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Workshop Series on the Role of Institutions in East Asian Development: Institutional Foundations of Innovation and Competitiveness in East Asia

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Abstract/Zusammenfassung
The discussion paper summarizes the results of a workshop that focussed on the institutional foundations of innovation and competitiveness in East Asia. The following papers are contained: "Transitional Institutions, Institutional Complementarities and Economic Performance in China. A 'Varieties of Capitalism' Approach", "The Current State of Research on Networks in China's Business System", "Recent Changes to Korea's Innovation Governance", "Standardization and Institutional Complementarities in Japan – Empirical Results from SAP R/3 Implementations in Japanese Automotive Suppliers".

Keywords/Schlagwörter
East Asia, Japan, China, Korea, institutional change, competitiveness, innovation

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Introduction: Workshop on the Institutional Foundations of Innovation and Competitiveness in East Asia

Werner Pascha, Cornelia Storz, Markus Taube (eds.)

The workshop series on the role of institutions in East Asian Development tries to make a contribution to the development of theoretical approaches to East Asian Studies. Institutional theory is found to be particularly helpful, as it encompasses a rich variety of approaches that deal with the organisation of socio-economic phenomena in different circumstances. This holds for the different schools of institutional economics, including new institutional economics like property rights, principal-agent, incentive, transaction cost and contract theory, but it also holds for the wider approaches to institutional theory in the social sciences and beyond. The yearly workshops are a gathering of senior and junior scholars who are interested to develop a theory-based view of regional studies and of those interested to apply their institutional knowledge to East Asian phenomena.

Revised papers of the 2007 workshop, held at the Protestant Academy in Tutzing at Lake Starnberg, in view of the Alps in Upper Bavaria, are presented in the present discussion paper. The general subject of the 2007 meeting was an assessment of the institutional foundations of innovation and competitiveness in East Asia. What those foundations are is a key question that scholars outside East Asian studies are interested in, and for which we were looking for contributions from an institutional perspective. Why have the East Asian economies been growing so strongly? More particularly: What are the institutional and organisational conditions under which this success was possible? Will there be change? What does this mean for their further development?

The collected papers approach these issues from various angles. *Joachim Ahrens* and *Patrick Jünemann* (Private University of Applied Sciences, Göttingen, and European Business School, Oestrich Winkel) take up a puzzle of the recent spectacular success of the Chinese economy: Although one might expect, at first glance, that economic growth was due to fully embracing the advantages of a market economy, in the understanding of the authors this was actually not the case. Rather, China made use of "transitional institutions", as the authors call them. Ahrens and Jünemann analyze them from the viewpoint of the "varieties of capitalism" approach and discuss possible future courses. They conclude that the duality of the economic and the political realm as well as wide-spread bureaucratic behaviour are likely to remain.

*Johannes Meu*er and *Barbara Krug* (Erasmus University, Rotterdam) take up another key factor that is frequently associated with China's economic success, namely the presence of network ties that goes beyond the simple distinction of markets and firms. The authors undertake a careful literature survey and identify four approaches to networks, namely Chinese business groups (*qiyejituan*), Overseas Chinese Communities, networks of social relations (*guanxi*), and Network Capitalism as an alternative economic model. Through their theory-focused lens, they identify gaps within the individual approaches that might guide future research. For instance, they argue that "Chinese business groups" and "Overseas Chinese Communities" studies could profit from structuralist research that looks into concrete personal and professional ties.

Dominik Schlossstein (European Business School, Oestrich-Winkel) deals with another East Asian success story: the phenomenal rise of South Korea's economic competitiveness. He applies a national innovation system framework and argues that upstream governance of the innovation system was critically important to bring the economic successes about. On this basis, Schlossstein is particularly concerned about future challenges, namely those of effectiveness, efficiency and efficacy. Generally, he feels that the restructuring of the innovation system from "imitation to innovation" is well under way.

Alexander Müller (Philipps University, Marburg) contributes to a topic that is important for Japan's future economic path, namely for the prospects of convergence or divergence with other advanced economies. A key issue in this field is whether global standards are readily adopted in Japan or not. Müller studies this with respect to the implementation of the widely accepted SAP R/3 Enterprise Resource Planning (ERP) software in the Japanese automotive industry. He notices that SAP R/3 is widely used, but rather as a quality standard signalling best practice than as a compatibility standard, because the complex Japanese supplier system are not easy to integrate in the SAP R/3 standard. This finding sheds a sobering light on the widely held expectations that the spreading of global standards will lead to a convergence of Japanese development patterns with other leading economies.

The contributors shed light on different aspects of innovation and development, and were inspired by different theoretical approaches, such as the concept of varieties of capitalism, network theories or standardisation economics. One heatedly discussed topic of all contributions was the relevance of multiple equilibria, and how differentiated our analysis has to be in order to explain real world phenomena. A further issue was the necessity of considering the role of actors in the development of institutional paths. Summing up, the contributions offer interesting insights into vital aspects of competitiveness and economic progress in East Asia, and are challenging both for regional specialists as for those interested in institutional studies.

The organisers plan to continue the workshop series in cooperation with the Tutzing Protestant Academy (Evangelische Akademie). The next workshop is scheduled for March 2008 and will again take place in conjunction with the Tutzing (German-language) conference series on Normative and Institutional Foundations of Economics. Depending on the submitted papers, the workshop may be held in English too. Those interested in attending or in presenting a paper are invited to get in touch with any of the workshop organisers signing below. For the documentation of earlier workshops see http://www.vsjf.net/de/aktiv.php?back=ja&aid=1 on the homepage of the German Association for Social Science Research on Japan.

We would to thank all those who contributed to make the workshop and its documentation a success, including Martin Held, Gisela Kubon-Gilke, Richard Sturn of the Tutzing conference series and Susanne Satzger of the Tutzing Academy.

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Transitional Institutions, Institutional Complementarities and Economic Performance in China

A 'Varieties of Capitalism' Approach

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Abstract.

The paper focuses on institutional change and institution building as integral parts of economic transition in China. China's success, particularly compared with other advanced transition economies, implies a puzzling observation: China did not apply theoretically-derived policy recommendations. Instead, authorities followed a gradual, pragmatic approach to reform, decentralize, and transform the economy. Notable examples of non-orthodox policy measures, which worked effectively in China, include so-called transitional institutions such as the dual-track approach to industrial restructuring, anonymous banking, the establishment of special economic zones or the priority given to create competitive structures while postponing large-scale privatization of state-owned enterprises.

Hence, it is not evident what kind of market economy will emerge in China in the long run. The paper aims at (i) applying the Varieties-of-Capitalism (VoC) framework to China and assessing its suitability in a transition context; (ii) addressing the question of what kind of market economy is emerging in China; (iii) analyzing the impact which the emerging type of capitalism will have on the economy's allocative and dynamic efficiency; and (iv) elaborating policy implications which may help generate or strengthen potential institutional complementarities in the long run.

JEL classification: H0, O53, P2, P3

List of abbreviations

ACFTU	All-China Federation of Trade Unions
ADB	Asian Development Bank
CCP	Chinese Communist Party
CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States
CSRC	China Securities Regulatory Commission
eds.	Editors
FASB	Financial Accounting Standards Board
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
IIF	Institute of International Finance
MEGS	Market-Enhancing Governance Structure
MNC	Multi-National Corporation
NPC	National People's Congress
NPL	Non-Performing Loan
OECD	Organization for Economic Co-operation and Development
R&D	Research & Development
RMB	Renminbi (Chinese currency)
SFAC	Statements of Financial Accounting Concepts
SME	Small and Medium sized Enterprises
SOE	State-Owned Enterprise
SHSE	Shanghai Stock Exchange
SZSE	Shenzhen Stock Exchange
TQM	Total Quality Management
TVE	Town or Village Enterprise
US-GAAP	U.S. Generally Accepted Accounting Principles
VET	Vocational Education and Training
WTO	World Trade Organization

1 Introduction

One of the most important events in modern economic history is the socialist countries' transition from a centrally planned economy to a capitalist market economy that started in the last two decades of the 20th century. China's transition was very successful compared to the difficulties experienced by countries in Central and Eastern Europe and the former Soviet Union: China's annual economic growth has been consistently higher than 7% for the last decade; the country has managed to attract increasing amounts of FDI and successfully fought poverty across the nation.[1] China did however not follow theoretic policy recommendations developed by Western think tanks such the IMF or the World Bank, but pursued an incremental, gradual, and highly pragmatic "Chinese" approach to transform its economy into a capitalist system.

The 'Varieties of Capitalism'[2] literature claims that there are two coordination regimes that vary systematically across countries: at one end of the spectrum there are liberal market economies (LMEs) that use markets as their main means of coordinating economic activity. At the other end, coordinated market economies are identified that rely more heavily on non-market institutions to solve their coordination problems. This binary classification of national forms of capitalism leaves many countries in an ambiguous position, since they cannot be clearly categorized. France and Italy are examples of such intermediate countries in the developed world.[3] One crucial characteristic of the 'Varieties of Capitalism' approach is that it has been developed to analyze advanced market economies and does not offer any theoretic explanation as to how to classify transition economies – such as China. The objective of this paper is to apply the 'Varieties of Capitalism' framework to the institutional reform process in China and to test its validity within a transition context. The 'Varieties of Capitalism' analysis will serve as a foundation to derive an answer to the question as to what kind of capitalism is currently being developed in China. Has China's transition process taken the way towards a LME or rather a CME or does China actually represent a certain third "hybrid form" of capitalism that cannot be classified according to the standard 'Varieties of Capitalism' concept? How efficient, stable and sustainable is China's variety of capitalism?

[1] Cp. ASIAN DEVELOPMENT BANK (2000), pp. 1 – 10.
[2] Cp. HALL/ SOSKICE (2001), KITSCHELT ET AL. (1999), AMABLE (2003), CROUCH/ STREECK (1997), AMABLE (2000), DORE/ LAZONIK/ O'SULLIVAN (1999), HALL/ GINGERICH (2004), STREECK/ YAMAMURA (2001).
[3] Cp. AMABLE (2003), p. 79.

In order to address these questions, this research paper is organized as follows. First, necessary background information on the 'Varieties of Capitalism' theory that frames this research into China's economic transition is presented. Thereafter an in-depth analysis of China's reform process is offered focusing on those five institutions that are at the core of the 'Varieties of Capitalism': the development of China's financial system, industrial relations, the country's inter-firm relationships and intra-firm relations, as well as the situation of education and vocational training. The paper then moves on to offer an insight into the interplay of the described institutions and addresses the question whether the Chinese model is complementary and therefore efficient. During the course of the analysis, several questions arise around the applicability of the 'Varieties of Capitalism' approach within a transition context. The postulates of the 'Varieties of Capitalism' framework are critically reflected when it is applied within a transition context and major shortcomings are discussed. Finally a perspective on what kind of capitalism is really emerging in China is offered: a hybrid form that does neither adhere to a LME nor a CME model will be put up for discussion. A critical review of the main findings concludes.

2 The 'Varieties of Capitalism' approach

Since the breakdown of communism at the end of the 20th century, capitalism is considered as the unrivalled model of economy and society – a conviction deeply rooted in Western culture.[4] The early 1990s saw a widespread ascendancy of neo-liberal thought indicating that a singular world of market unification and institutional convergence was about to emerge. But soon after this vision of a unitary and all-encompassing capitalism had been expressed, critics of this concept started to voice their concerns, pointing to "ostensibly resilient differences in the organization and trajectories of capitalist systems, regimes and models".[5]

The "Varieties of Capitalism" literature offers extensive studies on the historical evolution of different national types of capitalism in developed economies - notably of Britain, the US, Japan and Germany. It provides a framework for analyzing and understanding the institutional similarities and differences among developed economies. Especially Hall and Soskice (2001)[6]

[4] Cp. MILLER (2005), p. 1.
[5] PECK/ THEODORE (2005), p. 1.
[6] Cp. HALL/ SOSKICE (2001), pp. 1 – 68.

present a central framework claiming that national economic development and economic policies in advanced economies follow path-dependent trajectories of two kinds: liberal market economies (LMEs) and coordinated market economies (CMEs) that differ with regard to the types and configurations of their implied economic institutions. LMEs are exemplified by the US, Great Britain, Canada, Australia and New Zealand, CMEs by Germany, Sweden, Switzerland, the Netherlands, Norway, Austria, Denmark and Japan. Both types are seen as extreme forms of political economies that represent the two limits of a spectrum along which nations can be arrayed.

In LMEs, transactions are mainly organized through competitive market arrangements and hierarchies. The preference for market oriented institutions within LMEs induces a typical pattern of corporate behavior: firms will invest in "switchable assets" such as general skills and multi-purpose technologies, because these do not tie up corporate resources in the long-run, but instead facilitate a short-run realization of value.[7] This implies that companies are inclined to be more attentive to current earnings and to their share price on equity markets. Moreover, LMEs are characterized by deregulated labor markets, and strong product-market competition. In CMEs, however, there is a much higher tendency to invest corporate resources into "specific assets", the value of which cannot be realized rapidly, but which is instead based on both the availability of patient capital and the expectation of complementary, cooperative behavior of other actors.[8] Hence, a longer-term orientation prevails, and coordination problems are primarily solved drawing on non-market relationships such as networks and centralized associations – the so-called strategic coordination. This preference for network-based approaches in one sphere – e.g. in the financial system – is likely to produce mutually reinforcing spillover effects in related institutional domains:[9] Therefore, other characteristics of CMEs include cooperative industrial relations, high levels of vocational training, weakened product-market competition and strong information exchanges through more or less formal professional associations favoring the establishment of common industrial standards.[10] Both types thus represent coherent configurations of complementary institutional elements meaning that they are presumed to be stable and self-reinforcing. They are hence expected to react in more or less predictable ways: an

[7] Cp. PECK/ THEODORE (2005), p. 21.
[8] Cp. PECK/ THEODORE (2005), p. 21.
[9] Cp. PECK/ THEODORE (2005), p. 21.
[10] Cp. AMABLE (2003), p. 78.

economic crisis would give rise to market-oriented policy responses or to coordinated policy responses, respectively.[11]

Emergence and Change of Institutions

When analyzing a transition economy, key attention must be given to an understanding as to how institutions – the deliberate incentive structure of a society - change and evolve. This paper is based on North's (2005) concept of institutional change. Institutions conceived as the formal and informal rules of the game define the constraints on patterns of human interaction. In an economic sense this means interaction in order to deal with scarcity, hence competition for resources.[12] The structure a society imposes to order that competition shapes the way the game is played.[13] Change in this structure is brought about by agents, namely decision makers in organizations, who act depending on the opportunities they see that again depend on their mental models. So either through external changes in the environment or through changed mental models (e.g. due to new knowledge/skills) institutional change will be initiated by these agents. Thereby, alternative choices become superior, and change in the design of an institution occurs, if altering the existing framework is less costly than contracting within the old one. Changes in the formal rules may stem from legislative changes such as passing a new law.[14] Changes in informal rules (e.g. norms, conventions) arise gradually and often rather subconsciously and more slowly as individuals develop alternative patterns of behavior that are in line with their new evaluation of costs and benefits. Hence, change is usually an incremental and path-dependent process: "The reason is that the economies of scope, the complementarities, and the network externalities that arise from a given institutional matrix of formal rules, informal constraints, and enforcement characteristics will typically bias costs and benefits in favor of choices consistent with the existent framework."[15] Thus, the direction of change processes is determined by path dependence, because political and economic organizations which have emerged as a result of the institutional matrix naturally have a stake in maintaining the existing framework. The remaining question, particularly in analyzing the successful transition case of China, is how an institutional matrix emerges that encourages productive activity. Particularly in a transition context, many

[11] Cp. MILLER (2005), p. 16.
[12] Cp. NORTH (2005), p. 1.
[13] Cp. NORTH (2005), p. 1.
[14] Cp. HALL/ THELEN (2005), p. 23.
[15] NORTH (1994), p. 6.

former socialist economies such as Russia have learned painfully that the underlying institutional framework was the source of their poor performance in their transition process and have now been trying to find ways to restructure the institutional framework to redirect incentives that in turn will direct organizations to a productivity-enhancing path. This paper seeks to shed some light on the reasons why China has managed to embark on a productivity-enhancing path by focusing on gradual change processes of key institutions.

Institutional complementarity

Institutional complementarity would exist if one (or more) institution(s) enhance the effects of (an)other institution(s). For example, if the efficacy of labor market institutions depends on a specific type of institutions for corporate governance, then efforts to assess the impact of labor market arrangements that do not also consider the nature of corporate governance may generate misleading conclusions.[16] This interaction effect holds for most kinds of institutions. Streeck, Crouch and other researchers point out that institutions are not always designed to be complementary – complementarity is often discovered at a later stage in time.[17] This means that a high degree of experimentation is involved in the process of institution creation. The key lies in the perspective which regards political action as driven by the interests of individual actors, meaning that "politics is usually about who gets what, when, where and how."[18] As an actor-centered and rationalist approach, the 'Varieties of Capitalism' theory conceptualizes the political economy as an environment populated with entrepreneurial actors seeking to advance their interests as they construe them and looking for ways to make institutions work for them.

The notion of complementarity implies that it is not possible for a capitalist regime to easily switch from one system to the other. Self-reinforcing differences imply diversity in forms of capitalism, which represent a so-called comparative institutional advantage of nations: LMEs exhibit different patterns of innovation and technological change as well as a different industrial specialization compared to their CME counterparts. LMEs have a comparative advantage in industries where competitiveness is based on a firm's ability to quickly adapt to changing market conditions. Radical innovation patterns prevail. CMEs, on the other hand, have their competitive

[16] Cp. HALL (2005), p. 373.
[17] Cp. CROUCH ET AL. (2005).
[18] HALL (2005), p. 376.

advantage in industries where success is based on building up cumulative knowledge and company-specific skills. Incremental innovation prevails in this system.[19]

Comparative institutional advantage

Within the theoretic framework of the 'Varieties of Capitalism' literature, the concept of comparative institutional advantage plays a key role. The concept is thought to complement and extend the theory of comparative economic advantage. The latter focuses on the relative endowment of input factors (e.g. land, labor, capital) and proposes that trade will lead that country to specialize in the production of goods that uses its most abundant factors most intensively.[20] This theory has its limits in explaining e.g. intra-industry trade and the causes and effects of international capital movements: according to the comparative economic advantage theory, there is no reason for a country to import and export goods from the same industry sector. Further the theory does not account for the fact that international capital transfer can change national factor endowments in a short period of time. Here is where the concept of comparative institutional advantage steps in: the main idea is that the institutional matrix of a particular economy provides firms with advantages for engaging in specific types of activities. This is because the institutional support firms receive for certain activities and the institutions relevant for such activities are not evenly distributed across nations. According to Hall and Soskice (2001)[21] there is now widespread recognition among economists that the institutional matrix of a nation can condition rates of growth and technological progress. However, most endeavors to identify these institutions have focused on market relations and the legal framework and have neglected the non-market relations that may be equally important to explain such outcomes. Depending whether we analyze firm behavior in a LME or a CME, the modes of coordination will differ. In a CME, non-market coordination patterns will prevail. The availability of a certain institutional matrix hence conditions the efficiency with which a firm can perform distinct activities and produce certain kinds of goods and services. This means that the institutional matrix provides a nation with comparative advantages in particular activities. Due to international trade, this comparative institutional advantage will lead to patterns of distinct specialization across nations. One important type of comparative institutional advantage is the

[19] Cp. MILLER (2005), p. 17.
[20] Cp. HALL/ SOSKICE (2001), p. 36.
[21] Cp. HALL/ SOSKICE (2001), p. 38.

impact of the institutional setting on patterns of innovation: radical innovation, which brings about significant shifts in product lines, goods and production processes is distinguished from incremental innovation, characterized by gradual but small-scale improvements. These patterns of innovation again have an impact on what types of products and services prevail in an economy: Radical innovation will stimulate activity in fast-moving technology sectors with R&D-intensive products such as e.g. software, biotechnology and micro-electronics. Incremental innovation however is needed to maintain competitiveness in the production of capital goods, such as machine tools and consumer durables. CMEs are defined as being better in fostering incremental innovation, since the workforce is skilled enough to come up with such innovations and secure enough on their job that they do not perceive being threatened when suggesting a product improvement but see this rather as a duty within the dimension of their job. A CME provides exactly such an environment with secure employment, autonomy from close monitoring, and the possibility to shape the decision making in the firm. Moreover, inter-firm collaboration encourages both clients and suppliers to suggest improvements to products or production processes. In contrast to this, LMEs are said to limit firms' capacities for incremental innovation but to support radical innovation patterns: Their environment is characterized by fluid labor markets and short job tenures that inclines an employee to focus on her own career rather than to advance the firm's success by developing general industry skills. Furthermore, contract and anti-trust laws discourage inter-firm collaboration and hence limit the potential for incremental innovation to take place. Radical innovation, however, can be frequently observed in a LME environment: highly fluid and liberal labor markets give the opportunity to an enterprise that is interested in developing a completely new product to rather easily hire the necessary experts but also to set them free again easily in case the project fails. Inter-firm relations are based mostly on markets: extensive equity markets allow firms to buy themselves into new technology by acquiring other companies and a viable venture capital scene allows scientists to market their own ideas.

3 Institutional change and complementarity in a transition economy: the case of China from a 'Varieties of Capitalism' perspective

Following Hall and Soskice's concept of institutional complementarity, a qualitative analysis of the key institutional realms which are at the hear of the 'Varieties of Capitalism' approach is conducted for China, in order to idnetify elements and mechanisms of complementarity. Hence, the subsequent discussion focuses on the financial system, industrial relations, inter-firm and intra-firm relations as well as the country's education and training system.

3.1 China's financial system

Although there is no consensus regarding the future development of China's economic growth, there is widespread agreement that the financial system is one of the weak links in the economy and it is estimated to hamper future economic growth.[22]

The evolving banking sector

On the eve of the reform process in 1978, China had only three state-owned banks.[23] Until today, the banking sector has remained strongly regulated with only slow opening up due to pressure from WTO membership. The People's Bank of China has dominated the financial landscape for a long time: it controlled almost four-fifths of all deposits in banks and credit cooperatives and was the source of 93% of all loans granted by financial institutions.[24] It simultaneously served as the country's central bank, regulating money supply and interest rates as well as managing and supervising all other institutions of the financial system. This type of monobank system was typical in many centrally planned economies.

In the course of the reform process, China's financial system grew more complex. New banks as well as non-bank financial institutions emerged, but competition remained weak, because, e.g., interest rates remained centrally regulated. However, since these new institutions were usually not required to grant loans to money-losing SOEs, their financial strength and health grew stronger rather quickly. These new organizations have thus played a key role in making the

[22] Cp. ALLEN/ JUN/ QIAN (2005a), p. 15, LARDY (2000).
[23] The People's Bank of China, the Bank of China, and the Construction Bank of China.
[24] Cp. LARDY (1998), p. 61.

allocation of capital more efficient – a central problem of China's financial system that prevails to some extent until today.

