Product innovation and knowledge protection in the relationship between automotive first-tier suppliers and OEMs in China: an empirical investigation

A thesis submitted to the University of Manchester for the degree of Doctor of Philosophy (PhD)
In the Faculty of Humanities

2012

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ABSTRACT

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Product innovation and knowledge protection in the relationship between automotive first-tier suppliers and OEMs in China: an empirical investigation

2012

The entry of China into the globalized world and onto the stage of the global auto market has presented auto manufacturers with the largest ever market opportunity. While global competitive forces drive firms to develop product innovation through their global supply chains, the approach of global auto manufacturers and their first-tier suppliers has been to bring existing technology into China. Only recently has the supply chain in China become integrated into the global product innovation cycle. While innovations generated by supply channel relationships, as opposed to individual partners, are playing an increasingly important role in the success of all supply chain partners, there has been limited research in the literature on how supply chain relationships cultivate the process of such innovation generation, particularly in China.

Correspondingly, this study explores how multinational suppliers can develop adaptive product innovation in order to create a sustainable competitive advantage in China and how the protection of their knowledge helps them sustain it. Drawing on the knowledge-based view and transaction cost economics, and integrating those with behavioural governance and the institution-based view this study identifies drivers of product innovation for MNC suppliers in their relationships with Chinese OEMs, investigates the influence of supplier involvement and knowledge protection on supplier product innovation and examines the outcomes in the specific context of the Chinese automotive industry from the first-tier supplier perspective. Survey results of 170 multinational automobile suppliers in China indicate support for most of the hypotheses.

Specifically, knowledge protection is found to have an impact on product innovation in the context of the auto industry in China. Supplier involvement in co-design and co-development with an automotive OEM customer has an inverted U-shaped relationship with product innovation. Furthermore, trust and technological uncertainty are found to drive greater product innovation. In addition, the institutional environment moderates the effect of product innovation on performance.

Overall, this study enhances the understanding of how MNC suppliers can acquire local knowledge, develop products adapted to the local market requirements and foster product innovation while retaining their knowledge and know-how and minimizing negative effects of spill-overs to the local competition in the automotive industry in China.

KEYWORDS

Automotive industry, China, institutional environment, knowledge, knowledge protection, product innovation, supplier involvement, intellectual property
DECLARATION

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Acknowledgements

My interest in China dates back to the early 1990s when I first met my next-door neighbour at my parent’s house in Vienna, Austria, who today is a close friend and served as my best man at my wedding, Viktor Frey, who was born in Sichuan and raised in Peking. It was he who introduced me to the country and its customs during my first year in China from 1998 to 1999 and got me into contact with numerous people during that year, some of whom I am lucky today to call my friends.

The idea for pursuing a PhD was nurtured by my supervisor, Prof Rudolf R Sinkovics who had been the supervisor for my Master’s Thesis at the Vienna University of Economics and Business Administration (WU Wien) before. During the six years that I lived in China from 2004 to 2009, he visited a number of times and discussed the topics most relevant to managers in the auto industry in China with me. It was during those discussions that we came up with the idea for this research. He motivated me to enter into the application process at what then was still UMIST and pursue further academic education.

My second supervisor, Prof Mo Yamin, not only fed me with a constant stream of thoughts and paper recommendations to consider, but also showed me the beauty of Old Glossop and its surroundings, let me understand the global importance of Manchester United, and gave me the occasional taste of the most delicious chaotic Iranian cooking.

The support of member companies of the European Union Chamber of Commerce in China’s auto components working group was most valuable to this research, my great thanks go to all managers who supported.

I would like to take this opportunity to thank the three MSc students who worked with me on elements of this project over the course of the years: Chloe Doughty, Wei-Chieh Liu and Chen Luo.

The advice and guidance given by my fellow student Ruey-Jer 'Bryan' Jean who became a good friend and who progressed to become post-doctoral research fellow and associate professor while I continued as a student (the downside of any part-time program), was most helpful for me setting my ideas into a framework. I do hope that the papers we have planned with the set of data I collected come to fruition.

I especially wish to thank my head technician, Noemi (Pezderka) Sinkovics, another fellow student who became a good friend, for supporting me in putting the questionnaire online using some awkward university-provided software tool that I could have never mastered alone, let alone through a fragile VPN connection to Manchester servers from China.

Last, but not least, my thanks go to my wife, Julia, who not only accompanied me from Germany to China and on to Austria and put up with many years of a very busy work and travel schedule, but who accepted that I would use substantial parts of my spare time for academic research and further education and who continues to actively support me in my endeavours.
1 Introduction and motivation of the study

1.1 The gravitational shift of the centre of economic activity

Globalization continues at a rapid pace with ‘hyper-globalists’ arguing that we live in a borderless world in which the ‘national’ is no longer relevant or as Friedman put it in his book: “The world is flat.” (Friedman 2007) The predominant view shared by politicians and business men both to the left and to the right of the political spectrum is that increasing geographical spread and increasing functional integration between economic activities amounts to an unstoppable process (Dicken 2011).

