making the transition from sustained to sustainable growth. Therefore, the country is seeking better access to global knowledge and technologies, especially, information and communication technology and biotechnology. As a result, market based funds for financing innovation have increased significantly.

China's spending on R&D is still heavily focused on experimental development. Only 11 per cent of patents by Chinese firms are considered inventive, compared to 74 per cent of patents by foreign firms patenting in China. Therefore, the planning process during the last years involved debates on the importance of indigenous innovation. The aim is to improve R&D in Chinese companies. Long-term planning over the past decades helped China to develop the economic environment and direct the allocation of resources (OECD 2008b: 432).

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Policy recommendations based on an empirical survey conducted in Shanghai (Zhu et al., 2006) suggest three steps:

- (i) The government's direct funding should be continued in order to stimulate innovation investments at the industry-level.
- (ii) The investment environment and the access to further financial resources, such as bank loans and foreign investments, should be improved.
- (iii) Low-tech investments should be discouraged by allocating tax incentives on high-tech activities.

So far, market orientation and long-term oriented innovation policy resulted in greater productivity of the Chinese economy. Compared with the rapid privatization and liberalization in Eastern Europe, in East Germany and in the former Soviet Union during the 1990s, which can be described as a shock therapy, China is following a gradual strategy characterized by a mixture of planned and market elements of governance. While globalization is putting pressures on the role of governments and policy worldwide, the Chinese model may represent a successful way of directing regional resources towards sustainable development. Due to the worldwide financial and economic crisis, Western countries might face the challenge of creating a new coordination mechanism in order to compensate for the reduced impact of political institutions. Stronger political governance in China is heading towards a flexible consensus in terms of balancing the various interests; the more innovation-driven Chinese strategy might become a point of reference for some European countries.

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