The structure of China's banking sector, dominated by four large state-owned banks, implies that the degree of competition is extremely low. The industry concentration ratio, however, has been dropping sharply since 1997 from about 92% to about 51% in 2001 after many non-state banks and intermediaries entered the market.[25] The most important problem for the whole financial system is however the amount of non-performing loans (NPLs) within the state-owned banks. In the context of institutional complementarity, it is important to recognize that most of China's NPLs were not inherited from the pre-reform era, but created after the reform actually began. They can be seen as a by-product of China's strategy choice of gradualism for its economic transition to a market economy.[26] Instead of introducing hard budget contraints for SOEs triggering a short-term increase in unemployment and a decline in output due to "big-bang" restructuring efforts, the state provided various kinds of subsidies to ensure that virtually all firms were able to stay in business.[27] Gradual reform mainly took the form of easing the constraints faced by a market-based non-state sector rather than imposing market discipline on SOEs in an ad-hoc style. To a large extent, the build-up of NPLs in the financial system mirrors the success of economic reforms in other areas: Through price reforms, e.g., SOEs no longer had access to agricultural products and raw materials below the market price. Also the elimination of the two-tier pricing system of foreign exchange in 1994 put an end to the preferential treatment of SOEs that had granted them privileged access to foreign exchange. In addition, many reform $measures that needed to be implemented after WTO accession, such as the reduction of the number of commodities requiring import licenses once used to ensure SOEs' access to scarce commodities lead to an equal treatment of private sector firms and SOEs in many areas. In order to manage this transition for SOEs, the preferential access to loans from state banks served as an important measure to prevent these companies from bankruptcy. That way, the Chinese government has made the transition socially less costly. However, this strategy is not without danger, since the growing NPLs can become one of China's most severe problems. Reducing the amount of NPLs to normal levels is therefore the most important task for China's financial system in the years to come. But nevertheless this precisely illustrates the Chinese government's

[25] Cp. ALLEN/ JUN/ QIAN (2005a), p. 17.
[26] Cp. LARDY (1998), p. 220.
[27] Cp. WEI (1997).

strategy of how to manage reform. Complementarity with other institutional decisions can also be found: government debt is comparatively low, which implies that the Chinese state budget can afford the high level of NPLs relatively well. Exhibit 1 compares the ratio (NPLs + Government Debt)/GDP among China, Japan, South Korea and the US for the period 1997-2002. The lower the ratio (resulting from low NPLs, low government debt, or both), the easier it is for the government to assume the NPLs.[28] However, if the NPLs were to be depreciated from the banks' balance sheets (as the WTO actually postulates), the banks would be estimated to go bankrupt.

China's stock market development

Since their inception in 1990 China's domestic stock exchanges, the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE), have seen fast growth, but they cannot yet be considered efficient since prices and investors' behavior are not fully driven by fundamental values of listed firms. Exhibit 2 shows that China's stock exchanges have the highest turnover velocity[29] among the world's largest exchanges, namely 224.2% in 2002.[30] China's stock market movements show patterns common to developing economies: due to poor protection of minority investors and other imperfect market regulations stock prices move more synchronously. However, China has performed better than most other transition countries when standard measures for stock market performance are analyzed, even though the country has only slowly developed a legal framework for stock markets and has a weak law enforcement record.[31] Given this seeming contradiction, there must have been other governance institutions that stepped in as a substitute for this lack of formal law and law enforcement and that were thus complementary to the wider institutional transition context which the set-up of the stock market took place in. In the beginning phase, China had primarily relied on an administrative governance system built around the quota system that in turn relied on the decentralized structure of the Chinese administration.[32] This quota system served two important functions and shall be briefly introduced here: it helped mitigate the serious information problems that both investors and regulators faced in China and it helped local bureaucrats to select viable companies at the IPO

[28] Cp. ALLEN/ JUN/ QIAN (2005a), p. 22.
[29] Turnover Velocity is defined as the total turnover for the year expressed as a percentage of total market capitalization. Cp. ALLEN/ JUN/ QIAN (2005a), p. 25.
[30] Cp. ALLEN/ JUN/ QIAN (2005a), p. 25.
[31] Cp. PISTOR/ XU (2005), p. 185.
[32] Cp. QIAN/ XU (1993), pp 40 – 44.

stage. Quotas had been the basic feature of economic management and regulation in China before and during the transition period. The system was particularly designed to allocate critical resources among regions, such as credits or energy.[33] The annual quota for a region, i.e. the amount of shares firms were allowed to issue to the public, was set in an intense bargaining process between central and regional authorities. The primary purpose of the central government to adapt the quota system to the stock market was to gain and maintain control over its size and stability. In practical application however, it went far beyond that: Due to regional competition, it fostered a selection and information collection process that facilitated the market development during the start-up period, since the quotas were set by the central authority drawing on the quality of the companies selected and handed in for assessment by the regional governments. Regions that performed well were rewarded by the CSRC and those whose companies failed or underperformed were punished. Regions thus had an incentive to collect and reveal critical information about the real quality of companies in their area. Based on their assessment, the CSRC then pre-selected companies that were allowed to enter the formal approval process. The quota system has significantly raised disclosure levels and transparency – critical factors for a functioning stock market. Of course the system with its inherent institutions is not built for the long-run but must be seen as a transitional institution. Today, China has already started to abandon the system and to "grow out of" the quota system.[34] China is now strengthening its legal infrastructure and enforcement mechanisms.[35] One major area of concern, however, is the reliability of firm-specific information as intermediaries capable of verifying information have only begun to emerge. Chinese financial reporting, accounting practices and disclosure are currently oriented to primarily meet the information requirements of taxation authorities and not those of investors.[36] A separate reporting for tax and accounting purposes does not exist. The consequence is that tax laws determine how accounting is carried out in China. This system therefore paradoxically constitutes a high incentive for Chinese companies to use loopholes in the system and to modify information.[37] This shows that the Chinese accounting practices are

[33] Cp. PISTOR/ XU (2005), p. 196.
[34] Cp. NAUGHTON (1996): The author describes China's economic reform process as an approach of "growing out of the plan". The quota system serves as one example for the pattern of Chinese reform in general. It was put in place in 1993 and officially abandoned in 2000.
[35] Cp. LU/ YAO (2003).
[36] Cp. TENEV/ ZHANG/ BREFORT (2002), p. 118.
[37] Cp. BAI/ LIU/ SONG (2004).

still far away to fulfill the qualitative characteristics of good corporate accounting as formulated by the FASB.

In a 'Varieties of Capitalism' context it seems too early to derive a final judgment as to whether the Chinese stock market takes the path of a liberal or coordinated economy. Of course the low liquidity level and its still low importance as a means to finance companies point into the direction of a CME approach. However, the stock market is growing at a significant pace and its operation is maturing but it remains a young institution that still needs to take shape.

Corporate Governance in China

A major building block of a financial system is a country's corporate governance structure. It describes the power-relationships between major stakeholders of an economy and therefore serves as an important and insightful domain within a 'Varieties of Capitalism' analysis. There are two stylized types: insider control systems that prevail in CMEs (e.g. the "Deutschland AG" in Germany) and outsider control systems that are common for LMEs.[38]

Banks are important players in corporate governance and enterprise monitoring. As shown in the preceding discussion, the banking system in China is still the most important external source of financing of enterprises.[39] Therefore, the relationships between banks and enterprises are naturally close. The banking reform in China goes hand in hand with enterprise reform and both depend on each other. Since banks have a monitoring capacity, they constitute an important leverage for a functioning corporate governance environment: they can play an important role to counterbalance insiders on the one hand and counter possible abuse of power by holding companies on the other.[40] However, a precondition for banks to take major roles in corporate governance in China is that they must have the capability and the incentives to do so. China's banking system is however still characterized by the high share of NPLs.[41] This accumulation of bad debt is mainly due to the fact that the banking system fails to efficiently allocate financial resources and to monitor enterprises.[42] Banks in China are still not fully market oriented and are subject to political influence when it comes to allocating credits.[43] This shows that the banking

[38] Cp. ALLEN/ GALE (2001).
[39] Cp. exhibit 4.
[40] Cp. QIAN (1995), p. 246.
[41] Cp. exhibit 5.
[42] Cp. QIAN (1995), p. 248.
[43] Cp. exhibit 6.

system in China is still not fully able to perform needed tasks in enterprise reform and cannot sufficiently play its vital role in corporate governance.

The development of corporate governance standards is also closely linked to the degree of development of the stock market, because an efficient stock market would reward better corporate governance with lower funding costs. However, despite its impressive development during the last ten years, Chinese stock markets are not yet capable of promoting good corporate governance, because China's financial markets do not yet reward better and more transparent companies with lower-cost funds.[44] However, as the preceding section on the stock market has shown, there is control by a set of transitional institutions that have helped the stock market to grow. But they are hardly effcient: A research conducted by the Shanghai Stock Exchange found, e.g., a number of disclosure problems among Chinese listed companies. Especially the disclosure of related party transactions is a major concern, since these transactions are often neither disclosed fully nor timely. The survey also found that the use of funds raised from the public is not fully disclosed by many corporations and discrepancies between anticipated profits and actual net income are only insufficiently explained. This poor disclosure is also due to the poor quality of audits by certified public accountants in China.[45] Confusion often arises due to the fact that the government does not prescribe a specific accounting standard. This hampers clear comparability among the different listed companies. In addition to inadequate disclosure, selective disclosure is an important problem given the underdeveloped and speculative nature of Chinese capital markets.[46] Companies listed on the "A share market" are e.g. not required to distribute financial reports to shareholders. It has therefore often been the case that selectively disclosed information has resulted in high share price changes or unusually high trading volumes, mostly to the disadvantage of small and medium shareholders. The main reason for these problems can be found in deficient law enforcement. Both private enforcement of investor rights and public enforcement of contractual disputes have been extremely weak in China. This underperformance leads to a vicious circle: the weak legal system firstly limits the scope of corporate governance practices a firm can follow; and secondly it predetermines the set of

[44] Cp. TENEV/ ZHANG/ BREFORT (2002), p. 118.
[45] Cp. LIN (2004), pp. 10, 11.
[46] TENEV/ ZHANG/ BREFORT (2002), p. 120.

regulatory frameworks that China can choose from. Other institutions can surely adapt to some extent but not enough to offset weak legal protection.[47]

It is interesting to note though, that China's regulatory structures are formally based on the Anglo-American corporate governance system and are hence oriented towards a LME concept: The board of directors is the first method that shareholders have to control managers and ensure the company is run in their interest.[48] However, everyday practice in China can differ quite substantially from the formal structure. The concept of socialist "public" ownership is still prevalent in the minds of both government officials and managers. A major problem for the functioning of Chinese boards is the high degree of insiders: Chinese reality shows that large shareholders nominate new directors in 57% of listed companies; the board of directors does so in 34% of companies, the chair of the board in 6% and existing directors in 3% of companies. In order to strengthen the independence of the board of directors, the CSRC issued guidelines for establishing an independent board of directors in listed companies in August 2001. But also independent directors face many obstacles and problems while exercising their duties. Especially the lack of a strong legal backing as well as a lack of incentives often leads to results of inferior quality.

Another important institution within corporate governance is the board of supervisors. Here, the Chinese case paints a very different picture compared to the Anglo-American approach just presented in the context of the board of directors. It could best be described as a mixture of a German supervisory committee and China's traditional concept of employees as "masters of enterprise."[49] But the establishment of the supervisory board is not based on the same social and philosophical considerations that led to the German system due to the difference in historical development.[50] The Company Law does not specify how many shareholder's representatives and how many employees' representatives shall set up the board of supervisors but leaves this decision to the individual company. Surveys have shown that given the SOEs tradition and history, the ratio is about 50/50.[51] Leaders of party committees, however, tend to hold key positions such as chairs and vice chairs. Unions are not represented to a significant extent. The responsibilities of the supervisory board mainly include the following: (a) to examine the

[47] Cp. SHLEIFER/ JOHNSON (2001), p. 5.
[48] Cp. ALLEN/ GALE (2001), p. 93.
[49] Cp. TENEV/ ZHANG/ BREFORT (2002), p. 99.
[50] Cp. TAM (1999), p. 86.
[51] Cp. TENEV/ ZHANG/ BREFORT (2002), p. 100.

company's affairs; (b) to supervise directors and managers to see whether they violate laws or regulations; (c) to require directors or managers to correct actions that have harmed the interests of the company; (d) to propose to hold extraordinary shareholder's general meetings.[52] Given its limited function and rather fuzzy mode of operation, the supervisory board cannot be expected to play an effective role. But it must be noted that the general philosophy behind this concept diverts significantly from a liberal approach as practiced in the US or UK. The high degree of coordination and the resemblance to the German model in many aspects leads to the conclusion that China might be trying to follow a CME path rather than that of LMEs. The picture however, is very mixed and ambiguous in the domain of corporate governance.

Chinese corporate governance as a transitional institution

The starting point for developing corporate governance standards in China is very different from the starting point in Europe or North America: judicial systems, capital markets, institutional investors are far less developed. Getting companies to comply with new rules will thus take time. Given the vast differences in ownership structures, business practices and enforcement capabilities, merely adopting new requirements *en masse* from North America or Western Europe would be a mistake.[53] China must therefore develop its own institutional mix that leads to wealth-enhancing exchange processes. However, the appropriate institutional mix will not arise automatically. This means that the state needs to play a key role in "defining the rules of the game". The development of corporate governance is to be seen as one important field embedded in a whole set of institutions which needs to be further developed.[54] In order to create a wealth-enhancing economic foundation, secure property rights and an open market structure must be enforced,[55] since "secure property rights give rise to (a) technological progress and (b) flexible organizational structures, and appropriate economic institutions maintain (c) open markets and (d) the constant value of money through competition between money issuing authorities."[56]

Corporate governance reform is therefore a long journey in China. The continued opening up of markets to competition is essential to reduce the incentives for (state-) ownership concentration and therefore to increase the incentives for dispersed shareholding, risk diversification at the

[52] Cp. TAM (1999), p. 86.
[53] cp. BARTON/ COOMBES/ WONG (2004), p. 56.
[54] cp. MURREL (2003), pp. 28 et sqq.
[55] cp. MANTZAVINOS (2001), p. 240.
[56] MANTZAVINOS (2001), p. 240.

level of individual or institutional wealth holders, and hence for improved governance practice. Given the size of the country and the different institutional constraints that have evolved over time, reforming corporate governance should not follow a single model but allow for diversity. "In this sense, the most dangerous reform strategy is to insist on a single organizational model for all enterprises in the country."[57] As of today, the situation in China thus paints a very ambiguous picture that is highly inconsistent with the 'Varieties of Capitalism' concept. German-style coordinated components have been identified as well as liberal elements: The banking system is comparable to the main-bank system in Japan and therefore close to a CME concept.[58] However, the monitoring capability of Chinese banks is still very low. Further reform measures will therefore give a better insight into where the banking system is heading. Other institutions such as the general meeting of shareholders described as the "organ of power" face a similar problem of ambiguity since codified law often differs substantially from real practice. The fact that large shareholders dominate, relationships matter, and an absence of dispersed ownership structures are strong indicators for a CME environment. The same holds for the board of supervisors that draws on the German model. On the other hand the analysis has shown that China's regulatory structures are based on the Anglo-American corporate governance system. This fact serves as a strong indicator that China is oriented towards a LME concept.

To summarize, it can be said that with a stock market still in its infancy and an inefficient banking sector and a very ambiguous picture in the domain of corporate governance, the Chinese financial system can hardly be categorized within the 'Varieties of Capitalism' framework. China seems to follow neither a pure shareholder nor a pure stakeholder approach. While this configuration can be efficient during the transition process, it could disappear as the economy matures. Before coming to a final conclusion on the issue of complementarity within the whole system, the remaining other institutional areas shall be analyzed.

3.2 Industrial relations in China

Since the beginning of reforms China's labor force has experienced fundamental transformations. At the beginning, the majority of the work force was employed by SOEs or rural communes which guaranteed life-long employment, which led to low productivity due to

[57] QIAN (1995), p. 252.
[58] Cp. AOKI (2001), pp. 329 – 346.

overstaffing and shirking. Reform implied powerful changes in the distribution of jobs: By the end of the 1990s, about one third of the rural labor force had moved into non-farm activities and about three fifths of the urban work force had found employment outside the state sector, e.g., in private enterprises and joint venture companies.[59] Under socialist central planning, government agencies fiercely controlled the job market, and job changes were usually prohibited. Since 1978 a series of deregulatory reforms have established a more liberal labor market. However, the state administration continues to play an important role, and many policies as well as existing institutions still prevent the labor market from operating efficiently. Managing labor market transition is one of the most challenging tasks for the Chinese government, and the way in which regulations and other institutions evolve in response to these challenges shall be briefly discussed, in order to determine which development path China's labor market is following.

The first wave of liberalization took place in the commodity and goods markets before the labor market was touched in China's urban areas.[60] Labor allocation used to be conducted by labor bureaux: Job eligibility was restricted to residents in possession of a "hukou" (i.e. a local residence permit), which entitled them to housing, food subsidy, schooling as well as retirement and health benefits. Wages were centrally determined according to a centrally administered wage grid, and the job was guaranteed for a life-time. The wage grid mainly valued 'formal' qualification such as education and years of experience and largely ignored an individual's real labor productivity. These institutional arrangements imposed severe limitations on job mobility and flexibility and led to inefficient solutions.

When describing the reforms, one has to bear in mind that reform in the form of laws and regulations can often substantially differ from reality due to the severe deficiencies in law enforcement.[61] A turning point in the reform process was the introduction of labor contracts in 1986: This new system denoted that enterprises were only responsible to workers for as long as the contract specified and were no longer required to continue to pay workers a salary after the contract had expired. The new Enterprise Law stated that "the enterprise shall have the right to employ or dismiss its staff members and workers in accordance with the provisions of the State Council."[62] This statement can be interpreted as a radical shift in the context of China's recent

[59] Cp. FLEISHER/ YANG (2004), p. 1.
[60] Cp. HOPE/ LAU (2004), pp. 15 et sqq.
[61] Cp. chapter 3.1.4 on corporate governance in China.
[62] Cp. GUTHRIE (1999), p. 88.

institutional history. Other institutional changes complemented this step, such as the introduction of unemployment and social security funds. By 1995, 93% of all SOE employees were under contract.[63] The labor contract system thus represents a relatively flexible labor allocation mechanism compared to the rigid pre-reform arrangement. However, in comparison to a free labor market that one would find in a LME, the flexibility of the contract system was still limited in many ways. Severe restrictions, e.g., remained in regional mobility and, although management had gotten more control over recruitment, it was still bound to the state labor plans and could not simply dismiss employees because of overstaffing until the early 1990s.[64]. Regulations in this respect have become much more relaxed, but liberal hiring and firing has nevertheless not become common practice. Hence, a liberal labor market in the sense of a LME does not exist in China. Another factor that prevents further liberalized structures can be found in the belief systems of many Chinese managers: They choose not to dismiss employees due to their conviction that the company is a kind of "socio-political community". Managers are responsible for that community and are judged by both their superiors and their subordinates on their success in all areas regarding community welfare, including employment.[65]

The presented findings show that in the domain of labor relations, China has also chosen a gradual transition strategy: Firms take a more market-oriented approach in their labor relations, but the rank of a firm's governing organizations remains important during the transition process.[66] Also, conceptions of loyalty and fairness maintain clientelist relationships. These pre-reform ideologies continue to play a crucial role in the decision making of managers in reform-era China. Hence, the new labor system must be still regarded as an institution in transition, because the socialist ideology of supporting workers still persists in many companies. A high degree of coordination activities exist coming from two main sources: First, the state still exerts power on decision making, and, secondly, the Chinese belief system has an important effect for the management of labor relations. It can be concluded that the Chinese labor market exhibits many characteristics of a CME model.

[63] Cp. MENG (2000), p. 81.
[64] Cp. MENG (2000), p. 82.
[65] Cp. GUTHRIE (2002), pp. 96 – 98.
[66] Cp. GUTHRIE (2002), p. 98.

3.3 Inter-firm relations and R&D and technology transfer

The preceding discussion on corporate governance closely links with the subject of inter-firm relations. In CMEs, where highly liquid capital markets do not exist, these relations perform a monitoring function. In other areas such as R&D, companies in CMEs pool resources in business networks, whereas firms in LMEs rely heavily on the movement of scientific personnel across companies through a fluid labor market.

Inter-organizational business networks exist in order to enhance the survival and capabilities of organizations by providing opportunities for shared learning, knowledge transfer and other resource exchanges. Since firms cannot generate all required resources internally, they must conduct exchanges with other firms or organizations. Organizational networks emerge that connect and transfer complementary and interdependent competencies between firms.

Guanxi (i.e., "relationship" or "connection") is a cultural characteristic that has powerful consequences for inter-personal and inter-organizational dynamics in Chinese society. Guanxi has been developed over many centuries in China and is embedded in every aspect of personal and organizational interactions. Given its strong institutional effect on firm operations in China's transition economy, it is necessary to discuss implications of this phenomenon as to how it shapes inter-firm relations in China. Guanxi has its origins in Confucianism which fosters collectivism and thus the importance of networks and inter-personal relationships. It can be described as a form of "social capital" because it involves the exchange of social obligations. This reciprocal exchange of favors is essential to grow and sustain guanxi. "The rules of reciprocity in guanxi establish a structural constraint that curtails self-seeking opportunism and preserves social capital within the existing network structure."[67] Guanxi has remained a critical factor in firm performance in contemporary China. It structures the pattern how a firm interacts with its environment and therefore has a direct influence on the flow of resources. As China develops further and continues its economic reform guanxi has become even more important in the context of managing the newly arising uncertainty. Guanxi has an impact on financial outcomes, market benefits and competitive advantages.[68] The underlying logic for Chinese firms is to utilize guanxi to manage organizational interdependence and to deal with institutional disadvantages and other structural weaknesses. Its effectiveness depends on its fit with

[67] Cp. LUO/ PARK (2001), p. 457.
[68] Cp. LUO/ PARK (2001), p. 456.

institutional and organizational attributes.[69] As China's transition process has led to increased institutional uncertainty, firms turn closer to guanxi networks to lower their external dependence on key resources and to simultaneously lower their bureaucratic costs that would arise from internalizing operations. As a very loosely structured network, guanxi is an efficient means to facilitate economic exchanges. This guanxi-based "network capitalism", however, is different to business networks that prevail in CMEs: Guanxi stretches out to a multitude of (often small-scale) actors and does not tend to expand into large bureaucratic structures that would come about in CMEs. To overcome disadvantages from small size, Chinese businesses band together into clusters which are linked through flexible horizontal networks. The guanxi structure is also quite open to new members, as opposed to company networks, e.g., in Germany. In western countries, a relationship between business partners usually arises after the transaction whereas in China transactions often follow successful guanxi. A major concern of Chinese organizations is to engage in extensive networking activities through guanxi to build trust and exchange favors.[70] Overall, the findings reflect potential synergy gains in guanxi from resource complementarity and lower transaction costs. In China's transition economy with ambiguous property rights and a weak competition policies, guanxi provides an opportunity to increase market share through improved competitive positioning by collaborating with competitors and government authorities.[71] Firms thus establish guanxi networks to overcome strategic and institutional weaknesses by linking up with those agents that they are only remotely related with but that have strong control over key resources.[72] In conclusion, China exhibits a distinct prevalence of guanxi-networks in the private sector. Capitalist development in China is therefore characterized by a duality: On the one hand, a large state sector operates in key industries and services and stands under the control of the central government's industrial policies. On the other hand, this state sector coexists and melds with a private sector that is structured by guanxi-networks.

The informal institution "guanxi" deeply influences and structures economic activity in China. Though substantially different from Western business networks, guanxi leads to a high degree of coordination within the economy. This piece of evidence suggests placing China in a CME context rather than in a LME context.

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[69] Cp. LUO/ PARK (2001), p. 456.
[70] Cp. LUO/ PARK (2001), p. 459.
[71] Increasing market share through guanxi networks is costly due to the in-built reciprocity. Studies in this context have shown that increased market share does usually not translate into higher net profit.
[72] Cp. LUO/ PARK (2001), p. 473.

Research & development, technology transfer and innovation

At the outset of reform in 1978, China had organized and planned its R&D at the national level through the State Science and Technology Commission and related central government bodies. Research (including all creative or innovative activity) was conducted by research institutes. Under central planning, factories had neither a mandate nor any incentive to engage in innovation and change. Similarly, research institutes did not undertake any production activities.[73] Since 1978, profound changes in the organizational boundaries of the Chinese innovation system have taken place. For purposes of our 'Varieties of Capitalism' research focus it shall suffice here to limit our attention to the set-up of China's contemporary innovation system structure. Today, organizations have diversified into various functional activities and the former dichotomy between R&D and manufacturing no longer persists. Moreover, new actors have entered the market, with multi-national corporations (MNCs) taking an important position. Today research institutes are much more responsive to down-stream problems of e.g. manufacturers and end-users as the government has continually cut their operating budgets. They now compete for resources – market coordination prevails. On the other hand, the government has increased its funding of basic research, allocating money to develop scientific bases and technical infrastructure particularly in IT and biotechnology. Another major shift addresses the question where R&D is carried out and by whom. Today, more and more R&D activities are co-located with implementation and manufacturing, but plain R&D activities in universities and research institutes have increased even more significantly. Manufacturing firms have substantially increased their funding of R&D by outside research institutes, since managers perceive that buying or contracting for research services from outside is more cost-effective. At the enterprise level, R&D is primarily involved in process scale-up and other activities that are more related to implementation rather than to creation of new technology. The underlying rationale why firms in China have not become centers of innovation has been analyzed in empirical studies. Major reasons are e.g. a lack of qualified technical personnel and of access to relevant markets and technological information as well as unclear property rights.[74] Another major change in China's innovation system was brought about by the entrance of MNCs and

[73] Cp. LIU/ WHITE (2001), p. 1093.
[74] Cp. ibid., p. 1102.

their R&D centers. FDI has often led to extensive technology import, which then has been responsible for upgrading many of China's key industries.[75] However, the impact of foreign technology might have benefited China even more, if the country's coordination processes had been different: China focused more on codified technology (e.g. software, drawings, production lines) and not on intangible assets, such as intensive interaction and collaboration with foreign firms in research and problem-solving. Tacit knowledge has therefore been hardly transferred in China.[76]

This overview shows that economic reform during the past 25 years has substantially altered the structure and dynamics of China's innovation system to more efficiency. However, also the innovation system in China must still be regarded as a transitional institution, since a number of important issues remain open: government influence remains and often leads to inadequate incentives affecting innovative behavior. Most importantly however, the inadequate legal environment with weak and ambiguous property rights cannot yet provide a reliable environment for inter-firm and inter-organizational relationships which is crucial in the innovation process.[77] Liu and White (2001) state that there is even a relative decline in the tendency of organizations to cooperate in later stages of the innovation process. Exhibit 7 shows the development of joint patents in China and illustrates the described trend. In summary this shows that "organizations are cooperating more in the upstream stages of the technological development process, but cooperating less in the downstream stages as the commercial potential becomes clearer."[78] In a 'Varieties of Capitalism' context the current stage of development of China's innovation system can therefore not be clearly classified either. Competition for resources and increasing market coordination point towards a LME approach. However, R&D still remains primarily within research institutes and not production companies. Many of these are influenced by the government, as the increased funding of basic research indicates. R&D in a 'Varieties of Capitalism' context therefore remains ambiguous.

[75] Cp. YAN (2005), pp. 35 – 38.
[76] Cp. LIU/ WHITE (2001), p. 1103.
[77] Cp. LIU/ WHITE (2001), p. 1106.
[78] LIU/ WHITE (2001), p. 1109.

3.4 Intra-firm relations

The formal set-up of Chinese corporations and their decision making bodies including their (often not very efficient) system of checks and balances has already been excessively discussed in the chapter on corporate governance. This section now turns to another decisive factor that shapes intra-firm relations: corporate culture and management and leadership style in Chinese companies. With its unique cultural heritage, Chinese management and organization is deeply influenced by a collective orientation. The prevailing cultural values bring about a largely paternalistic approach to management, acceptance of hierarchy and the importance of relationships. Chinese management culture stresses human relationships and personal connections and trust as it is the case in inter-firm relationships.[79] Chinese entrepreneurs usually follow a management model that is not common in the West: "Chinese management culture starts with the family as a building block of society, whereas Western management culture typically starts with the individual and then moves to the group."[80] This approach is rooted in the underlying social fabric of Chinese culture: Confucianism. This philosophy serves to maintain sensitivity to hierarchy and social order via micro units of society, such as families.[81] This has several implications for the management style found in Chinese enterprises. Chinese management philosophy centers on people, hence virtues such as humanity and benevolence, righteousness, propriety, wisdom and trustworthiness define inter-personal relationships.[82] These values are strongly related to the concept of non-specific behavior: a Chinese manager/ leader will not set out clearly-cut, specific demands, but rather pursue general guidelines and goals that allow the employees to often have considerable freedom for task accomplishment. These principles are similar to concepts of empowerment in Western cultures. Another important building block for inter-personal relationships is an individual's capacity for compromise and maintaining a harmonious relationship with others.

The described system is very different from what one observes in liberal market economies in the Anglo-American world. One major variation is the collectivist orientation of the Chinese culture opposed to a very individualist system pertinent in the UK or the US.[83] Exhibit 8 gives provides a deeper insight into the contrasting value systems of the Anglo-American and Chinese

[79] Cp. chapter 3.3.1 on Chinese business networks highlighting the concept of guanxi.
[80] CHIN/ LAU/ PUN (2000), p. 326.
[81] Cp. CHIN/ LAU/ PUN (2000), p. 329.
[82] Cp. CHIN/ LAU/ PUN (2000), p. 330.
[83] Cp. HOFSTEDE (1997), pp. 49 – 78.

cultures. Chinese management continues to be heavily influenced by cultural tradition: the paternalistic style of leadership remains the dominant mode of leadership in Chinese business and large power distance are a defining feature. This translates into centralized authority, hierarchical structures, as well as informal coordination and control mechanisms.[84] Especially SOEs exhibit highly formalized and bureaucratic structures. They are also characterized by low employee empowerment and decisions tend to be taken rather top-down. In contemporary China, management and decision making styles vary largely across the different ownership types and are thus certainly evolving into more diversified approaches. The described underlying "social fabric" however remains active in all types. Within the 'Varieties of Capitalism' context, hierarchies, collectivism, and an importance of relationships are indicators for a CME environment.

Traditional Chinese management stresses a control-oriented approach that features a hierarchy of special managerial roles, reinforced by a top-down allocation of authority in order to monitor and control workers and their efforts. This approach has often resulted in poor execution of firm strategies, low innovation and quality improvements due to a disaffected workforce. Many modern Chinese organizations have however broken with that traditional concept and apply modern employee involvement and TQM schemes. With its relatively cooperative/ collectivist society China would be well placed to introduce more employee involvement and some companies are already doing so. That way the growth of organizational knowledge could be enhanced and companies could strengthen their competitive position by better leveraging their human assets. However, as for today the discretionary power of managers has not been constrained significantly and they continue to take decisions based on their hierarchical level. As outlined in the discussion on the labor market, job tenure is elevated due to restricted labor mobility. This fact together with the care an employee receives by its "firm-community", indicates that Chinese intra-firm relations adhere more towards a CME rather than to a LME approach.

3.5 Education and vocational training

The Chinese education system's ability to produce graduates with those skills that are required by employers has been a wide concern. Overall, the Chinese education system stresses

[84] Cp. CHIN/ LAU/ PUN (2000), p. 333.

certification in general skills rather than the acquisition of highly specialized industry- or even firm-specific competencies. The education system in China today finds itself between conflicting skill demands of the different types of enterprises that the transition era has brought about: traditional SOEs continue to focus rather on hard technical skills whereas new private Chinese enterprises as well as foreign and joint venture companies stress the importance of soft skills. Many SOEs are still looking for managers or technicians to work within relatively narrow concepts of management and tend to focus on task-oriented skills. They hence rate formal qualifications high, especially in science and mathematics related fields.[85] The Chinese education system has been catering well to this demand, since it highly values formal education in the sciences itself. Foreign companies and other newly founded private enterprises however increasingly seek graduates that are equipped with important soft skills (such as communication and problem solving skills, leadership and management skills etc.). Here the Chinese education system so far has shown a rather poor performance as curricula have not been significantly adapted. The system continues to cater rather well to the demands of SOEs since it had been geared towards exactly the needs of these traditional enterprises for the last decades. Foreign enterprises therefore use the education system mainly as an important selection mechanism in their HR strategy: they select candidates they estimate most promising and then further train their new recruits with tailor-made development and training programs.[86] They are usually equipped with the necessary resources that allow them to pursue this strategy. This does usually however not hold for local private enterprises that can therefore be seen to be worst off by the current arrangement. The system however is changing today and management education is becoming more wide-spread.

In conclusion it must be said, that the Chinese education system is geared towards the provision of formal (especially scientific) education and that links to the industry remain weak. There is no 'dual-system' as it exists in Germany that would provide for industry-specific skills. This situation indicates that China is following – at least for the time being – rather the liberal path within the 'Varieties of Capitalism' framework by Hall and Soskice in the domain of formal education.

[85] Cp. VENTER (2004), p. 289.
[86] Cp. VENTER (2004), p. 297.

The significant changes in China's advancing economy have also had a major impact on the Chinese vocational education and training (VET) system. The rapid growth and the increasing need for improved competitiveness have put pressure on the VET system to create a skilled workforce. New patterns of employment, such as jobs provided by foreign companies and the opportunity for self-employment have influenced the aspirations of young people towards VET. Also in order to reach sustained economic development, China needs to invest in its human capital stock. Similar to most countries in the world, formal education and vocational training are two separate systems that lead to two different career prospects. Vocational training is provided from two standard sources: VET institutions and employing organizations (state-owned, collectively-owned, and private firms). Training programs in vocational schools or technical colleges usually take two to three years and focus on technical/ vocational competency training and usually have only little theoretical elements in their curricula. There exist three types of institutions: the first is technical colleges that are directly controlled by regional/ local authorities. Secondly, there are technical schools established by the large SOEs and industrial departments that are accountable to the Ministry of Labor. These schools mainly focus on teaching technical skills for manufactories. Thirdly, there are institutions that were turned into vocational schools during the reform program of the secondary school system in the 1980s. It was usually poor performers (relatively speaking) that were transformed into vocational schools, since students from these schools had only little chance to proceed to university. Through the new system, these students should be given general occupational skills preparing them for jobs in the light manufacturing or services sectors, such as tailoring, equipment maintenance and cooking. Under the command economy, VET was centrally organized and catered to the needs of the large SOEs. During the second stage of China's economic reform however, this control was loosened and a broad variety of private training institutions emerged with a peak in 1995. Since then a process of consolidation has taken place.

Enterprise training is the other important source of skill training in China. The 'Reform and Development Plan for Education in China', issued by the State Council in 1993, stresses that continuous education and training on-the-job shall be the main methods for adult education in the country.[87] The Labor Law of China (1995) specifies further that "an employer shall establish a job training system, set aside funds for job training and use them according to the regulations of

[87] Cp. COOKE (2005), p. 37.

the State, so as to be able to train its employees systematically in the light of the circumstances."[88] 1996 vocational training had for the first time been given a separate piece of legislation: the 'Vocational Education Law of China'. It specifies the government's responsibility to implement vocational training schemes nation-wide. However also in this domain, law enforcement is an issue and China lacks behind its ambitious plans in many regions that give VET only low priority. Despite the fact that there are no detailed statistics to reflect a true and fair view of China's current VET situation, different studies do however provide insights into the generate state: Cooke (2005) summarizes the situation and provides data that proves that VET has not yet been widely established (see appendix 11 for precise figures). This shows, that VET is still in its infancy in China and the country is increasingly looking abroad to identify possible training schemes that could fit its own needs. For example the National Vocational Qualifications (NVQs) and General Vocational Qualifications (GNVQs)[89] system in the UK were considered as viable options.[90] However, the "dual system" of Germany was acknowledged to be the best model and some large cities have set up VET centers to experiment with the model. Already in the early 1980s 32 Sino-German training centers had been established in the country. So far, the German dual system has however proved to be too expensive and also the single-discipline nature of trainers/ teachers has made it difficult to implement the system.

From this the conclusion follows that VET is still a transitional institution in its infancy. Currently, most training schemes offer general skills training, as do their counterparts in the UK or US. This fact suggests that China is about to adopt a LME approach. From the desire to implement the German dual system one can however conclude that China has acknowledged the advantages such a system would have in its institutional context and is eager to implement it. This suggests that China is thriving to follow a CME approach, however so far lacks the resources to do so in a VET context.

3.6 Institutional complementarities in China's economic system

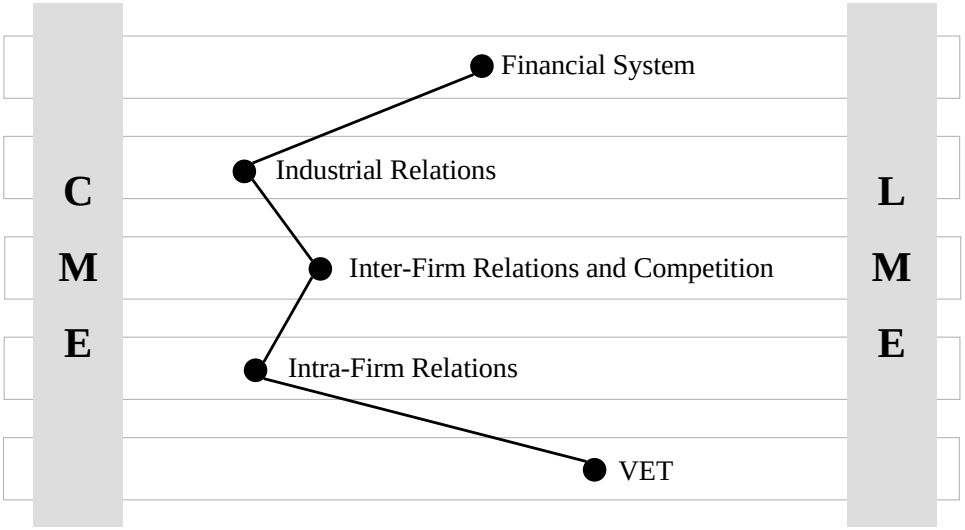
The 'Varieties of Capitalism' approach postulates that only a pure CME or LME configuration is stable, efficient, and successful in the long-run. Other cases falling in between are supposed to be

[88] COOKE (2005), p. 37.

[89] These are common qualification certificates in the UK. GNVQ is a suite of general vocational qualifications, providing an introduction to a broad vocational area. NVQs are work-related, competence-based qualifications that reflect the skills and knowledge needed to do a job effectively. Cp. www.qca.org.uk.

[90] Cp. COOKE (2005), p. 46.

subject to lower growth and more inefficiency. The 'Varieties of Capitalism' analysis of the Chinese case however generates roughly the following picture:



China clearly exhibits an ambiguous case that neither adheres fully to one or the other 'Varieties of Capitalism' regime. It seems though that there is a strong tendency towards a CME configuration. However, one major institutional element cannot be categorized, namely the financial system: high ownership concentration and Anglo-American regulatory structures on the one hand and a German-style board of supervisors, a focus on relationships, and a high degree of insiders on the other hand. Industrial relations as well as inter-firm and intra-firm relations point more to a CME model with clientelist relationships in the labor market, influential unions, the importance of "guanxi", government involvement and a collectivist culture. The education and training sector on the other hand focuses on general skills and can be described as rather liberal.

According to the 'Varieties of Capitalism' framework, the Chinese institutional configuration should not be successful and also not sustainable in the future. The past 25 years of impressive economic growth however speak a very different language and also the current upward trend of the economy opposes this 'Varieties of Capitalism' implication.[91] It must therefore be concluded that the static 'Varieties of Capitalism' approach falls short when applied within a transition context. It cannot fully explain the dynamics of an economic transition. The following chapter will therefore outline major shortcomings of the 'Varieties of Capitalism' approach within a transition context.

[91] Cp. GLAESER ET AL. (2004) and HAGGARD (2004).

The sustainable success of China's gradual reform indicates that the dynamic configuration of transitional institutions is nevertheless relatively efficient. However, this does not imply that the current institutional configuration is stable. Possibly, it will vanish at a later stage and transform into a different one as the economy matures. The notion of complementarity within the Chinese system can be outlined drawing on several examples:

Given the mentioned problems in the legal domain, the financial system has produced striking characteristics: The quota system applied to the stock-market has raised transparency and disclosure levels significantly. A positive-selection of qualitative companies was induced which led to a performing stock-market. The quota system has thus raised the efficiency of the stock market – hence, both institutions seem complementary. Weak competition policies and ambiguous property rights – another set of institutions that exhibits major deficiencies if analyzed from an "advanced capitalism" perspective – are met by a sophisticated "social software": guanxi. By collaborating in densely knit networks, e.g., with competitors and government authorities, a firm improves its competitive positioning and that way overcomes institutional weaknesses. The fact that R&D is carried out by research organizations or by individual companies that might cooperate with a small number of research institutes and hence do not create combined inter-firm and inter-industry research networks is in line with the 'Varieties of Capitalism' assumptions, given the focus on general knowledge as compared to industry-specific skills in the education and vocational training sector. Non-market coordination in industrial relations gives rise to non market coordination in both inter-firm and intra-firm relations. China has found very non-standard institutions to support its growth.[92] The degree of complementarity can be seen as high though and serves as a reference point to explain the county's economic success.

4 Limits of the Varieties of Capitalism approach in analyzing China

The focus on the firm as the center of analysis in the 'Varieties of Capitalism' concept implies that the state as a unitary actor in the economic system does not qualify as an explanatory variable as to how institutions emerge and change. Hall and Soskice (2001) explain that the 'Varieties of Capitalism' approach is actor-centered, which is to say that the political economy is

[92] Cp. ALLEN/ QIAN/ QIAN (2002), pp. 6 & 7, ALLEN/ QIAN/ QIAN (2005b), ALLEN/ QIAN/ QIAN (2005c), POMERANZ (2000).

understood as a "terrain populated by multiple actors, each of whom seeks to advance his interests in a rational way in strategic interaction with others."[93] Hall and Soskice further explain that it is companies that are the "key agents of adjustment in the face of technological change or international competition whose activities aggregate into overall levels of economic performance."[94] Here the 'Varieties of Capitalism' theory takes a democratic polity as a given – as it is the case in all market economies in the developed world with their multi-party political systems and history of coalition politics. Economic policy is explained as the outcome of a bargaining process among different actors that may be individuals, firms, producer groups, or governments; institutions then emerge and change as the product of compromise between those socio-political groups. The 'Varieties of Capitalism' model claims that there are two static equilibriums (either LME or CME). It hence fails to capture the political dynamics of the Chinese situation. As the discussion in the preceding chapters has shown, Chinese firms today still lack the high degree of autonomy assumed by the 'Varieties of Capitalism' approach and do therefore not play the central role in economic policy making. The 'Varieties of Capitalism' analyses underestimate the importance of political factors, in particular the influential role of the CCP[95], in China's economic transition and reform process. Individual politicians have also played an important role in shaping the set-up of the economy. In 1978 it was for example Deng Xiaoping who had emerged as the paramount leader and who successfully initiated the reform process by bringing reluctant and skeptical party bureaucrats in line. Also the strong leadership ability of China's premier Zhu Rongji two decades later can serve as such an example when he pushed through China's WTO accession despite severe political opposition within the country.[96] Post-Washington-consensus institutional economics literature on post-socialist transitions has pointed to the importance of the state in the transition process. Russia's failure to successfully transform its economy is today widely attributed to a lack of state capacity.[97] In contrast, China is typically considered an example of effective (at least in comparative terms to other transition economies) state governance. The CCP admits that it did not have a master plan for reform. China has chosen a gradual and incremental reform towards to the market economy during which the CCP had continued to exercise guidance over the direction of the reforms. The Chinese

[93] Cp. HALL/ SOSKICE (2001), p. 6.
[94] Cp. HALL/ SOSKICE (2001), p. 6.
[95] Cp. MCMILLAN/ NAUGHTON (1992).
[96] Cp. BRESLIN (2004), pp. 17 – 19.
[97] Cp. BLANCHARD/ SHLEIFER (2001).

government did not adopt a laissez-faire approach to the establishment of complimentary institutions to support market operations.

The 'Varieties of Capitalism' analysis does nevertheless offer valuable insights that justify its application to China's transition economy. Despite its orientation towards mature capitalist economies, the Chinese case also confirms the validity of the concept of institutional complementarities as an integral component of efficient market operations. This assessment, however, does not explain why China, a Confucian culture, would opt for either a LME or CME style capitalism. China challenges the conviction of the 'Varieties of Capitalism' approach and economic theory in general as it shows that economic behavior is embedded in a specific social, cultural, and historical context.[98] The emphasis of the 'Varieties of Capitalism' theory on economic factors as primary determinants in policy decisions and institution building does however not capture the complexity of the Chinese political environment. The CCP's reform strategy has been shaped by the interaction of economic and political factors, including external demands imposed from abroad.

The Chinese case has shown that economic reform and transformation would be ineffective if the appropriate institutional foundation was absent. There is an emerging consensus in economics that effective governance and institutional change are key factors for economic performance. Not a minimal state, but a state that is capable of formulating, implementing, and enforcing reforms takes on a crucial role in the transition process. The role of the state in Chinese – or more broadly in East Asian – development has been discussed widely in the literature and the 1990s saw two divergent theories competing with each other: the market-friendly view and the developmental-state view.[99] The first view expresses "that the state should confine its economic activity only to fostering market coordination, while the developmental-state view asserts that the state can be an important substitute […] for market coordination which often fails at the developmental stage of the economy."[100] Hence, either the market or the state solves resource allocation problems and market failures. However, as the 'Varieties of Capitalism' discussion in the preceding chapters has shown that coordination problems are of a broader and more general dimension than what the simple notion of market failure indicates: in resolving coordination problems, many different institutions other than markets evolve, such as the set-up of the financial system, industrial

[98] Cp. CHOW (1997).
[99] Cp. AOKI/ KIM/ OKUNO-FUJIWARA (2005).
[100] AOKI/ KIM/ OKUNO-FUJIWARA (2005).

relations or vocational training to name only a few. The main role of the Chinese state has not been in directly intervening in resource allocation (bar certain examples) but rather in developing those institutions and interacting with them itself. The government itself is an agent that is constrained in its own capacity to process information and has its own interests. It can therefore not be seen as a neutral body that steps in to correct private coordination failures but must be seen as an endogenous agent itself. Here the firm-centered view of the 'Varieties of Capitalism' concept falls short. Aoki emphasizes a third view that shall be taken as the framework of analysis here: the market-enhancing view. Here, the government and the market are not regarded as two mutually exclusive substitutes, the role of the government policy is examined to facilitate or complement private-sector coordination.[101] One premise inherent to this view is that private-sector institutions are seen to have important comparative advantages vis-à-vis the government, in particular in their ability to provide appropriate incentives and to process locally available information. However, it is acknowledged that the capabilities of the private sector are more limited in a developing economy like China.[102] "The market-enhancing view thus stresses the mechanisms whereby government policy is directed at improving the ability of the private sector to solve coordination problems and overcome other market imperfections."[103] From this perspective it is thus not the government's responsibility to solve a specific coordination problem but rather to facilitate the development of private-sector institutions. Over time the locus of coordination dynamically moves further to the private sector as it acquires more and more capabilities. A study on China's institutional reform process must take this aspect into account and therefore focus on governance structures and their ability to foster private-sector coordination. China has managed to gradually create such a market-enhancing governance structure (MEGS) – this dimension must therefore be incorporated into the discussion of China's transition process. Governance is defined as "the capacity of a country's institutional matrix (in which individual actors, firms, social groups, civic organizations, and policy makers interact with each other) to implement and enforce market-oriented public policies and institutions, and to improve private sector coordination."[104] The state as a facilitator of private sector coordination does not exist within the narrow scope of the 'Varieties of Capitalism' framework. At the end of

[101] Cp. AOKI/ MURDOCK/ OKUNO-FUJIWARA (2005), p. 1.
[102] Cp. ASIAN DEVELOPMENT BANK (2003).
[103] AOKI/ MURDOCK/ OKUNO-FUJIWARA (2005), p. 2.
[104] Cp. AHRENS/ MENGERINGHAUS (2005), p. 3.

the transition process, coordination will surely also be anchored within the private realm as it is the case in advanced economies already today. The 'Varieties of Capitalism' approach does however not account for this dynamic change in coordination patterns but presumes a stable state to already exist at the outset of the analysis. This is a major shortcoming of the approach and makes its validity questionable within a transition context. The state has thus played an important role in China's economic transition and must be included in any analysis.

5 China on the way towards a 'hybrid capitalism'

China's systemic transformation differs in many important ways from the experience in CEE[105] and the CIS. Especially their starting conditions were very dissimilar: China was characterized by its large and mainly poor agricultural sector, whereas transition economies especially in the CEE were already industry based. Although being a centralized state, China's more decentralized planning system had been in place early on, as the turmoil of the Cultural Revolution had damaged the reputation of central planning and substantially weakened the government bureaucracy and its vested interests.[106] A striking insight from China's transition is that system change from a planned to a market system occurred without a political revolution. If China hence completes its transition, it will be the first country under a communist leadership to do so. China's strategy of experimentation has shown that there is more than one path towards successful transition. The main lesson from the Chinese case however is that considerable growth is possible with "sensible but not perfect institutions", and that transitional institutions can be more effective and efficient than "best practice blueprint institutions" imported from other countries for a certain period of time due to the second-best principle: removing one distortion may be counterproductive in the presence of another distortion.[107] For example, when CEE countries and the former Soviet Union embarked on their transition to a market economy, they chose the Anglo-American system as the model to follow without considering the actual consequences it might incur. The implementation of e.g. privatizing SOEs in these countries did not produce a corporate governance structure characterized by outside stockholder control as it was desired by policy makers that imported 'Washington Consensus' management practices.[108]

[105] Cp. BREZIS/ SCHNYTZER (2003).
[106] Cp. QIAN (1999), p. 44.
[107] Cp. QIAN (1999), p. 46.
[108] Cp. KOLODKO (2001), pp. 30 et sqq.

Instead, it resulted in wide-spread insider control patterns and a large share of stocks was acquired by managers. It was the historical conditions at the outset of the reform that constrained the possible outcomes of the enterprise privatization process.[109]

This research paper has shown that China has embarked on a gradual and highly incremental transition path. China has developed basic market-supporting institutions such as the rule of law but is still lacking the people to operate and enforce them. Given this constraint, best practice institutions that require high skill levels and a variety of supporting institutions will most certainly not work for the time being. This implies that some existing institutions can contribute positively to market-oriented reform even though they will most likely eventually disappear. Fiscal contracting, anonymous banking, TVEs all constitute Chinese institutional innovations that have worked very well for a certain period of time in the Chinese context. Of course, there is still significant potential for improvement due to many allocative distortions.

There are several general principles that can be derived from China's transition experience: Firstly, government reform is a key component for economic reform, since if the government has strong positive incentives and faces hard budget constraints and competition, the resulting reform is productive. Moreover, the Chinese experience has shown that a reform program must be politically feasible, i.e. supported by the majority of people in order to be successful: a reform that does not create many losers in the first place will be accepted ex ante and will also be sustainable ex post. Furthermore, the issue of how to sequence different reform steps needs to be highlighted: the Chinese experience has shown that whenever it is politically feasible, "it is better to dismantle the existing institutions after the new ones are put in place, or allow the new ones emerge from the old, to avoid institutional vacuum".[110] One such example is the slow phasing out of the plan track while simultaneously allowing for private businesses to emerge – this strategy has minimized oppositional forces and improved economic efficiency at the same time. Of course, China could have done even better by choosing an even better reform measures, but what is crucial to see is that it was most important to avoid fatal mistakes.

A convergence of different 'Varieties of Capitalism' that exist worldwide – especially to the Walrasian model – would be difficult "because of the variance in historical conditions among

[109] Cp. AOKI (2000), p. 3.
[110] QIAN (1999), p. 47.

economies and the need for structural consistency between regulations and other institutions."[111] The 'Varieties of Capitalism' approach has claimed that different capitalist systems will either converge to a LME-equilibrium or to that of a CME. Economies that fall in between these categories are said to be inefficient. The preceding discussion has shown that the Chinese transition paints a somewhat ambiguous picture, but still appears to be relatively efficient as it exhibits seemingly complementary institutional configurations that are suitable for the time being. The dynamics of the Chinese situation are not sufficiently reflected by the theory. Comparative institutional economics proposes that there is diversity in economic systems on a global scale.[112] This study takes up this line of thought and suggests that the emerging capitalism in China is neither that of an LME or a CME in the sense of a pure 'Varieties of Capitalism' theory, but is of a hybrid form. Maybe the widespread tag "Capitalism with Chinese Characteristics" can actually serve as a term to label the emerging form of capitalism in China. For the time being, there is one important element in China's socialist market economy that appears to be difficult to change: the Party and government bureaucracy that limit the extent to which free enterprises can flourish in China.[113] This situation as is not expected to change, as long as the economy stays on its growth track, since this situation serves as the main source of credibility for the central government. The government is rather popular among a large number of Chinese citizens. The bureaucratic behavior in China is therefore likely to remain and affect the way non-state enterprises can function. This dualism of the economic and the political realm will remain one of the characteristic features of China's variety of capitalism.[114]

[111] Cp. AOKI (2000), p. 5.
[112] Cp. AOKI (2000), p. 5.
[113] Cp. CHOW (2002), p. 277.
[114] Cp. LIN (1993), PP. 197 et sqq.

Exhibit 1: A Comparison of the NPLs and Government Debt (%)[115]

Year	China	US	Japan	South Korea
1997	--	65.6	80.0	6.5
1998	12.3 (14.4)	63.4	96.2	10.5
1999	23.7 (34.3)	61.4	107.3	20.0
2000	40.4 (65.4)	58.3	115.9	16.7
2001	39.2 (62.1)	58.4	136.5	12.7
2002	33.8 (49.1)	60.5	--	12.0

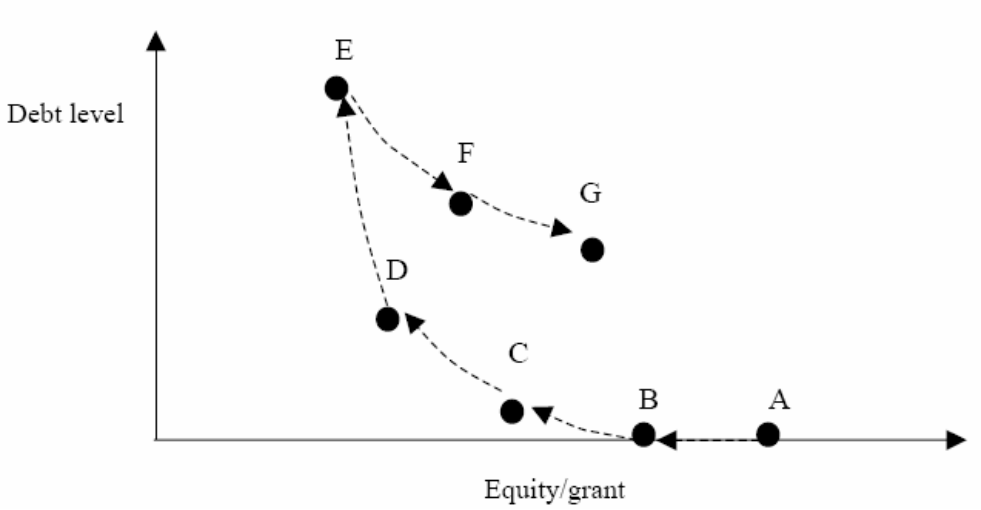
Exhibit 2 compares the ratio of (NPLs + Outstanding Government Debt)/GDP, in percentage, among China, Japan, the US, and South Korea for the time period 1997-2002, where the NPLs are the outstanding non-performing loans in a country's banking system, and outstanding government debt is the figure at the end of each year. The figure in brackets for China is the value of the official number for NPLs doubled. The lower the ratio, which results from low NPLs, low government deficits, or both, the less severe the problem of the NPLs becomes.

Exhibit 2: A Comparison of the Largest Stock Markets in the World[116]

Rank	Stock market	Total Market Cap (USD billion)	Concentration (%)	Turnover Velocity (%)
1.	NYSE	9015	61.3	94.8
2.	Tokyo	2095	60.6	67.9
3.	Nasdaq	1994	63.1	159.8
4.	London	1800	84.5	97.3
5.	Euronext	1538	72.3	153.6
6.	Deutsche Börse	686	72.0	125.1
7.	Toronto	570	67.8	67.9
8.	Swiss	547	81.2	138.6
9.	Italian	477	66.1	120.7
10.	China (Hong Kong)	463	83.0	39.7
11.	China (domestic)	463	29.4	224.2

[115] ALLEN/ QIAN/ QIAN (2005a), p. 83.
[116] ALLEN/ QIAN/ QIAN (2005a), p. 85.

Exhibit 3: Financial reform, debt level and governance structures in China[117]



A = Pre-reform unified income and expenditure system

B = 1978 – 80: Enterprise autonomy was expanded

C = 1981 – 83: Experimentation with some forms of contract responsibility system

D = 1984 – 85: Introduction of li-gai-shui (tax substituting for profit remission)

E = 1987 – 91: Nationwide adoption of contract responsibility systems

F = 1986: Local experiments with shareholding systems

G = 1992 – present: Corporatisation of SOEs, shareholdings regulations, proclamation of the Company Law, national experiment setting up modern corporations

[117] TAM (1999), p. 42.

Exhibit 4: Sources of financing in China by type[118]

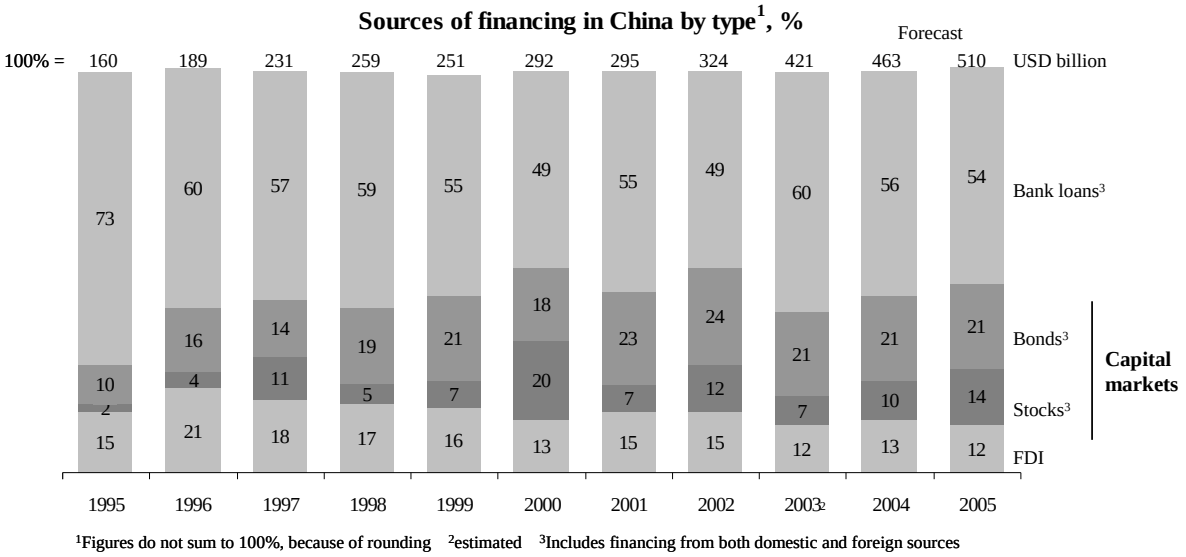
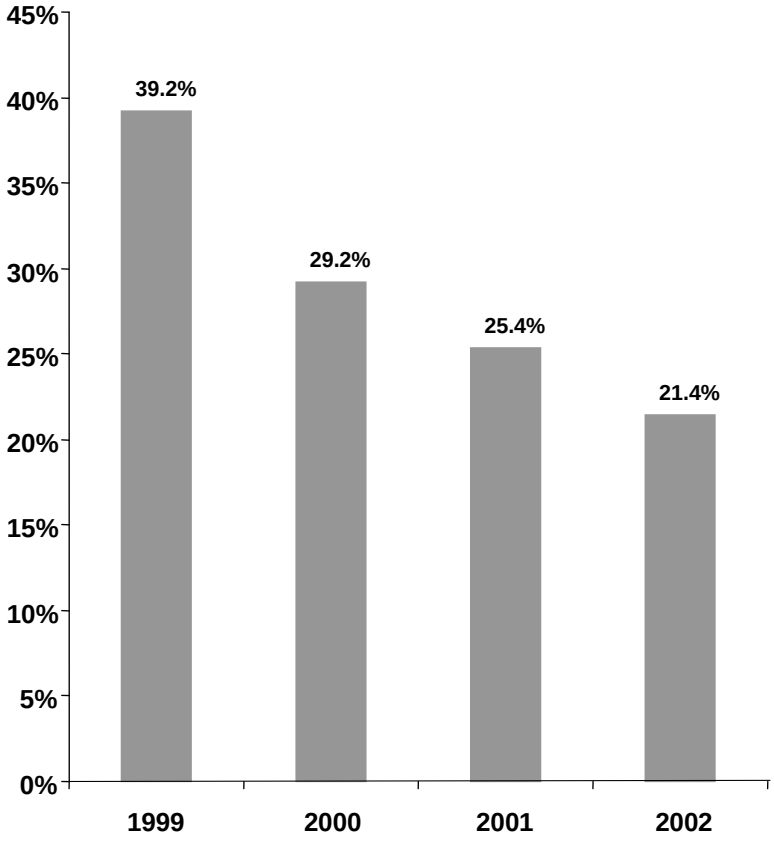
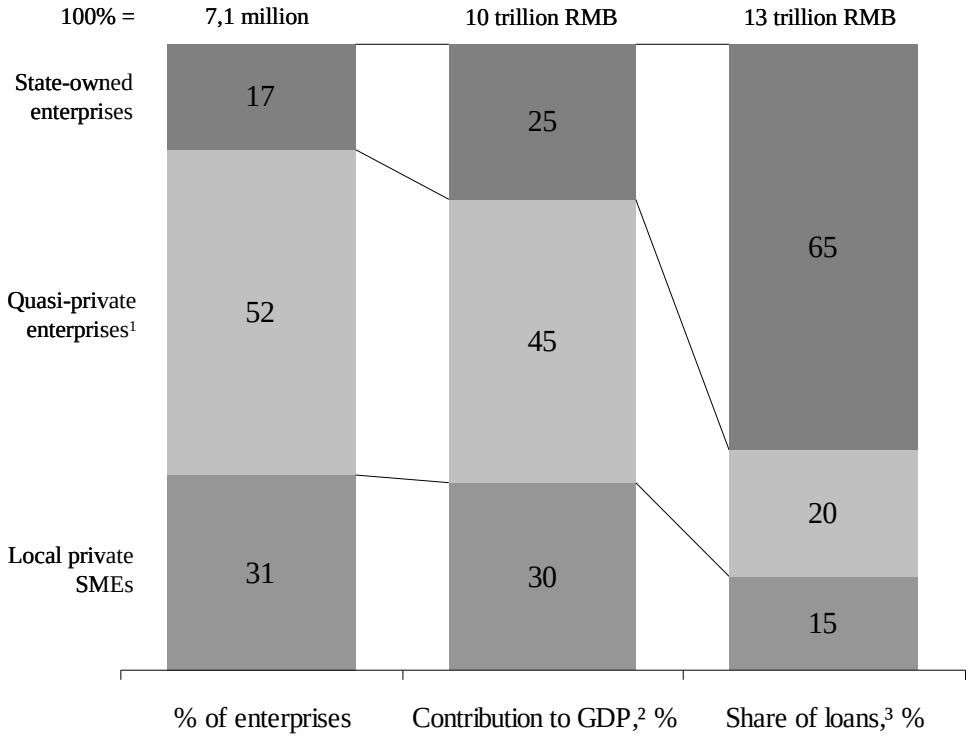


Exhibit 5: Breakdown on the NPL development of China's "Big-4" banks[119]



[118] WOETZEL (2004), p. 41.
[119] HU (2003), p. 47.

Exhibit 6: Misallocation of capital[120]



1 Includes companies with foreign investment and large local private enterprises.
2 Industrial output used as a proxy for state-owned enterprises; industry value added used as proxy for local private small/medium enterprises.
3 Financial liabilities used as proxy for bank loans in order to determine state-owned enterprises' share.

[120] PITSILIS/ WOETZEL/ WONG (2004), p. 12.

Exhibit 7: Total and joint patenting activity in China[121]

	1992	1993	1994	1995	1996	1997
Total patents	7.836	12.902	7.576	7.762	10.898	17.256
Joint patents (% total)	6.7	4.6	6.1	5.7	3.3	2.2
Total university patents	1.214	1.774	1.078	891	854	774
Total R&D institute patents	1.705	2.558	1.514	1.485	1.387	1.472
Total firm patents	4.917	8.570	4.984	5.386	8.657	15.010

Exhibit 8: Contrasting Anglo-American and Chinese cultures[122]

Anglo-American culture	Chinese culture
Rational	Intuitive
Inductive thinking	Holistic thinking
Scientific	Aesthetic
Individualistic	Collectivist (family oriented)
Low power distance	High power distance
Seek to reduce uncertainty	Accept or tolerate uncertainty
Explicit communications	Implicit communications
Function-oriented expression	Relationship-oriented expressio
Systematic trust	Personal trust
Diversified information networks	Top-down information system

[121] LIN/ WHITE (2001), p. 1101.
[122] Cp. CHIN/ LAU/ PUN (2000), p. 329.

Exhibit 9: Educational attainment of the population aged 6 and over in China[123]

Education level	Subtotal	% of population aged 6+
No schooling	89,629,436	7.75
Eliminate illiteracy class	20,767,295	1.80
Primary school	441,613,351	38.18
Junior secondary school	442,386,607	36.52
Senior secondary school	99,073,845	8.57
Technical college	39,209,614	3.39
Polytechnic college	28,985,486	2.51
University	14,150,726	1.22
Graduate student	883,933	0.08
Total population aged 6 & over	1,156,700,293	--

Original source:
China Statistics Yearbook, 2001 (2002), the Ministry of Statistics of China, pp. 106 – 109.

[123] MENG (2004).

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The current state of research on networks in China's business system

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Abstract

The purpose of the paper is to assess the current state of network research in China's business system. Research on networks has developed significantly during the last decades in regards to analytic techniques, number of research projects, and accumulated findings. While research on networks in China has always received much attention – not least because networks are (still) considered one of the major forces behind the country's socio-economic change – this development has also had an effect on how research on generic networks in China is being conducted. How Chinese networks are modelled, which aspects remain controversial in the academic debate, and which conclusions the different studies offer asks for a systematic comparison. The paper, based on an extensive literature research, therefore relies on a framework of theoretical concepts underlying the study of networks which allows a categorization of the dominant (generic) forms of Chinese networks as discussed in major journals. The study on the one hand is descriptive by filtering the diverse literature of network research on China's business system. On the other hand, it serves to identify gaps and shortcomings of the current literature in this field pointing to future research directions. We identify four generic types of networks, Chinese business groups (*qiyejituan*), Overseas Chinese Communities, networks of social relations (*guanxi*), and Network Capitalism, as an alternative economic model. As the study shows, the research approaches to these networks are extremely diverse both in description and analysis. A focus on the identified gaps within each type of network and a convergence between the types of networks should yield to further insights into the study of networks as well as their implications for economic systems.

Keywords: Social Networks, Organizational Networks, China

1. Introduction

"…if one would understand Asian economic development, one must first understand Asian business networks."
Gary G. Hamilton (Hamilton, 1996)

1.1. Network research in China

Research on social and organizational networks in China has increased significantly during the 1970s when Western social sciences started to focus on the concept of networks. Central to the study of networks in China has always been the attempt to explain the uniqueness if not Chineseness of social and organizational networks. Most of this research had initially been dominated by anthropologists and sinologists (Anonymous, 1991; van der Sprenkel, 1991; Whyte, 1991; Zheng, 1991), seemingly defying the usual social science concepts. Only recently did network studies in China include social science considerations, while simultaneously general network studies looked for ways how to better include the notion of culture (Boisot & Child, 1988; Krug & Hendrischke, 2007).

Today, network research in general as well as network research in China has reached a mature state (e.g. Academy of Management Journal, 1997; Acta Sociologica, 1994; Organization Studies, 2003; Strategic Management Journal, 2000). One indicator is the publication of special issues in academic journals. As calls for special issues are regularly expressed when a topic has attracted the attention of more than one academic field, to the effect that large numbers of theoretical and empirical contributions appeared in too dispersed location, such special issues point to the need to 'take stock'.

1.2. Core question and purposes

The purpose of this study is to offer an accurate description of the current state of research on generic social and organizational networks in China as published in academic journals. The focus will lie on networks claimed to be relevant for explaining the socio-economic development of China, highlighting how the concept of network is being applied in the context of China. In the most general terms, networks here will therefore only be seen as "an interconnected group of people or organizations having certain

connections which may be exploited to gain preferment, information, etc." (OED, 2006). In a first step the development of research in this field will be described, before the focal findings and trends both in empirical and in theoretical research will be singled out. Such a procedure allows for identifying gaps and shortcoming in present research concepts and practices. Finally, based on these findings, directions for future research will be suggested.

1.3. Structure of the paper

The remainder of this paper is structured as follows. In the second section, the research approach will be outlined. Data sources, selection mechanisms, characteristics of the selected publication set, and the analytical tool developed for this study will be described. Those publications in the list of references marked with an asterisk are included in the selected set of literature on networks in China. The findings are reported in section three, introducing the results with a broader analytical description, which allows constructing four distinct types of networks that dominate the literature on networks in China. After a summary in section four, the final section will discuss the overall implications of this study.

2. Research approach

The literature review employed a number of electronic databases searching for 'networks' and 'China'. This set of papers forms the base for clustering the different articles according to selected criteria. For doing so a classification scheme was developed including categories from other studies which have attempted to systemize network research while additional criteria were added when this promised more insights. In the following, the three main elements for the selection and analysis of the literature will be explained in more detail.

2.1. Data source

Three sources for selecting relevant publications on networks in China were used. After an initial research on electronic databases, namely SSRN, JSTOR, and EBSCO, all studies published in academic journals that responded to the search criteria 'China' and 'network' were identified. The initial collection required to exclude 'irrelevant' studies to

avoid a bias toward irrelevant data that arises when the findings of all studies are equally weighted. The number of studies in the data set was therefore reduced by eliminating publications on technical and logistical networks. Articles were ordered according to the impact factor of the journal they have been published in.[1] Journals relevant for sociological studies on China were added. References of the selected number of publications were examined, adding frequently occurring publications that had not been detected before. In case of doubt, abstracts of the given papers were obtained in order to assess the relevance of the publication. Finally, the list was cross-checked by colleagues with professional experience in the field.

The remaining set allows to assess findings in the field over time and to identify more recent consensus about specific research topics and approaches. It includes a total of 62 publications that appeared between 1985 and 2006 with an increasing number in the years since 1995. The data set includes empirical as well as theoretical-conceptual contributions.

2.2. Classification scheme

In order to systematically analyse the selected literature, a classification scheme was developed that addressed categories on network research, methodology, and lines of arguments. Some of the categories were derived from Borgattis' and Fosters' (2003) classification on network research in general (Borgatti & Foster, 2003). Two further categories aiming at discriminating the differing lines of arguments were provided by Krug (Krug, 2003). When required categories were adapted and extended according to recent developments in the field of network analysis. The remaining categories were added, mainly addressing methodological aspects of network research. The following subsections describe the classification scheme in detail and are structured as follows: first, categories for assessing streams of network research in the overall scientific field are explained (categories 1-4); second, methodological issues are discussed (categories 5-9) followed by third, categories that assess the opinions expressed by authors regarding the network at stake (categories 10-13). Each paragraph discusses a separate category

[1] The current ERIM's journal list 2006-2008 (EJL) served as a guideline, see http://www.erim.eur.nl

with its dimensions; the label of each category is given in *italic* letters. The presentation of the results in section three will follow the same order.

Categorizing general network research

Borgatti et al. (2003) identify among others six *areas of network research* (Borgatti et al., 2003). 'Social Capital', closely related to the works of Burt and Coleman refers to the social value of ties, enhancing among others organizational aspects such as leadership, mobility, employment, individual and team performance (Burt, 1997; Coleman, 1990). 'Social Embeddedness' mainly builds upon Granovetters' notion and focuses on the embeddedness of economic exchanges in social networks thereby predominantly relating to performance benefits (Granovetter, 1985; Uzzi, 1997). Employing the Williamson notion of networks as hybrids between market and hierarchies led to the research area of 'Organizational Networks' or 'Network Organizations'. The area is conceptually divided. While accepting the focus on exchange among semi-autonomous organizations (Williamson, 1975) the question whether organizations need to convert into networks, i.e. organizational networks or whether organizations already constitute an assembly of networks, i.e. network organizations is not settled (Borgatti et al., 2003). Studies on 'Joint Ventures' and 'Inter-firm' alliances assess the impact of such forms of collaboration on firm-level outputs, more precisely organizational learning or innovation. The area of 'Social Cognition' is concerned with the way networks are perceived as an entity by individuals members (Borgatti et al., 2003; DiMaggio, 1997) arguing that cognition of networks affects interaction and interaction in turn changes the network. The last area of network research on 'Group Processes' concerns the interaction of "… proximity, similarity of beliefs and attitudes, amount of interaction, and effective ties." (Borgatti et al., 2003: 998).

The second category regards the *direction of causality*. Causality offers insights into the understanding of research on networks and can either be directed to understanding the causes of networks, i.e. from where, how, and why network structures evolve, or to understanding the consequences of networks, i.e. what they contribute to overall outcome, what they offer their members, why they persist, or how they can be used as an (exogenous) variable for explaining other developments and trends (Borgatti et al., 2003;

Hendrischke, 2004). Studying the dimension of 'causes' leads to the search for evolutionary patterns illustrating that networks can either emerge generically, intentionally, or based on cultural and traditional reasons.

The third category examines two *explanatory goals* in the analysis distinguishing between studies that try to prove homogeneity between networks or actors as opposed to studies that attempt to explain differences in performance of networks or actors.

The last category assessing the literature on networks concerns the *explanatory mechanism* asking how the link between network and explanatory goal is modelled (Borgatti et al., 2003). While some studies focus on the content of ties and relations between network members (connectionists), others emphasis structural aspects such as brokerage positions, centrality, or embeddedness (structuralist).

Categorizing methodological aspects

The following five categories refer to methodological aspects. The findings in this regard were not so much used to classify the studies but rather to address preferences in the research on networks in China.

The intentions of researchers can be followed in assessing first what they singled out as *unit of analysis*. Network studies usually settle for one of the four following alternatives: individual actors, dyadic relations, networks, or multiple-networks. The difficulty in defining an appropriate unit of analysis lies in confusions regarding theoretical and methodological similarities between macro, meso, and micro levels in a business environment, in which clear authority relations cannot (yet) be identified. An organization can be considered a single actor in a network or can be regarded as a network itself (Borgatti et al., 2003). Multiple network analysis would argue, that an organization consists of a number of networks, such as an advice network, an information network, or a friendship network (Klein, Lim, Saltz, & Mayer, 2004) while concepts which focus on firms find it hard to delineate the boundaries of a firm (Holmström & Roberts, 1998; Krug, 2006).

Another methodological category concerns the distinction between *conceptual-theoretical* and *empirical* studies.

In the latter case, different methods of *data collection* (category 7) and *data analysis* (category 8), either qualitative or quantitative, can be distinguished.

Moreover, the findings of qualitative analysis, in particular interview techniques are taken seriously when it is argued that a number of scales require an adaptation to the specific cultural environment such as China. Because of variations in the perception of Lickert scales or the impact of social desirability biases for example, researchers not developing appropriate scales are in danger of using invalid measurements, besides spending time and resources on invaluable procedures (Abhik, Walters, & Luk, 2001). Farh et al. (2006) distinguish between an etic, i.e. universal, and an emic, i.e. specific (to cultural context), approach to scale development which should be made explicit in fieldwork (Farh, Cannella, Lee, & Lee, 2006; Farh, Tsui, Xin, & Cheng, 1998).

Categorizing opinions expressed by authors

The last five categories look at opinions expressed in the studies regarding the networks at stake. Studies might for example suggest certain *origins of networks* as already described above. The origins can be either of an intentional, generic, or cultural-historical nature.

How the type of *governance mechanism* of networks is evaluated forms another category. Studies distinguish between 'self-enforcing' governance mechanism prevalent in those cases where the social structure of the network itself serves to govern the behaviour of individual actors, and 'trusted-third party' mechanisms when referring to cases in which reputation mechanisms or referral to arbitration are focal governance mechanisms (Krug, 2003). While the cases above provide examples of private and market conforming forms of governance, other networks rely on legitimised 'authority-driven' mechanisms that are governed by fiat of a certain body, such as government agencies.

Studies question the *functional value* of networks which can either be assumed to exist in a reduction of costs or risk, an improvement in coordination, or access to resources (Krug, 2007).

Moreover, most studies offer an estimation about the *future of networks* under research. This question frequently occupies the academic community, which has not yet

reached a consensus. It was differentiated between a diminishing, prevailing, or strengthening significance of networks as claimed by authors.

Finally studies can be distinguished according to their standpoint whether Western theories were applied to China as a case, or whether China is considered a research topic *sui generis*. Especially this last aspect indicates whether researchers believe China to offer unique insights into and the ability to challenge existing theories and concepts, or whether its growing significance merely follows existing patterns.

In what follows, all aspects as seen in the different studies will be evaluated to show whether there is a trend in research and where the academic community is converging to one opinion.

3. Findings

The sample shows that four generic types of networks are at the centre of the analysis. They are first, networks of organizations in business when referring to *qiye jituan*, i.e. state-promoted business groups; second, networks of organizations in the civic society when discussing the role of Overseas Chinese Communities; third, networks of social relationships when referring to *guanxi*, and fourth, the notion of 'network-' or 'clan-' capitalism as an alternative economic model.

This section is structured as follows. It starts with general information on the selected sample against which the more specific information on the four networks can be contrasted. The following subsections comprise specific information regarding the four identified generic networks.

3.1. Descriptive analysis of findings

The academic controversy about the specificity of Chinese networks predominantly takes place in economic, sociological, and managerial journals. Most of the publications on networks in China are found in the area of 'Social Capital' (32%). Studies related to 'Networks of Organizations' or 'Organizational Networks' and 'Embeddedness' account for another 20% each. About 59% discuss consequences of networks, applying a functional approach to explain an improvement in performance. As such, most of the literature explains the contribution of network to the overall socio-economic development predominantly in access to resources (48%) while some other focus on contagion, a more

deterministic stream explaining a process towards homogeneity in beliefs, norms, values, or outputs (Borgatti et al., 2003).

Methodologically most studies take the 'network' as their unit of analysis. Almost two third of the studies (58%) are empirical. There is a tendency towards qualitative methods of data collection (68%). Only in some cases, the scales used in the data collection were being specifically developed to fit the cultural context (38%). About half of the studies however analyse their data with quantitative methods in most cases simple descriptive statistics. More sophisticated statistical methods are only being used in a small number of studies such as micro-economic studies conducted for instance by the William Davidson Institute (Batjargal, 2005a, 2005b). Within the subset most publications put an explicit focus on China with the intention to test and develop existing Western theories.

Most authors account the significance of networks in China's economic development to cultural factors, predominantly Confucian philosophy (57%). Yet, they differ with respect to the inherent governance system within networks. While some assume the functioning of 'self-enforcing' governance mechanisms others argue for a form of private arbitration assisted by a 'third-party'. Access to resources and superior forms of coordinating economic behaviour are the functional values of networks most often mentioned in these studies. More than 60% of authors believe that the impact of networks in the development of China's economy will persists.

3.2. Network types specific to the Chinese context

The four generic networks found in the set of literature on China will be presented in this section. First, a brief introduction into the subject of each type of network is given, followed by a presentation of the results. The findings are structured according to the classification scheme described in section 2.2. First, the respective body of literature will be classified into the context of network research. Next, the methodological aspects of the identified literature will be presented. Opinions expressed by the authors with respect to origin, predominant governance mechanisms, attributed functional value, and future of the discussed networks will be described before specific shortcomings of the research on the addressed network will be discussed.

Qiye jituan - Networks of organizations in business

Qiye jituans are networks of unrelated, diversified firms (still) under government control established by and around administrative bureaus during the 1980s (Keister, 1998). With the gradual opening of China in 1978, China's political authorities fostered connections between Chinese state-owned enterprises subsequently leading to the creation of these business groups. The motivation for promoting such a development was influenced by the success of the Japanese *kereitsu* or the Korean *chabeol*. After fiscal decentralisation transferred control rights and decision-making power to provincial authorities in 1987 they enjoyed considerable popularity when local government agencies considered business groups a promising mean to promote economic development.

In 1995, the official numbers given was 20,000 business groups in the country (Ma & Lu, 2005) when it was also reported that they accounted for approximately one quarter of the total state-owned assets. Their number declined once privatisation policy during the 1990s got off the ground (Keister, 2001). In 1997, the State Council selected 120 *qiye jituans* to strategically enhance international competitiveness of selected (mostly state-owned) industries while incorporating small and underperforming state companies at the same time (Ma et al., 2005). Today, the share of state-ownership in business groups is estimated between 20% and 50%; some of them are large enough to be listed in the upper segments of the Fortunes' Global 500 list such as Sinopec, State Grid, or China National Petroleum (Fortune Global 500, 2007).

There are only few studies on *qiye jituans* before 1998 appearing predominantly in economic and sociological journals. Next to a number of publications on specific alliances within business groups, most studies are positioned in the research on 'Organizational Networks' or 'Networks of Organizations'. There is a clear emphasis on analysing the consequences of these networks mainly in terms of their economic performance. The focus on consequences instead of causes of these networks follows a known pattern of research in all relatively young fields. At an early stage, studies stress the significance of their research object (consequences), while once acknowledged research moves on to more fundamental questions (causes). In general, the type of research conducted in the field of business groups can best be described as an attempt to explain their functional value via an improved access to resources.

Except for a few publications emphasising dyadic relations within these business networks, most studies focus on the 'network' as unit of analysis. Probably because *qiye jituans* are assumed to be similar to the Japanese *kereitsu* or the Korean *chabeol*, most of them are testing existing Western economic theories. Subsequently, China is taken as a case while the findings are not fed back into the focus of this stream of research. The analysis is dominated by conceptual considerations using static models. There is no clear methodological approach in terms of data collection and analysis, let alone an attempt to adapt scales to the specific cultural context.

Unsurprisingly, most authors agree on the question of the origin of *qiye jituans.* As constructs of political decision-making their governance is seen as 'authority-driven' despite the structural development towards privatization since their emergence in the 1980s. Access to resources is considered their main functional value. Most studies predict that they will become more important in the future, both in safeguarding the privatization of SOE's, and in creating national champions with the ability to compete internationally. This is reflected in the studies, which emphasize size, economic success, and strategic orientation of a number of these groups, some even going so far as to argue that the deliberate formation of business groups might be beneficial for economies in transition (Keister, 2001).

To sum up, more empirical studies on Chinese business groups are needed. Neither structural approaches to the study of *qiye jituans* nor studies focusing on their coordinating values were found in the literature. Their contribution to the overall privatization process remains obscure so long as no dynamic models are developed to the effect that the significance of *qiye jituans* in China's economic development remains unclear. Moreover, since both personal and inter-organizational relationships are recognized as crucial, business groups constitute an intriguing case for multi-level approaches. Finally, concentrating on one firm and examine its interaction with the network might lead to valuable insights; yet, most studies take the 'network' as the unit of analysis. By doing so, the question of network-costs which have to be borne by individual members are avoided and remain an unspecific factor (Nojonen, 2007).

Overseas Chinese Communities - Networks of organizations in civic society

Another distinct type of network within the China context is found in organized Chinese communities outside mainland China, so-called Overseas Chinese Communities. Their origin is well researched: In the geographic area of what is now considered China, migration has had a long history. Especially during the 19th and the 20th century many Chinese emigrated to South-East Asia and North America due to political unrest, wars and starvation where often enough they experienced severe discrimination and prosecution (Stuart-Fox, 2003). Nowadays, approximately 60 million Chinese live outside Mainland China, with the highest concentration in South-East Asia (Thailand, Indonesia, Malaysia, and Singapore) and North America. They form a social group with a strong ethnic identity. Assimilation to the new environment does to some extent take place; yet, tradition and language are maintained and cultivated. Overseas Chinese Communities identify themselves not so much by nationality but rather by shared backgrounds such as home village, last name, or clan membership (Jin, 1991). Family ties are valued much more than in other ethnic groups and are maintained both over generations and long distances (Hendrischke, 2007). Many Overseas Chinese Communities support relatives and home villages in China financially. After the opening of China's economy and the acknowledgment of private enterprises, large amounts of foreign investments in China originated from wealthy Overseas Chinese Communities (Wei, Liu, Parker, & Vaidya, 1999). These are becoming increasingly organized in formal associations and clubs, hosting numerous official conferences and meetings. This process of formalization mainly took place during the last decade as these groups became increasingly exposed to a number of business and political initiatives originating from the People's Republic of China (see for example Anonymous, 2005; Bank of Overseas Chinese, 2007; Overseas Chinese-American Entrepreneurs Association, 2007). Overseas Chinese Communities are not to be considered one unified network. They rather represent a network of separate, yet interrelated networks. Their interlinkages intensify with an increase in the degree of formalization. Simultaneously, their combined influence on the social and economic development in China is directed more strategically and the impact they exert becomes stronger.

There were only seven publications in the data set dealing with the topic of Overseas Chinese Communities and their impact on China's economic development. Most of them appeared in managerial and sociological journals.[2] Most of the literature on Overseas Chinese Communities positions itself in the area of 'Organizational Networks' or 'Networks of Organizations'. Studies focus the consequences such as trying o measure their performance or highlighting their impact on international trade or FDI (Gao, 2003; Rauch & Trindade, 2002).

As has been the case with the studies on business groups, all studies use a connectionist approach to the research question by focusing on the relational embeddedness of actors. Interestingly enough, some studies mention structure as an important factor yet fail to include structure in their line of argumentation. The research reveals a tendency towards explaining contagion, i.e. processes of homogeneity fostering similar attitudes, shared beliefs, and practices (Borgatti et al., 2003).

Methodological approaches too are similar to the studies on business groups. The 'network' itself is the unit of analysis in all publications. Studies are exclusively empirical, in most cases employing quantitative approaches. Because information used is often derived from publicly available statistics on macro-economic indicators, none of the scales applied were adapted to the specific cultural context. This is neither surprising nor questionable since the explanatory power of the studies is restricted to providing a general picture of the influence of Overseas Chinese Communities. Whereas research on business groups, as noted above, is in many perspectives influenced by former research on their Japanese of Korean counterparts, the research on Overseas Chinese Communities mainly contributes to already existing theories. In contrast to Chinese business groups, Overseas Chinese communities can indeed be considered a uniquely Chinese phenomenon, offering attractive data for scrutinizing existing theories. Unsurprisingly, the studies unanimously agree that these networks emerged as historical and political incidents. 'Self-enforcing' governance mechanisms are argued to describe best the internal functioning whose dominant functional value is consequently ascribed to their coordinating advantage. The studies offer an ambiguous scenario for the future of Overseas Chinese Communities and their impact in China's economic development. A

[2] It can be assumed that a large body of literature exists in the area of Sinology and anthropology.

majority of studies sees their significance increasing while others both argue for a constant or even diminishing impact.

Similar to the studies on business groups, the one on Overseas Chinese Communities remains under-researched. The review of the literature leaves the impression that the impact of for example Western direct investment is being overestimated, whereas direct investment from Overseas Chinese is regarded as marginal. Studies on Overseas Chinese communities do not use structural approaches. However, the ongoing formalization of these networks makes the use of such approaches an attractive research agenda. Finally, combining economic with sociological and anthropological studies on Overseas Chinese Communities might give insights into their functioning and better enable an assessment of their future role in China's economy.

Guanxi - Networks of social relations

The third generic form of networks in China refers to the rather illusive concept of *guanxi*. Innumerable definitions on *guanxi* can be found in literature (e.g. Guthrie, 1998; Nee, 1992; Park & Luo, 2001; Tsang, 1998; Tsui & Farh, 1997; Yang, 2002). What the majority agrees on is the emphasis on informal social relationships between two or more individuals characterised by notions of trust, familiarity, reliance, and reciprocity (Faure, 2000). Moreover, its strong embeddedness in Chinese culture, its central position in everyday business life, and its strategic importance in inter-organizational relationships are accepted undisputedly (Goodman, 2007). As such, the concept constitutes explicitly or implicitly an integral part of nearly all publications on networks in China. The fast economic development of China not easily explained by the usual macro-economic models has often tempted scholars to search for other explanations; in many cases *guanxi* seems to be the best alternative. While in the past, *guanxi* has been considered a major contributing fact for China's economic growth, newer studies emphasise the costs in form of corruption and waste of resources (Nojonen, 2007). Literature on *guanxi* certainly comprises the earliest studies on networks conducted by Western social science, as already in the 16th and 17th century scholars have noticed the significance of personal relations in the Chinese culture (e.g. Leibniz, 1977).

The literature on *guanxi* is large and extremely diverse. Most studies are found in the area of management and sociology. However, as this field of research has a long history, many studies, especially older ones, can be found in history, philosophy, theology, Sinology, and anthropology. With over 55% of all publications included, *guanxi* clearly dominates research on networks in China. The focus still lies on explaining the causes of *guanxi* instead of emphasising its consequences. Only recently have publications emerged that look at both positive and negative aspects of *guanxi* or show the impact of *guanxi* in specific business situations, such as HRM practices, alliance formation, or supplier identification (Chen, Chen, & Xin, 2004; Millington, Eberhardt, & Wilkinson, 2006). Most research takes place in the area of 'Social Capital', i.e. discussing the value of connections and assessing the impact of a person's ego-network on aspects such as leadership, mobility, employment, or entrepreneurship (Batjargal & Liu, 2004; Bian, 1997; Davies, Leung, Luk, & Yiu-Hing Wong, 1995; Li & Rozelle, 2003). The field is dominated by studies approaching *guanxi* networks from a connectionist approach, intending to explain deviations in performance where once more 'access to resources' is seen as the crucial advantage.

Guanxi studies focus on individual actors and dyadic relations as unit of analysis. One negative side effect of this is that such a perspective possibly flattens the diverse nature of the impact of *guanxi* in daily life (Nojonen, 2007). Whereas research on its consequences can be explained by such a simple model, an analysis of its causes requires a more complex unit of analysis, such as interrelated or even multiple networks. In contrast to the studies on business groups and Overseas Chinese Communities, those on *guanxi* are dominated by qualitative methods, in which in-depth interviews play a central role. Therefore, more studies use scales that were developed for the specific research context. Data analysis is mixed insofar as both qualitative and quantitative methods are being applied. *Guanxi* studies often serve to develop existing theories. There is a clear tendency towards empirical studies employing static models for assessing the respective research question.

As diverse as the literature on *guanxi* as diverse are opinions regarding its origin, governance mechanisms, functional value, and future significance. However, one has to be careful with collecting and assessing scholarly opinions on these matters. It is

noteworthy how many authors seem to adopt opinions and arguments from other scholars without critically examining their justification. This might explain the persistence of the cultural essentialism in these studies which first articulated by Kahn (1979) explained China's surprising economic development by its underlying values found in Confucian writings (Kahn, 1979). Recent publications try to put the record right by showing that significance of social relationships in China has been a side effect of the Cultural Revolution and was intensified by membership in political or military groups such as the People's Liberation Army (Faure, 2000; Goodman, 2007). Others point out that the art of applying social relations or *guanxi* in daily business transaction has only emerged recently and has become increasingly difficult and complex since the opening of China's economy (Nojonen, 2002; Wong, 1998). The governance mechanisms most frequently referred to are 'reputation' or 'referral to third-party'. In some studies authors describe this as a self-enforcing mechanism, especially when *guanxi* is considered rather a network itself instead of merely a dyadic social and informal relationship (Krug, 2006). The functional value of *guanxi* is mostly ascribed to an improved access to resources, which is in line with the classification of this stream of literature as research on social capital. Finally, the opinions regarding the future role and significance of *guanxi* are ambiguous. Whereas more than a third of all authors believe *guanxi* will prevail, only one study explicitly suggests a strengthening role in China's social and business life. Recent studies (after 2000) which argue for a declining role of *guanxi*, account for approximately one fifth of the publications.

In contrast to the two networks described above, *guanxi* is extensively being studied by researchers. In fact, it clearly dominates the body of literature on China-specific networks. There is a strong tendency towards explaining the beneficial factors of *guanxi*, while the 'dark-side' remains underrepresented. One major shortcoming of the literature is the unquestioned Chineseness of guanxi despite the fact that other societies show similar mechanisms and "… have developed similar practices to govern social interaction at some time or another… " (Goodman, 2007: 176). Yet a debate is needed why and how social relationships seem to be more significant in China than in other business systems. Less quantity and more quality is strongly recommended in this field. Dynamic and longitudinal studies integrating the consequences of *guanxi* in more concrete and relevant

organizational settings could yield valuable insights in this respect. This also asks for a shift in terms from 'Social Capital' to 'Embeddedness' studies. A qualified assessment of the future role of *guanxi* in China for individuals and organizations should then become more plausible.

Network Capitalism - Network as an alternative economic model

The last identified area of research on generic Chinese networks is of a somewhat different character. The inclusion of this field is rather due to its distinctness in the respective literature than its relatedness to actual modern studies on networks in social science. It concerns an alternative economic model that has been introduced by the notion of network capitalism (Boisot & Child, 1996) or *guanxi* capitalism (Hamilton, 1996). What has been proposed is a specific variant of a capitalist system in which the major actor is a network itself. As such, this field of research possibly represents the most promising approach to understanding the significance of networks or social relationships as *guanxi* in China's socio-economic development. In 1992 already, Biggart and Hamilton have argued that neoclassical economics does poorly when it comes to explaining the process and success of some of Asia's business systems (Biggart & Hamilton, 1992). Precisely this was the problem that led to a combination of Western economic theories with empirical findings based on other social science approaches as a new way for explaining China's economic development. The focal objective relies on the consequences of a presumably network-driven environment in which not formalized ownership and property rights but relatively uncodified relationships derive legitimacy from social practices (Boisot et al., 1996). Because the research object in this field basically differs from the proceeding three, the initially developed classification scheme was only partially applicable to the selected publications. Moreover, only few articles on this context were found. Nevertheless, the attempt was made to approach this field of network research with a similar method.

Most of the articles are published in economic journals. They mainly argue from a 'Social Capital' perspective, focusing on the consequences of the deep embeddedness of networks. This is insofar not surprising as the topic, Network Capitalism, is based on the assumption of deeply embedded networks in China's social and business environment. Its

closeness to the social capital area of research indicates that Network Capitalism mainly refers to the importance of personal, informal relations and not to other possible networks such as business groups or Overseas Chinese Communities as described above. Also in line with the findings on social capital and *guanxi* networks is the explanatory mechanism applied. All publications use a connectionist perspective. They are predominantly conceptual using static models where China serves as a contributing case to (further) develop economic theory.

The term Network Capitalism is found in all possible varieties in studies on networks in China, in many cases leading to conceptual confusions regarding the intentions of the authors. Often, it is merely applied as a buzz term to catch the attention of readers. The absence of a larger body of literature on Network Capitalism indicates both a lack of comparative studies and academic discussion on economic systems. Nevertheless, as argued above, the mere existence of this body of literature can be considered an indicator of the significance of networks in China's and greater Asia's economic development. Research on Network Capitalism seems to be the most promising field of the ones described for enhancing economic and sociological theories. Unfortunately, neither empirical studies nor theoretical contributions in academic journals indicate an existing interest in this field of network research. It is difficult to address possible directions for future research. The emphasis of connectionist approaches to the study of Network Capitalism seem more suitable than structuralist approaches since the value of relationships and not the structural characteristics of networks are to be emphasised. Nevertheless, recent economic and sociological findings on distinct networks in China – as the one described above – might yield to new approaches in the study of Network Capitalism.

4. Conclusion

4.1. Summary of findings

As this overview shows, research on networks in China is diverse in its description and analysis. By systematically analysing the literature on networks in China, four networks have been identified within this field, all of which can be considered generic to the Chinese business environment. While networks in business (*qiye jituans*), networks in

the civic society (Overseas Chinese Communities), and Network Capitalism (an alternative economic model), have received limited attention, only *guanxi* (the network of social relationships) clearly dominates the field. The research on networks in China emphasises access to resource as their dominant functional value, while reduction of transaction costs and risks are less a topic. A comparison with the catalogue of criteria used in the general research on networks shows that the analysis of Chinese networks still lags behind the generally accepted analytical social science frame. Most studies use a connectionist explanatory mechanism and static models to derive arguments and construct models. The emphasis on the consequences of networks might be the reason why a cultural, only limitedly substantiated explanation for the relative significance of networks in China still prevails in the academic discussion. Only recently have researchers begun to move away from this cultural essentialism towards more substantiated explanations (Hendrischke, 2007; Wank, 1996). A significant number of studies insists on China being a research topic *sui generis,* following the callings of a number of scholars to discard existing (neoclassical) economic theories because of their limited ability to explain processes taking place in a number of (especially Asian transitory) economies.

4.2. Implications for future research

Despite the large variety of research on networks in China, the results of this study suggest some future directions for the field. More research on business groups, Overseas Chinese Communities, and Network Capitalism is needed while the field could most likely spare more studies on *guanxi*.

The subject of business groups might benefit from more empirical studies using a structuralist approach. On the one hand, they seem suitable for multiple-network analysis since both personal and professional ties between group members are assumed to be significant. On the other hand, case studies on individual organizations within business groups might yield insights into the positive and negative implications of membership. Similar to business groups, research on Overseas Chinese Communities will benefit from structuralist approaches which should be easier to conduct in the future due to the process of formalization taking place within and between these communities. The stream of

specific network literature addressing *guanxi* needs to move to dynamic models focusing on the implications of embedded informal, personal relationships. One of the major fallacies in this field is the large number of studies doing not much more than emphasising the presence of networks and social relations in China. However, as Boisot and Child (1996) phrased it, "… it is not the presence of networking that is distinctive about China's emerging economic order but, rather, the depth and nature of its social embeddedness." (Boisot et al., 1996: 623). Many studies on *guanxi* continue to explain functioning and consequences, while failing to carve out the distinctiveness, i.e. the relative significance, of personal and informal relationships in China compared to other economic environments. Much needed research on the costs of *guanxi* is also still largely missing (exception Nojonen, 2007). Lastly, the field of Network Capitalism will benefit both from better endogenizing the three types of networks and from an intensified discussion on comparative business systems.

One type of research on networks, despite its promising contributions, has been entirely disregarded by studies on networks in China. Studies on Convergence focus on processes of social and environmental shaping (Borgatti et al., 2003). The basic concept underlying this field is structural equivalence proposing actors in an environment to be structurally similar in being linked to the same partners. Taking an attributal perspective these studies intend to explain homogeneity between actors. Both structural and relational elements are being combined. If networks indeed significantly characterise and affect the Chinese economic development, then the effects of structural equivalency should be well observable in this environment. Borgatti et al. suggest that especially institutional theories fit in this area (Borgatti et al., 2003). Dynamic models will lead to deeper insights into the actual functioning and relative significance of networks. These approaches should moreover yield to further understanding the relation between formal and informal institutions in China's socio-economic development.

5. Discussion

Networks are neither linked to a specific culture nor, as economic historians have shown, to a specific period of time (Faure, 2000; Greif, 2006; Tilly, 1987). The fact that networks seem to be everywhere and nowhere is the outcome of how economic and social collective action is perceived in social sciences. While anthropology and parts of

the China-specific literature regard networks as exogenously given, social groups based on shared values, or family relations which defy further analysis, the problem within economics is that networks were originally situated between markets and hierarchies. Yet, the case of China gives further evidence to the claim that networks are not a distinct coordination mechanism that can simply be added to other forms of coordination, let alone economic regimes. Instead, networks can be combined with all other coordinating forms and cultures. They might differ in origin, purpose, professionalism, and embeddedness. Despite this, what they have in common is the use of social relations as a base for pursuing socio-economic goals by collective action.

China in this respect offers a unique environment for the study of networks. Their relative significance in the country's economy long has been emphasised. The absence of rigid institutional arrangements as known in the West moreover seemingly speeds up the process of change in China resulting in dynamics facilitating the study of networks. However, the conduction of research in China implies a number of difficulties challenging researchers' possibilities in designing social studies as transparently as in other economies. While evaluating findings of this study as well as results of future research these challenges have to be kept in mind. Despite these specific characteristics, China and its economic development offer chances to substantially enhance existing theories in modern Western social sciences.

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Recent changes to Korea's innovation governance

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Abstract. ***Governments around the world are faced with the challenge of an increasing sophistication of the technological base at home and abroad. How they cope with it is reflected in institutional change. Highlighting Korea's stunning growth in financial inputs to its innovation system since the early 1980s, this paper provides an in-depth and first-hand account of the ongoing changes to South Korea's national innovation system. Emphasis is given to the most recent reform enacted in 2004. It is concluded that Korea's NIS is an important foundation of its economic competitiveness.***

Introduction

The Republic of Korea (South Korea) has witnessed a phenomenal pace of growth since the 1970s, with per capita incomes in real US dollar terms rising seven fold over the past 30 years. Reaching the level of 20,000 USD in per capita GDP is a declared government objective that will probably be met in 2008. From a nation shattered by the upheavals of the Korean War (1950-1953) it has been transformed to the world's tenth largest economy and the third largest in Asia. It is important to note this has been achieved with a minimum of foreign assistance. Commonly touted as one of East Asia's four dragons (alongside Hong Kong, Taiwan and Singapore) Korea today can clearly be counted among the advanced industrialized nations. Though the exact causes and mechanisms of this startling advance are subject to an ongoing academic debate, dwelling in particular on the role of the state in this context (Amsden 1989, Krugman 1994), most scholars would subscribe to the notion that a set of well-defined science, technology and innovation (STI) policies – suited to the specific needs of a late industrializing country - have underpinned that growth in a very significant fashion.[2]

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[2] This interpretation is supported by recent World Bank research which noted Korea's successes in total factor productivity (TFP) in comparison to Mexico. TFP essentially is about the development and successful exploitation of knowledge and innovation.

Driven by external (the rise of China) and internal (ageing population) factors, Korea has embarked on becoming a knowledge society in which traditional factors of production such as capital and labor are progressively superseded by new dimensions such as patents, research and development (R&D) and availability of knowledge workers. A knowledge society is one that "creates, shares and uses knowledge for the prosperity and well-being of its people" (http://www.med.govt.nz/pbt/infotech/digital-strategy/draft/draft-11.html). It was estimated by the OECD that over 50 percent of GDP in the major OECD economies has become knowledge-based. And as much as 70 to 80 percent of economic growth is now said to be due to new and better knowledge (OECD 1996). These insights frame the current debate within Korea about the impending innovation challenge and the proper strategies required to carve out a profitable niche in the sandwich position between high-tech Japan and low-tech China.

These insights immediately invite the question of how the institutional underpinnings of Korea's national innovation system (NIS) look like today, how they evolved over time and to what extent, if any, they could be replicated in other countries. The paper will investigate the hypothesis, that Korea's relative success in S&T owes much to the distinct patterns of up-stream governance of its NIS. In so doing, we will first introduce the theory of national innovation system as it has been developed mainly by Scandinavian scholars from the late 1980s. The following part will entail a summary of Korea's experiences with S&T and dwell on how its NIS has developed over the past fourty years. Next we will shed light on the most recent changes to Korea's upstream innovation governance. The article concludes by a summary of strengths and weaknesses of Korea's NIS.

General picture of S&T in Korea

Under the leadership of President Roh Moo-hyun, elected to office in 2002, the Korean government has made big strides in attempting to foster R&D across the board, both within public research institutes and the private sector which finances 75% of R&D in Korea. This resolve is mirrored in comparative S&T statistics usually placing Korea on par with the advanced countries of North America and Europe, at least as far as financial inputs to R&D are concerned. General expenditure on R&D (GERD), the broadest measure of money flowing to science and research in an economy, peaked at 25 billion US dollars in 2005, the highest figure the country has seen since statistics were first compiled in the early 1960s (Figure 1). Since 1970 GERD has expanded by a compounded annual growth rate (CAGR) of 26.1%. Considering the relative share of GERD in relation to GDP, Korea also compares very favorably with other countries: the ratio of GERD over GDP is at 2.99% (2005), a very healthy figure against Japan's 3.15% (2003), Sweden's 3.98%, Germany's 2.52% and the United States' 2.68% (OECD 2005).[3] This coincided with a considerable improvement in the annual rankings of the World Competitiveness Yearbook by the International Institute for Management Development (IMD). In the field of science competitiveness Korea advanced from 28th (1998) to 12th (2006) position, and from 27th (2003) to 6th (2006) place in technology competitiveness (IMD 2006). These figures are particularly noteworthy as the country's overall ranking has slightly slipped to 38th over the past eight years. So clearly there is a positive momentum in the field of science and technology which is further supported by a host of indicators beyond the IMD league tables such as R&D intensity (R&D as

(http://info.worldbank.org/etools/docs/library/235384/KoreaKE-Overview.pdf). For an overview of STI policies Teubal (1997).

[3] Government projections in Korea foresee a rise of GERD/ GDP to 5.2% by 2030.

a percentage of GDP), the government R&D budget,[4] the number of researchers and science personnel and the number of publications measured by the Science Citation Index (SCI). All of these show very healthy upward trends. All together Korea has shown a propensity to constant fine-tuning of its innovation governance in synch with a changing technological, social, economic and political environment.

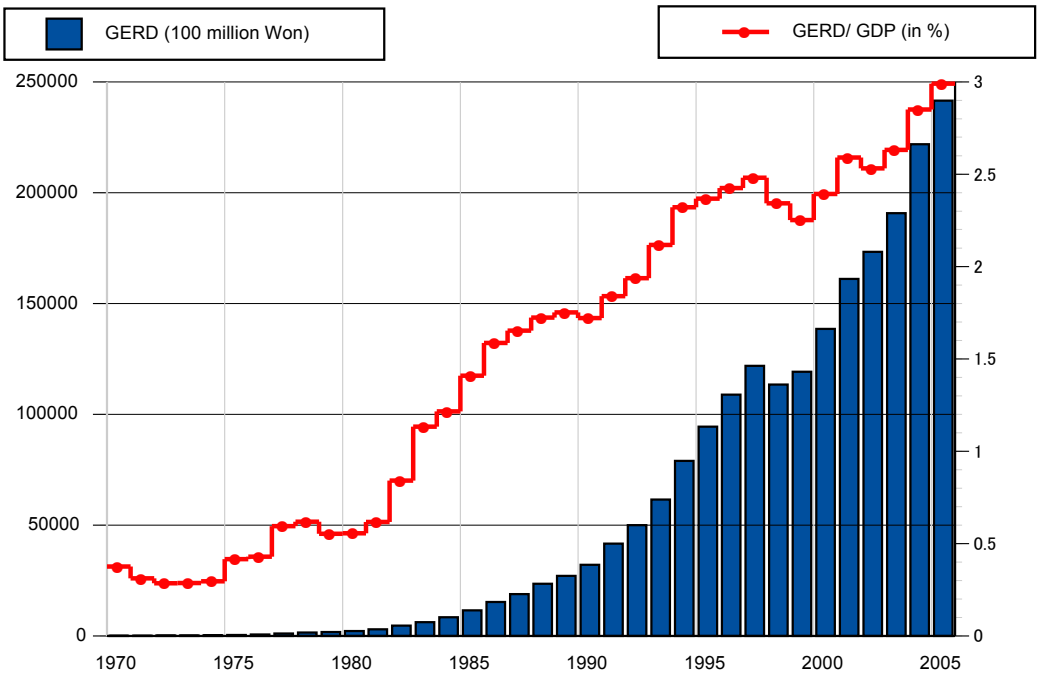

Figure 1: GERD (right scale) and GERD as a percentage of GDP (left scale) in Korea, 1970 to 2005.
Source: MOST S&T database.

National innovation systems

Innovations are the lifeblood of any modern economy, as they propel economic growth by means of technical change (OECD 1992). Yet despite their significance the economic and other sciences are only edging marginally closer to a comprehensive understanding applicable across time and space of how, why and when innovations emerge or not. Innovation is a ubiquitous phenomenon in any modern economy and has, therefore, been studied in a variety of contexts, including in relation to technology, commerce, social systems, economic development, and policy construction. Lundvall who stressed the importance of learning and user-producer interaction in his groundbreaking book on the subject wrote: "In practically all parts of the economy, and at all times, we expect to find ongoing processes of learning, searching and exploring, which result in new products, new techniques, new forms of organization and new markets." (Lundvall 1992: 8). In the course of this ambitious strand of research that gained substantial pace from the mid 1980s, a near consensus has emerged that "government matters" in fostering innovative processes. As Ahrens (Ahrens 2002 : 10) puts it: "This new line of thinking seeks to bring politics back in and to overcome the apparent dichotomy between the market and the state as two mutually exclusive mechanisms of resource allocation. (…) Thus the pendulum has actually begun to swing back toward redefining the role of the state in economic

[4] The 2007 government R&D budget amounts to 10 billion USD. Until 2010 the R&D budget will grow by 10% annually. This is about one half of Germany's public R&D budget, and 1/15 of the US.

development." This forceful logic is equally true for the role of government in the innovation game, where it is now considered a very important player, sitting either at the supplying end (e.g. through providing funding for scientists) or at the receiving end (e.g. through innovation-enhancing public procurement).

This raises two pertinent questions: first about the shape of a limited, but effective government (World Bank 1993: 84) and second about how to best design the innovation governance matrix that procures policy advice and frames interventions, particularly so in rapidly developing countries such as South Korea that have had little time in making the paradigmatic shift in their national innovation systems from imitation to innovation. Adopting third generation innovation policies that anchor science and innovation at the very heart of government action across multiple policy domains remains a prime challenge (OECD 2006). And so does the crafting of proper innovation governance, i.e. the institutional matrix through which policies are fashioned, prioritized and delivered.

Early explanations of innovative activity focused exclusively on inputs (financial and human resources) being utilized in a linear model of innovation stretching seamlessly from basic research to commercialization. New technology was assumed to start with basic research and move through applied research, invention, commercial market testing, and ultimately to diffusion. Innovations were considered the result of a linear process made up of different stages that take place in a sequential, hierarchical and one-way order. The adoption of this linear concept of innovation could lead to the conclusion that high investments in R&D would have positive consequences on productivity and growth. However, during the 1970s and 1980s the emergence of new and important technologies was followed by a reduction of productivity in the majority of the OECD countries (OECD 1991). The apparent contradiction between these facts was known as the productivity paradox. The Green Book on Innovation (European Commission 1995) also highlighted this paradox in relation to European countries. The pitfalls of the linear model of innovation became increasingly evident, in that it ignores the importance and influence of institutions (North 1990) and other market and non-market factors which in various and complex ways impinge upon the emergence of new products and services (OECD 1992). In the light of these new findings, the basic assumptions behind the linear model lost much of their explanatory power and appeal to policy makers. The new focus on the economic importance of knowledge and its properties helped a radically different perspective on innovative activity to thrive: national innovations systems.

The theory of national innovation systems was first conceived in the second half of the 1980s to provide a broad-based account and add analytical rigor to the understanding of innovative activity in a given economy (Lundvall 1985), (Freeman 1987), (Lundvall 1988), (Nelson 1993), (Lundvall 1992), (Edquist 1997), (Edquist 2001), (Chaminade and Edquist 2006). NIS theory frames innovation not as a linear process, but as a complex interaction between various institutions, in particular governments, universities, private and public research institutes and private firms. The point of departure is the existence and reproduction of entities in biology or, if translated to the economic world, a certain configuration of technologies and organizational forms. There are mechanisms that create diversity (i.e. innovations) in the system and there are selection mechanisms (i.e. nature or the market) that reduce diversity by increasing or decreasing the relative importance of elements through a "filtering system" (Edquist 1997: 6). This filter ensures that only entities survive that adapt with a tolerable fit (Hodgson 1993). Through that lens technological change is a path-dependent and open-ended process where a system never reaches an equilibrium

state because technologies are only superior in a relative, not an absolute sense. National innovation systems are open systems (as opposed to closed systems) with an often discontinuous transition to states characterized by greater complexity, path-dependency, multi-stability and heterogeneity of agents. Their openness implies a limited degree of determinism making it hard to foresee or predict outcomes (Nicolis and Prigogine 1989, Saviotti 1997: 182). NIS are highly knowledge intensive which is generated through search activities in individual and collective learning processes.

Evolutionary theories as the basis of national innovation systems theory share three characteristics, hailing from biological evolution but adapted to socio-economic evolution (Nelson and Winter 1982). 1) retention and transmission of knowledge; 2) generation and novelty leading to diversity; 3) selection among alternatives. These three principles are underpinned by the assumption that explanations of why an evolutionary pattern of change occurred must be identified in the decisions and actions of various economic agents, implying that the evolutionary logic can be leveled to describe innovation systems at different levels, such as national, regional or sectoral (McKelvey 1997:202). Rather than focusing on the individual and isolated units within the economy (firms, consumers) NIS flag the collective underpinnings of innovation and address the overall system that creates and distributes knowledge. In doing so innovation is construed as an outcome of evolutionary processes within these systems, and unlike in neoclassic theory information asymmetries are not considered a market failure but essential stepping stones of variety and novelty.

How players in the NIS interact and share knowledge in a productive way has captured the attention of policy makers and academics for the past decade and continues to pose a considerable research challenge. What has emerged thus far is a prevailing consensus that a systems approach to understand the dynamics of innovation is more realistic and provides a more useful yardstick to policy making than does the linear model of innovation. Edquist (Edquist 1997: 14) defines innovation systems as "all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations". Nelson (1993) expresses similar views in defining NIS as "the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge…and are either located within or rooted inside the borders of a nation state". Depending on the objective and the level of analysis, innovation systems can be supranational, national, regional or sectoral. The NIS approach reckons that successful innovations depend on long-term relationships and close interaction between the innovative organisation and external organisations and institutions. Moreover, this systemic approach to innovation considers that innovative activity and interactions between innovative agents are strongly influenced by the institutional environment. Institutions can be described as "sets of common habits, routines, established practices, rules, or laws that regulate the relations and interactions between individuals, groups and organizations" (Edquist and Johnson 1997). "Institutions are the rules of the game", according to North (North 1990: 3), and their main function is to "reduce uncertainty by establishing a stable (but not necessary efficient) structure to human interaction" (Ibidem: 6). Because institutions influence the way individuals, firms and organisations behave, relate to each other, learn and use their knowledge, they affect the emergence of innovations. Institutions have been rightly termed the "missing link" in the study of economic, political and social systems. The NIS approach thus highlights that actors do not innovate in isolation but within continuous interactions with other organizations in the system (at regional, national and supranational level). Their coordination of innovative activities

involves two dual and concomitant processes, i.e. flows of economic resources in transaction and production processes as well as transformation and transmittal of information that shape coordination and behaviour (Norgren and Hauknes 2000: 6). Though a more nuanced understanding of these flows has emerged over the last ten years, their detailed understanding still poses considerable challenges to researchers and policy-makers. What appears certain however is that in evolutionary economic perspective on qualitative technological change and innovation is regarded the most important driver of economic growth.

One of the earliest explicit contributions to NIS theory can be found in Freeman (Freeman 1987) who studied major elements of the Japanese system and thus became the first to use the term 'national innovation system' in published form. In his words a national innovation system is "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" (Freeman 1987: 1). In the second groundbreaking book on the subject, Lundvall (Lundvall 1992) explained his radical departure from neoclassical economics and the resulting motivation by way of two assumptions: "First, it is assumed that the most fundamental resource in the modern economy is knowledge and, accordingly, that the most important process is learning. (…) Second, it is assumed that learning is predominantly an interactive and, therefore, a socially embedded process which cannot be understood without taking into consideration its institutional and cultural context." (Lundvall 1992: 1). Lundvall identifies NIS as complex, dynamic and social systems "constituted by elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge (…) either located within or rooted inside the borders of a nation state." (Lundvall 1992: 2). This suggests that innovation is no longer an extraordinary event entering from outside and temporarily disturbing the general equilibrium but rather a pervasive, all-around phenomenon of modern capitalism. In all visible essentials, innovation now appears to be a process of interactive learning, not a single discreet event (Lundvall 1992: 8-9). It follows from what has been said that a useful distinction between national innovation systems in a broad sense (encompassing all parts and aspects of the economic structure and the institutional set-up) and a narrow sense (entailing only organizations and institutions involved in searching and exploring, i.e. firm R&D departments, universities) can be made (Lundvall 1992: 12). Lundvall himself suggests that the boundaries of a national innovation system cannot be sharply determined, but seems to prefer the delimiter of national boundaries in contrast to global, regional or sectoral innovation systems.

The next prominent scholar on NIS theory is Nelson (Nelson 1993) who introduces no explicit definition of an innovation system but, unlike Lundvall whose analysis was mainly theoretically informed, Nelson provides 15 case studies from a variety of countries, sandwiched in between a general opening and closing chapter. While venturing discontent with the somewhat abstract and broad concept of national innovation systems, Nelson and Rosenberg sum up their research approach as follows: "the orientation of this project has been to carefully describe and compare, and try to understand, rather than theorize first and then attempt to prove or calibrate the theory" (Nelson and Rosenberg 1993: 4). These three books together are considered the classic foundation of NIS theory, where a lot of the later works are built on.

Other major publications concerned about national innovation systems are summarized in the following portion. Patel and Pavitt (Patel and Pavitt 1994) in an overview article welcome NIS as a serious attempt to define and describe the metrics of intangible investments made by countries and companies and to account for the

important differences between countries in the levels of these investments. National innovation systems are defined as "the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change-generating activities in a country." (Patel and Pavitt 1994: 12). Within this approach, and in line with earlier work, the public sector is identified as an important player in systems research about innovative activity. The article concludes with a call for more and better data related to innovation and for more in-depth scholarship on the differing institutional competencies across countries that underpin the economic benefits of learning activities (Patel and Pavitt 1994: 27).

In another seminal contribution to NIS theory, Edquist (Edquist 1997) sums up the basic ingredients of national innovation systems: "Innovation processes are influenced by many factors; they occur in interaction between institutional and organizational elements which together may be called 'systems of innovation'." (Edquist 1997: preface). He also reported that the theoretical foundation of innovation systems research is rather patchy. Conceding that NIS is highly relevant from a policy-making point of view, Edquist points out the lack of conceptual rigour inherent to any new theory such as a systems theory of national innovation systems. In this environment innovation processes occur over time and are characterized by feedback loops, frequent inter- and intra organizational interaction and shaped by institutions. Edquist (Edquist 1997: 14) defines innovation system as "all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations". Thus he cautions against an ex-ante inclusion of certain elements of a system. Edquist's work is important in that it complements nicely earlier writings by Freeman, Lundvall and Nelson.

More recent work of Niosi defined NIS as "the system of interacting private and public firms (either large or small), universities, and government agencies aiming at the production of science and technology within national borders. Interactions among these units may be technical, commercial, legal social, and financial, in as much as the goal of the interaction is the development, protection, financing or regulation of new science and technology" (Niosi et al. 1993: 212). Niosi borrowed the terminology of "x-efficiency" (Leibenstein 1976) and concluded in an analogy to firms that national innovation systems are not operating optimally but exhibit a variable level of efficiency, depending on their internal organization and accumulated knowledge.

For the purpose of this study the definition of Metcalfe (Metcalfe 1995) is particularly insightful because he expressively re-affirms government's position at the nexus of policy development and implementation. For him a "system of innovation is that set of distinct institutions which jointly and individually contributes to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies." (Metcalfe 1995: 462-463). Taken together these definitions vary in detail but are broadly informed by three principles. 1) Organizations do not innovate in isolation but in close collaboration with various subsystems the quality and efficacy of which define the overall outcomes of the innovation system (Freeman 1987, Smits 2002). 2). More and very heterogeneous actors are involved in the management of innovation processes (Grimmer et al. 1999). 3) National innovation systems are path-dependent. This "memory" should be taken into account in the course of any analysis (Rosenberg

1976, Hollingsworth and Boyer 1997). And these trends collectively urge government to take the leading role as innovation system builder and facilitator (Smits and Kuhlmann 2002: 12). As such the NIS approach has a systemic perspective on innovation which is mainly the result of various agents' actions and mutual relations/ interactions. This approach reckons that successful innovations depend on long-term relationships and close interaction between the innovative organisation and external organisations and institutions. Moreover, this systemic approach to innovation considers that innovative activities and interactions between innovative agents are strongly influenced by the institutional environment.

Ultimately, governments around the world are faced with the challenge of an increasing sophistication of the technological base at home and abroad. Science is infinitely a more complex thing than policy makers would generally admit. This transformation has led to an upgrading of the means and instruments of S&T policy making itself, and a detailed study covering the governance of the upstream S&T system in Korea will therefore be meaningful to reveal sources of economic competitiveness.

Korea's innovation governance past and present

Economics borrowed the term "governance" from political science, where it used to connote "structures and practices of coordination and control without a sovereign power" (Benz 2007: 1). Governance structures underlying the process of policymaking craft institutions which provide individuals with specific (dis)incentives for their action and thus affect political and economic outcomes (North 1990). Hence, governance is not a synonym for government; the former rather highlights the importance of state capacity and institutional variety (Ebner 2005). More recently, governance was defined as "the capacity of the institutional matrix (in which individual actors, organizations and policymakers interact) to implement public policies, enforce rules and regulations, and to improve private sector coordination" (Ahrens 2002). And de la Mothe aptly characterized governance as "the handling of complexity and the management of dynamic flows. It is fundamentally about interdependence, linkages, networks, partnerships, co-evolution and mutual adjustment" (de la Mothe 2001).

This paper is chiefly concerned about the emerging reference frame of upstream innovation governance. It is argued that there is a) a need for distinguishing different levels of governance (in addition to the classical separation in public and private) and b) a growing academic interest to characterize how STI policies are framed and implemented within countries and regions. Therefore, upstream innovation governance refers to the formal and informal rules, incentives and constraints which shape the interaction of high-level state actors in national systems of innovation. In that it specifically addresses the instruments and mechanisms of priority-setting[5], policy coherence[6] and institutional learning. This is applied to the case of Korea, a country that over the past four decades has experienced distinctive phases in its upstream innovation governance. Throughout the various stages of development, Korea's innovation governance has evolved and improved in lockstep with changes in the external environment and internal needs (Figure 2)

[5] Schlossstein (2007b), Schlossstein and Park (2006)
[6] Schlossstein (2007a)

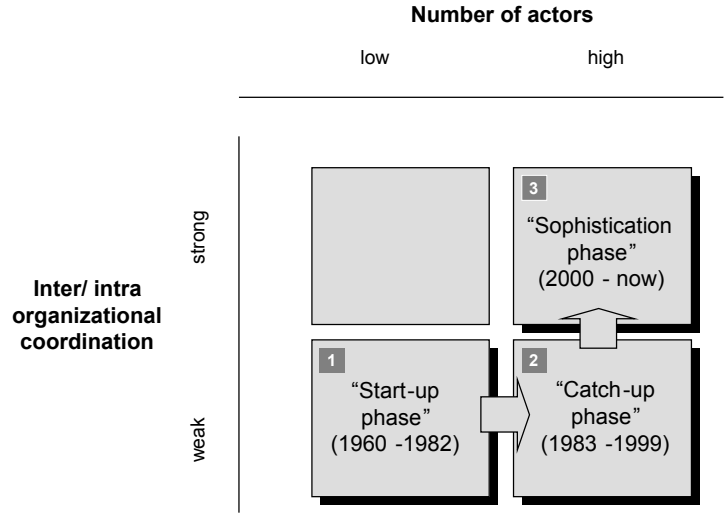

Figure 2: Adaptive evolution of Korea's innovation governance.

At the very beginning, the "Division of Technology Management" in the Economics Planning Board (EPB) was charged with S&T policy making.[7] Under the heavy-handed leadership of President Park Chung-hee the country switched to an export promotion strategy in 1964, after US support was withdrawn, affording Korean companies a chance to upgrade their technological capabilities via exposure to foreign markets and better capitalize on imports that included technology in some form. The choice of appropriate technology and its adaptation required a minimum of indigenous R&D capability. Coinciding with the first five year economic development plan, a full Ministry of Science and Technology (MOST) and the Science and Technology Promotion Law were established, both in 1967. This earned Korea a reputation for being the first developing country with a ministry-level organization for S&T. In addition to trade, science education in secondary schools and universities was initiated. With the basic infrastructure in place, the 1970s can be construed as the growth stage of Korean S&T with the focus shifting to capital and technology intensive industries, heavy and chemical industries, and emphasis on the education of qualified scientists and engineers. In 1973 a Council for Science and Technology (CST), chaired by the Prime Minister, was established and tasked with overall planning of the science system. However, this group was largely ineffective as it met only four times in a decade (Lim 2000).[8] In the second half of the 1970s a number of government-supported research institutes (GRI) were created which for many years formed the backbone of scientific research in Korea.[9]

The development of technological capabilities in the private sector was the policy thrust of the 1980s. A rapid increase in real wages and labor disputes forced firms to firmly embrace technological development. Led by the government, this was achieved in two ways. First, through a reform of tax incentives for private sector R&D,

[7] EPB is a government body credited with engineering Korea's economic growth from the 1960s to the 1980s. It was merged with the Ministry of Finance in 1995.

[8] Later attempts, such as the PCPST, were similarly ineffective. This situation was only remedied with the establishment of the National Science and Technology Council in 1999, under the direction of the president (and no longer the prime minister).

[9] In the early days, GRI employees had the status of civil servants. After 1982, when MOST took control of GRIs, the employees' status changed to researchers.

and second through a national R&D program by MOST in 1982 and by the Ministry of Commerce, Industry and Energy in 1987 which both aimed at the deployment of indigenous R&D capabilities. These new government programs came at a time when the private sector already spent as much on R&D as government and heralded the advent of the "select and concentrate" principle which basically stipulates that government should only act as catalyst for private investment, and not as its replacement ("crowding out"). Major industries of the 1980s included semiconductors, steel, automobiles and shipbuilding which continue to account for much of Korea's competitiveness in the global marketplace.

By the 1990s S&T activity on the government and private levels were greatly expanded as evidenced by the fact that 75% of Korea's cumulative R&D investment was allocated past 1990. Starting with the Highly Advanced National (HAN) Projects in 1992, the first government R&D program in Korean history to be crafted through inter-ministerial consensus-building, the decade saw a three-fold rise in GERD and the emergence of an institutional framework needed to steer the proliferation of science and technology across the board. The focus was firmly on reinforcing high-tech industries, in particular information technologies and semiconductors (Figure 3).

Along with a proliferation of stakeholders, in particular ministries, the "coordinating function" became seemingly weak and ministries continued to push their own vested projects. The Prime Minister, entrusted with overall R&D management, could not effectively remedy this trend, since most of the decision power is in the hands of the president of Korea; S&T statistics and indicators were underdeveloped and government officials lacked crucial knowledge about S&T policies (Hwang and Kim 2000).

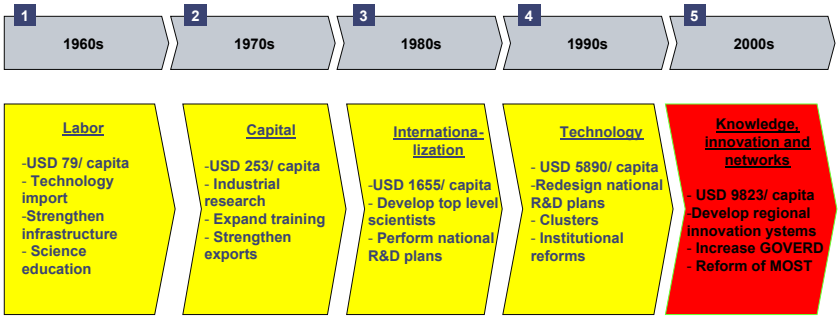

Figure 3: Major development stages of S&T in Korea since the 1960s.
Source: Author.

Although being regarded as a successful model of technological catch-up, Korea is presented with the challenge of transitioning from a catch-up innovation system to a system that truly supports the build-up of an indigenous knowledge base. This can only be achieved through deep institutional reforms that go much beyond funding considerations and ultimately cure the shortcomings of the Korean NIS, i.e. a lack of comprehensive coordination, weak linkages between S&T policies and government budget, excessive competition among ministries, weak evaluation and some overlaps in the missions of the GRIs (Hong 2005). To counter these perceived problems, the Korean government since 1999 has enacted a series of cross-cutting organizational reforms aimed at strengthening coordination among ministries and R&D agencies as well as improving harmony among different policy measures. With the need for horizontal STI policies becoming more obvious, the government in 2004 created a new governance structure build around the hallmarks of integration and

coherence (Figure 4). As it entails some elements that have drawn international attention, this new governance structure deserves closer attention.

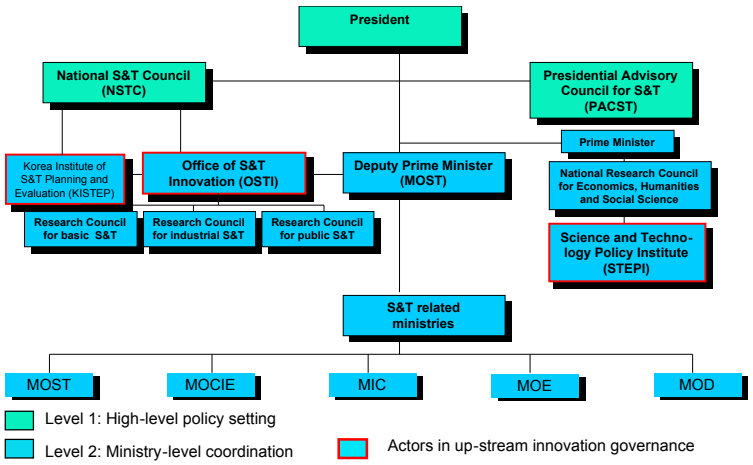

Figure 4: Korea's national innovation system after the 2004 reform (MOST – Ministry of Science and Technology, MOCIE – Ministry of Commerce, Industry and Energy, MIC – Ministry of Communication, MOE – Ministry of Education, MOD – Ministry of Defence).
Source: Author.

The revised five year (2003-2007) S&T basic plan, which was re-edited after the inauguration of the new government in February 2003, proposed the reinstatement of Korea as an S&T nation and it was declared as a major policy goal that Korea's global competitiveness in S&T would reach the 8th place in the world by 2007. Ranked no 6 in technological infrastructure and no 12 in scientific infrastructure by the IMD World Competitiveness Yearbook 2006, Korea is en route to achieving the stated objectives. The basic policy directions of the revised S&T basic plan are advancing the national S&T governance system, select and focus on strategic future S&T areas, strengthen future growth engines (a new government R&D program), strengthen regional innovation systems, create new jobs matching the demands of a knowledge-based society and expand people's participation and spread a general S&T culture. What is new about the revised basic plan is that it defined S&T as being the foundation of society, economy and culture and that it derived concrete policy measures from this point of departure.

Korea's S&T governance is now led by the President who is head of the National Science and Technology Council (NSTC) which was created in 1999 and acts as the highest decision-making body for S&T in Korea. NSTC is tasked with the following mission:

- Formulation and co-ordination of major policy and planning for S&T.
- Allocation and co-ordination of the national R&D budget reflecting the result of the NSTC's review.
- Planning of the mid- and long-range national R&D program, including the New Growth Engines.
- Measures for developing GRIs

While having no standing staff, it is composed of three subcommittees, the Steering Committee, the Special Committee on National Technology Innovation and the Special Committee on Next Generation Growth Engines. Regular meetings are held three times a year and prepared by the Office of Science and Technology Innovation (OSTI), a unit within with MOST serving as a secretariat to the NSTC. Headed by a Vice Minister, OSTI employs 100 staff members drawn from MOST

(50%), from other government ministries (25%) and from the private sector (25%). It is hoped that this unique combination of skills will provide rich perspectives on the future development of STI policies in Korea, but some early pitfalls came to light as some junior officials lacked a proper understanding of the nature of the innovation process (from discussions with MOST staff). OSTI was created on 25 October 2004. OSTI's policy intelligence mainly flows from KISTEP, a government research institute which works almost exclusively for OSTI. Individuals in the two organizations have day-to-day interaction, and KISTEP is regarded as an important repository of knowledge, in particular as regards statistics, for the government. Under OSTI, there are also three research councils for basic, industrial and public S&T which group around ten GRIs each under their leadership and try to evaluate their member institutes as well as avoid duplication of work between them. They command however no real budgeting power. In the words of one council chairman, research councils can only use "name and shame" tactics to expose member institutes weaknesses. The real budgeting power lies with the Budget Office instead.

As a result of this reform, MOST had to transfer the management of all programs concerned with applied R&D or R&D commercialization to relevant ministries. For example machinery, electronics and aero-technology R&D were transferred to MOCIE. However, MOST retained big science, fusion technology and science communication programs in its portfolio. In September 2004, the Minister of Science and Technology was elevated to the position of Deputy Prime Minister, on par with the Ministers of Education and Finance. This underscores yet again the high value which is accorded to science in Korea and more importantly, allows him to effectively coordinate the other 20 ministries with a share in the government R&D budget. This used to be a weak link in the Korean system which has now been cured by the elevation which marks the first such incident of its kind in the world, according to the OECD.

Since 75% of GERD is financed and performed by private firms (one of the highest levels in the world after Luxemburg and Japan) government is concentrating its efforts on support to basic science and on how to best complement business R&D through the deployment of an efficient institutional framework in which different S&T actors collaborate and share knowledgeKorea's. To underscore its commitment to science as an important driver of economic change government increased its S&T budget appropriations by double digit figures each year since 2001, to eventually reach 9.5 billion US dollars in 2007 (Table 1). This budget is allocated to 18 ministries.

Unit: 100 million KRW	2003	2004	2005	2006	2007	CAGR 2003-2007 in %
Grand total	65,154	70,827	77,996	89,096	97,629	8.42%
R&D budget	55,768	60,995	67,368	72,283	81,396	7.86%
general accounting	52,678	57,418	56,612	61,094	65,907	4.58%
special accounting	3,090	3,577	10,756	11,189	15,489	38.04%
Funds	9,386	9,832	10,628	16,813	16,233	11.58%
Ministry of Science and Technolgy	13,143	14,427	19,609	21,691	23,460	12.29%
Ministry of Commerce, Industry and Energy	12,510	13,903	17,673	19,956	21,836	11.78%
Ministry of National Defence	7,693	7,757	9,087	10,618	12,584	10.34%
Ministry of Education	6,878	7,715	8,778	9,672	10,323	8.46%
Ministry of Information and Communication	6,775	6,643	6,972	8,028	7,833	2.94%
Ministry of Agriculture	2,547	2,787	3,044	3,361	3,674	7.60%
Small and Medium Business Administration	1,765	2,120	2,317	2,679	3,600	15.32%
Ministry of Construction	885	913	1,519	2,620	3,278	29.94%
Ministry of Welfare	1,354	1,537	1,657	1,969;	1,808	5.95%
Ministry of Maritime Affairs and Fishing	1,152	1,249	1,406	1,719	1,789	9.20%
Ministry of Environment	1,111	1,264	1,340	1,458	1,678	8.60%
Other	17,055	18,245	13,680	5,013	5,766	-19.50%

Table 1: Development of government R&D budget in Korea, 2003-2007. Source: MOST, calculations by author.

Summarizing the major effects of the 2004 reform to Korea's S&T governance, we conclude that it represents a definite improvement over the status quo ante, especially as concerns the realignment and clarification of policy jurisdictions between ministries (MOST, MOCIE and MIC) and the strengthened coordination function of the NSTC. On the other hand, we have to remain mindful of other problems such as weak university research and underdeveloped ties between private firms and university research labs.

Future challenges for Korea's innovation governance

The world's S&T landscape is developing rapidly, and certainly Korea's neighbours account for a large share of that advance. From today's vantage point upstream innovation governance is challenged from three angles, i.e. effectiveness, efficiency and efficacy.

a) *Effectiveness* concerns the effects of STI policies on growth and employment. Korea will harness full effectiveness only if its innovation governance is constantly fine-tuned and upgraded to reflect the growing interdisciplinary nature of science. The key word in this context used by the OECD is "horizontalization", i.e. the ability of governments to leverage and manage third-generation innovation policies as a cross-cutting, inter-departmental affair. Also due regard has to be given to the shrinking importance of government if it comes to innovation financing (25% public vs. 75% industry financed). Here government needs to assume an "enabling role" complementing private research efforts.
b) *Efficiency* concerns the inner workings of ongoing R&D programs which are numerous in Korea. 21 Future Promising Technologies, Creative Manpower Initiative, 6T Technologies, Next Generation Growth Engines, 839 IT strategy and others. They are typically run by R&D management organizations (such as KOSEF or IITA) that work under the control of specific ministries. Whether this unleashes the full potential for cooperation across scientific domains and across science-related organizations is a much debated question in Korea. It is however safe to say that the rapid proliferation of programs raise the danger of duplication.

c) *Efficacy* (the ability to produce a desired amount of a desired effect) concerns the degree of policy learning and organizational adjustments. For instance, the newly created Office of Science and Technology Innovation (OSTI) is staffed in a unique way (see above). And younger policy-makers increasingly see themselves as adaptive agents. Very recently, a North-East Asia S&T Roundtable was launched, a trilateral forum where Japan, China and Korea discuss S&T matters.

Conclusion

This paper investigated the hypothesis that Korea's economic competitiveness developed in large part thanks to the upstream governance of its national innovation system. We found evidence of institutional learning and organizational improvement over the past 40 years and ongoing. Though Korea in the past relied on an imitation strategy, it would be a mistake to suggest the country would not have needed any NIS. This is a misunderstanding of the NIS concept. Korea climbed from pure imitation over catch up to technology leadership in certain areas (most notably microchips, TFT screens, collaborative online games, cargo shipbuilding). The impending challenge is in the transition to a creative innovation system. In closing let me summarize the strong and weak aspects of Korea's current NIS.

- The 2004 NIS reform is working, but policy horizontalization among ministries could still greatly be improved.
- Strong growth in public R&D budget, but lingering questions about the efficiency of spending
- Number of SCI publications growing rapidly, but their impact factor remains low
- Government keen on promoting science, but number of science students shrinking
- "Hwanggate" (alleged academic misconduct of Hwang Woo-sok) was cleared up with resolve, but cases of plagiarism and idea theft are still reported elsewhere.[10]
- Regional innovation systems are emerging (particularly in Gyeonggi Province around Seoul), but central government accounts for 97% of all R&D spending
- Public research institutes have been greatly reformed in recent years, but the role of the four Research Councils in managing GRIs is still weak (in particular they have no budgeting power).
- In the past the most important research happened in public sector institutes; as a consequence the quality of university research in Korea is rather low (but catching up).
- The Roh Moo-hyun government has called for a more visible role of Korea in world politics, but bilateral or multilateral government science cooperation in North East Asia is not yet properly developed.

This summary is mixed, since every strong point is (partly) neutralized by a weak one. However this reflects well the current state of affairs in Korea, where the transition from "imitation to innovation", a favourite government catchphrase, is well under way. Korea's upstream innovation governance has shown signs of "adaptive

[10] In March, the President of Korea University had to step down after an academic inquiry found him guilty of scientific misconduct.

efficiency" (North 1990) in that it has responded well to external and internal change imperatives.

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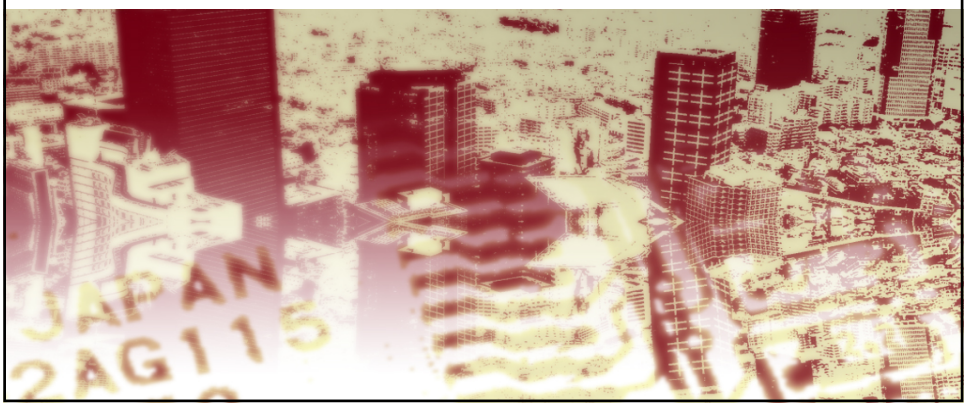
Standardization and Institutional Complementarities in Japan – Empirical Results from SAP R/3 Implementations in Japanese Automotive Suppliers

Tutzing, March 5, 2007



AGENDA

- Deviations from compatibility standards? The case of Japanese companies
- Theoretical framework
- Empirical results: SAP R/3 in Japan
- Complementarities of industrial organization with institutions of the Toyota Production System
- Summary

STANDARDS

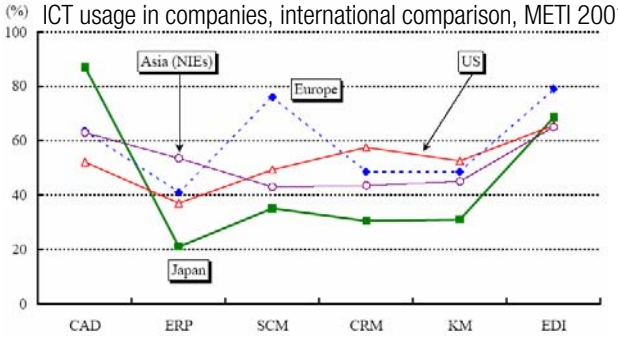
- Standards
- Effects
  - Compatibility („inter-operability), complementary goods. (David, 1990; Besen 1984)
  - Diffusion of innovations/technology, positive externalities, path dependency. (Katz, 1985; Farrell, 1987)
  - Reduction of transaction costs (formal institution). (Kindelberger, 1983)
- Standard implementation
  - Quality standards: deviations are known (ISO 9000, ...).
  - Compatibility standards: self-enforcing (coordination game), assumption that actors have no interest in deviating from the standard. (David, 1994)
  - "*The study of standards creation and adoption has been a fertile area of economic research, but* ***research has rarely examined adoption decisions directly, treating them as a black box for aggregate-level outcomes***." (West, 1999)

THE COMPATIBILITY STANDARD SAP R/3

- SAP R/3
  - ERP-Software
  - Market leader: dominant design (Tushman, 1986, Utterback 1996)
- Different standardization areas in SAP R/3:
  - (1) Communication (ISO/OSI-Model)
  - (2) Information (protocols, e.g. TCP/IP, EDI)
  - (3) Applications (API for complementary goods, e.g. CRM-Software)
  - (4) Business Processes
- Focus on (4) Business Processes

DEVIATIONS FROM SAP R/3 IN JAPAN?

(%) ICT usage in companies, international comparison, METI 2001



- Indicators that Japanese companies deviate from ERP-Software
  - METI (2001): „*the low ratio of ERP introduction by Japanese companies is related to the large number of companies which do not use IT for management innovation but rather in support of their existing business practices.*"
  - Motohashi (2006): „*Even when it [ERP] is introduced, proper modifications of business practices are not conducted, and it does not contribute to business performance at all.*"

OBSERVING SAP R/3 DEVIATIONS IN JAPAN

- Aim: Find a global, dominating compatibility standard whose deviation is not treated in scientific literature (=SAP R/3).
- Observe standard deviation in Japanese automotive supplier industry (high investments in ERP software).
- Possible implementation outcomes of SAP R/3
  - No Deviation: Implementation of standard according to process reference models (Practice adjusted to meet standard requirements).
  - Deviation 1: Customization of standard; add-on-development, specific processes programmed into the standard. (Practice changes standard)
  - Deviation 2: Implementation of SAP R/3 as a facade, actual processes not standardized. (Practice disconnected from standard)

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THEORETICAL FRAMEWORK I: ACTORS

- Actor perspective: observe the process of technology shaping, not only the outcome; constructivism (e.g. Pinch & Bijker 1984).
  - Technology-Acceptance-Model (Davis, 1989; Rogers 1995)
  - Specific knowledge and organizational capabilities/routines (Penrose 1972, Dosi 1988, Nelson & Winter 1982, 2000)
  - Power relations & sanctions (Star 1995, Esser 2000)
- Institutional framework around actor perspective
  - Institutional complementarities with formal and informal rules that influence actor behaviour on a higher level.

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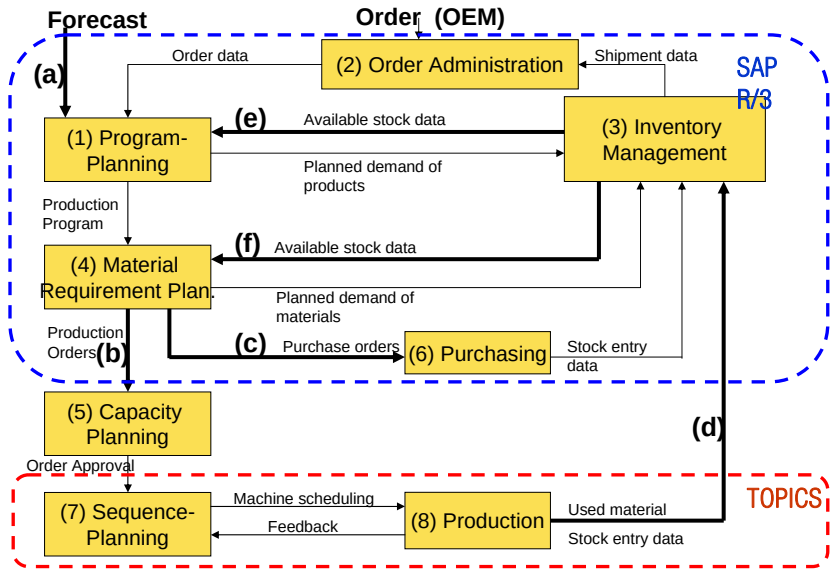
METHODOLOGY

- Multiple Case Studies
  - Explorative case study: Japanese supplier for Diesel pumps („PUMP"), October 2004.
  - In-depth case study: Japanese component and system producer for brakes („BRAKE"), between October 2004 - March 2006. Focus: time survey of processes in production planning.
- Interviews
  - 50 expert interviews with participants from the automotive industry, consultants, ERP-vendors, etc. (January 2004 - March 2006). Aim: Validation the results of the case studies.

IN-DEPTH CASE STUDY „BRAKE“

- BRAKE: supplier to all major OEM (mainly Toyota)
- Willing to introduce „pure SAP R/3“ (implementation start in 2002).
- Focus on production planning (indications from PUMP).
- Interviews with production planning employees
- BRAKE used elements from the Toyota Production System for production administration.
- SAP R/3 used for production planning (program and material planning).
- SAP R/3 not physically integrated into production administration.

„BRAKE“ PRODUCTION PLANNING



„BRAKE“ TIME SURVEY

Aktivitäten von Mitarbeitern im Zusammenhang mit Produktionsplanung	Fertigung (73 MA)	Logistik (104 MA)	Einkauf (24 MA)	Summe (201 MA)
(Auszüge aus BRAKE Aktivitäts-Survey für 2004, Angaben in h, hochgerechnet auf 1 Jahr)	**7,549**	**189,803**	**867**	**198,218**
Planungs-Aktivitäten	**43**	**492**	**89**	**624**
Nachfrage-Prognose		170		170
Analyse der Lead-time		103		103
Festlegen von Ziel-Lagerbeständen	43	218		262
Produktionsplan (Bestellungen)	**3,284**	**20,567**	**327**	**24,176**
Datensammlung von OEM	29	698		727
SAP-Dateneingabe	1,654	2,923		4,576
Erstellung und Aktualisierung des Produktionsplans	1,044	4,728		5,772
Prüfung von Lagerbeständen (online)	533	3,103		3,636
Übermittlung des Produktionsplans (intern und extern)	5	2,136		2,141
Anderes		6,998		6,998
Disposition der Materialbestellungen	**589**	**48,068**	**282**	**48,959**
Anpassung/Einstellung von Order Kanban		2,909		2,909
Abwicklung der Bestellvorgänge mit Zulieferern		8,592		8,592
Wareneingang und Prüfung	86	4,207		4,294
Interner Warentransport	407	22,775		23,182
Monitoring der Materialbestände	10	5,904		5,914
Interne Kommunikation und Abstimmung	86	3,701		3,787
Warenausgang	**1,523**	**97,118**	**0**	**98,641**
Dokumentation (Lieferscheine, etc.)	466	15,029		15,495
Zusammenstellung von Lieferungen		40,908		40,908
Verpackung	336	14,126		14,462
Transport der Waren (bis zur Sammelstelle)	485	5,506		5,990
Transport der Waren (Sammelstelle bis Warenausgang)		8,045		8,045
Transport der Waren (Warenausgang bis LKW)		137		137
Handling von Containern	187	8,722		8,909
Dateneingabe	16	3,922		3,937
Sortierung von Kanban-Karten	34	725		758
Engässe bei fertigen und halbfertigen Produkten	**1,078**	**3,048**	**149**	**4,274**
Kommunikation mit OEM		1,003		1,003
Kommunikation mit Lager	103	1,291		1,394
Anpassung des Produktionsplans	974	754		1,728
Engässe bei Material	**1,051**	**12,355**	**0**	**13,406**
Kommunikation mit Lager	295	3,298		3,593
Anpassung des Produktionsplans (in SAP)		1,325		1,325
Anpassung des Produktionsablaufs mit Kanban	391	802		1,193
Kommunikation mit Zulieferern	38	2,861		2,899
Suchen nach Material	326	4,070		4,397
System-Administration	**0**	**8,114**	**19**	**8,134**
Entwicklung		1,085		1,085
Wartung und Betrieb		4,442		4,442
Troubleshooting		2,587		2,587

- Left-hand process overview shows time used for each process in production planning.
- Base: extrapolation of 3 months for 1 year, 201 employees.
- Result: Time spent for stock-outs of material and products about 18.000 hrs./year
- Time spent on on-site search for material (4.397) higher than online-check of inventory (3.636).

„BRAKE“ PROBLEM AREAS IN PROD. PLANNING

- High resistance against SAP R/3 production planning process.
- Production plan creation with SAP R/3 in BRAKE made almost impossible for planning staff.
- Disconnection of practice from standard SAP R/3.
- Compatibility standard adjusted (practice changes standard SAP R/3).

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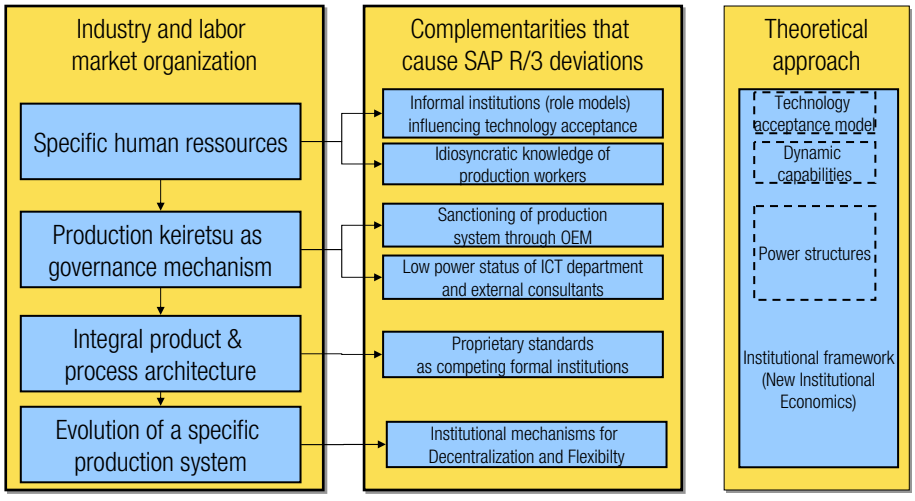
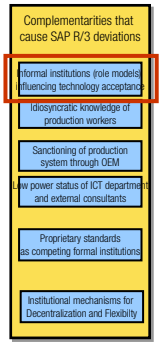
COMPLEMENTARITIES - OVERVIEW

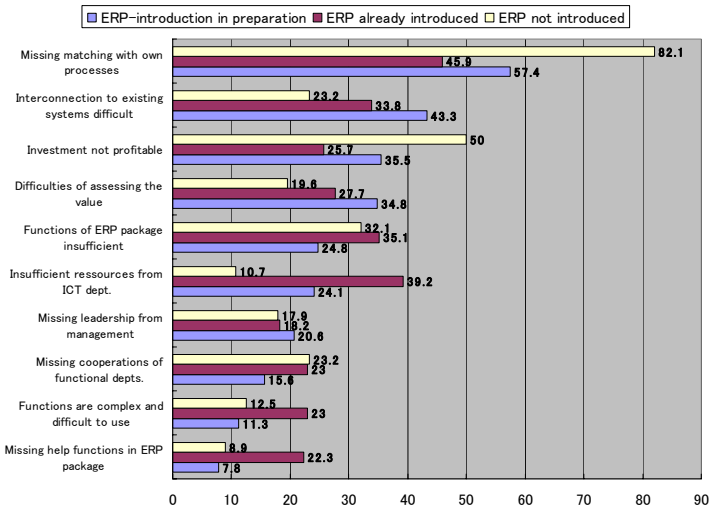


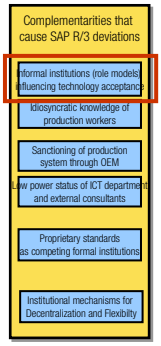
ROLE MODELS INFLUENCING TECHNOLOGY ACCEPTANCE

- Japanese/Toyota production system (TPS) is a network of formal and informal rules.
- Formal rules: example kanban
- Informal rules: example kanban
- Low acceptance of SAP R/3: low perceived usefulness (mismatching with mental models; gap to reality of Japanese production).



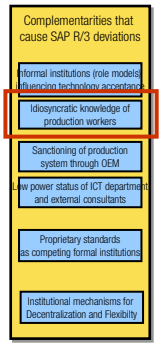
ISSUES WHEN USING ERP





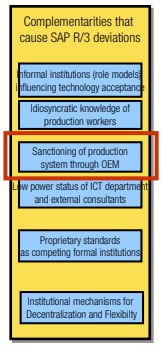
SPECIFIC KNOWLEDGE OF PROD. WORKERS

- TPS is a set of institutions that have channeled knowledge accumulation.
- Implicit knowledge in kanban production.
- No formalization of practice as achieved in SAP R/3 production planning (reference model process chain).
- Specific routines are difficult to separate, as they consist of complementary formal and informal rules.



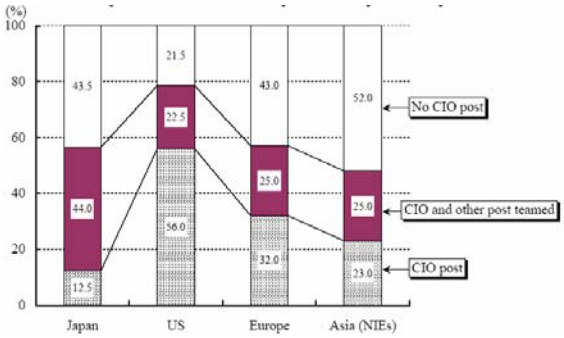
SANCTIONING OF PRODUCTION SYSTEM THROUGH OEM

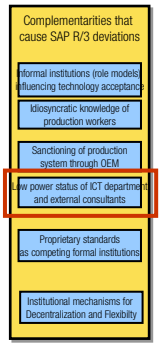
- Japanese production system processes include suppliers (example: flexible JIT-production)
- Production planning systems and routines have to be adjusted between several companies: High integration of OEM and supplier processes
- Sanctioning of in-house standards and routines through OEM.
- High legitimy of TPS: example „Monozukuri Philosophy“
- Usage of TPS rules is a precondition for transactions with Toyota (kanban, DRBFM, ...): this leads to adjustments of SAP R/3.



LOW POWER STATUS OF ICT-DEPARTMENT

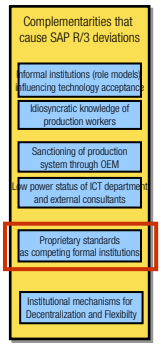
- ICT often not represented in corporate management (below: CIO posts in Japanese companies).
- No role change of ICT staff with SAP-introduction.





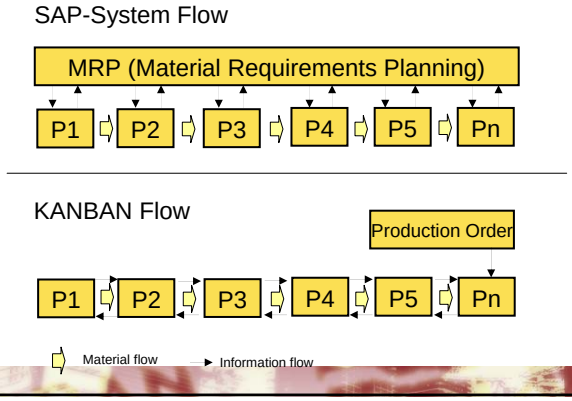
PROPRIETARY STANDARDS AS FORMAL INSTITUTIONS

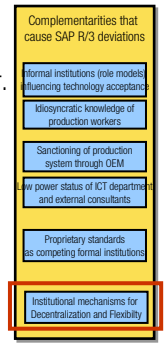
- High amount of private in-house standards that are issued by the OEM.
- Lock-in into proprietary standards such as TOPICS (complementary formal institution to TPS).
- Comparison: European and US-companies favor industry-wide standards (danger of holdup leads to low investment into specific assets).



DECENTRALIZATION AND FLEXIBILITY

- Differences in production planning between SAP R/3 and kanban
  - SAP: focus on central planning, real-time data, efficiency, push-production, susceptible to errors.
  - Kanban: independence, flexibility, transfer of responsibility to factory floor.





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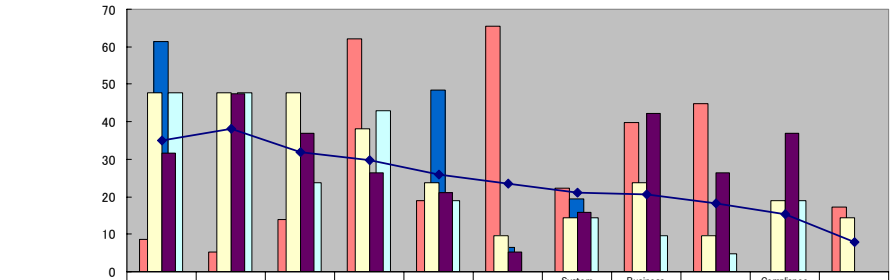
SAP R/3 PERFORMANCE VS. JAPANESE ERP-PACKAGES



	Adjustability to processes	Price	Ease of customization	Market share, references	Vendor support	Global success	System Integrator support	Business process functions	Global standard compliance	Compliance with Japanese processes	Technological progress
SAP (n=58)	8.6	5.2	13.8	62.1	19	65.5	22.4	39.7	44.8	0	17.2
GLOVIA-G (n=31)	61.3	45.2	22.6	19.4	48.4	6.5	19.4	16.1	0	16.1	0
OBIC 7 (n=21)	47.6	47.6	23.8	42.9	19	0	14.3	9.5	4.8	19	0
COMPANY (n=21)	47.6	47.6	47.6	38.1	23.8	9.5	14.3	23.8	9.5	19	14.3
Super Stream (n=19)	31.6	47.4	36.8	26.3	21.1	5.3	15.8	42.1	26.3	36.8	0
Industry (n=49)	34.9	38	31.9	29.7	25.8	23.6	21	20.5	18.3	15.3	7.9

SAP R/3 AS A QUALITY STANDARD

- Rather than a compatibility standard, SAP R/3 is used partly as a quality standard in Japan.
- SAP R/3 as a certificate: „the best-run companies run SAP“.
- Costs from lack of compatibility are internalized from actors (corporate management).

SUMMARY: STANDARD DEVIATIONS AND COMPLEMENTARITIES

- Standard implementation faces obstacles due to complementarities within the institutional setting.
  - Rules affect actors and their self-commitment: role models of production staff (flexible production, rotation, ...), consultants (with preference for specific solutions), management (low representation of ICT, high valuation of production).
  - Sanction: Production system sanctionized by OEM (especially Toyota) which reduces options for process adjustments together with SAP R/3 implementations.
- Deviations from compatibility standards occur when facing institutional conflicts.
- Deviation Type 1: Standard disconnected from practice.
  - Factual refusal of SAP R/3-processes in production area.
  - Occurs in case of strong conflicts between actors (management with standardization mission, refusal of central planning in production)
- Deviation Type 2: Standard adjusted according to practice.
  - High level of adjustment to existing processes („add-on developer“ on business card)
  - Occurs as a result of consensus-oriented interaction between actor groups.

END

- Thank you very much for your attention.

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