A look back at the historical development shows that some core economies in the eighteenth century declined to the periphery while others emerged as new economic powerhouses, especially in the late nineteenth and early twentieth centuries. After the Second World War the Soviet bloc drew clear boundaries around itself and its Eastern European satellite states. However, it was the United States of America (USA) that emerged as the new powerhouse from the war accounting for 27 per cent of global gross-domestic product (GDP) in 1950 and with the political power as well as the economic and technological capabilities to lead the way (Dicken 2011).

Since 1950 two noteworthy political shifts have occurred, the rise of China¹ and the collapse of the Communist East. This research centres on the first, China’s rise in the global economy and the implications of this development in the specific context of supplier – original equipment manufacturer (OEM) relationships in the automotive industry in China. In particular the economic implications of the rise of China lie at the heart of this research. As outlined in Danny Quah’s blog (Quah 2011b) North

¹ For the sake of completeness, it is stated that in this study the terms “China”, “Mainland China” and “PRC” are all used interchangeably to refer to the People’s Republic of China. As the focus of this study is the automotive industry, “China” excludes for our purpose the right-hand driving markets of Hong Kong and Macao which are, of course, part of the People’s Republic of China as Special Autonomous Regions (SAR). In addition, The Republic of China, also known as Taiwan, and viewed by the People’s Republic of China as its 23rd province, is treated as a separate economy and not included in this analysis. The Republic of China, also known as Taiwan, and viewed by the People’s Republic of China as its 23rd province, is treated as a separate economy and not included in this analysis.
America and Western Europe produced more than two thirds of global income until the 1980s. The continuing rise of East Asia, and, in particular, India and, more importantly in the context of this study, China has led to a shift in what he calls a gravitational shift. His analysis shows that the global economy’s “centre of gravity” (Quah 2011a) defined as a visualization of a cylindrical projection of global economic activity on a 2-dimensional world map began somewhere in the mid-Atlantic in 1980. Using data from 483 urban agglomerations and 210 rural proxies, Quah (Quah 2011a) used national GPD figures adjusted for purchasing power parity to calculate the shift of that centre which by 2008, because of the continuing rise of India, China and the rest of East Asia, has moved east-ward from the mid-Atlantic towards a point close to Izmir in Turkey. More interestingly, extrapolation of data leads Quah to predict that this move east will continue until 2050 when the world economic centre of gravity will approach a limit point around 92 degrees East and 30 degrees North, on the border between India and China, surrounded by cities such as Urumqi, China, Kolkata, India, Dacca and Chittagong, Bangladesh and Mandalay, Myanmar; much of this movement due to the extraordinary growth experienced by China (Quah 2011a).

Figure 1: visualization of the shifting world economic centre of gravity at three-year intervals between 1980 and 2008 in black and an extrapolation to 2050 in red (Quah 2011a, p.7)

One of the major characteristics of today’s global economy is the increasing interconnectedness, in particular in trade and foreign direct investment (FDI). National and local economies, and the firms and individuals embedded in them have
thereby come into ever-closer contact. One of the academic frameworks trying to answer questions about the dynamic economic geography of industries is the concept of global value chains (Gereffi, Humphrey, and Sturgeon 2005). Global value chain (GVC) theory identifies five ways that firms coordinate and govern the linkages between value chain activities: market linkages, governed by price; modular linkages, where complex information regarding the transaction is codified and often digitized before being passed to highly competent suppliers; relational linkages, where tacit information is exchanged between buyers and highly competent suppliers; captive linkages, where less competent suppliers are provided with detailed instructions and, last but not least, linkages within the same firm, governed by management hierarchy (Gereffi, Humphrey, and Sturgeon 2005; Sturgeon, Van, and Gereffi 2008).

These five linkage patterns can be associated with combinations of distinct variables: the complexity of information to be exchanged between value chain tasks; the codifiability of that information; and the capabilities resident in the supply base (Gereffi, Humphrey, and Sturgeon 2005).

For this research the shifts undergone within the auto industry in this context are of high relevance. In the automotive industry global integration has advanced in buyer-supplier relationships, in particular in the relationship between automakers and their largest suppliers (Sturgeon, Van, and Gereffi 2008). Production is increasingly organized along regional or national lines, with bulky, heavy, and model-specific parts production concentrated close to final assembly plants to assure timely delivery. Lighter, more generic parts can be produced at a distance to take advantage of scale economies, low labour costs or clusters of know-how (Sturgeon, Van, and Gereffi 2008). As a result value chains in the automotive industry, such as the value chain in the context of China, are embedded within global organizational structures and business relationships of the largest lead companies.

At the same time, countries are becoming more closely linked through trade flows between them; the global ratio of trade to GDP has developed from just below 25% in 1960 to more than 50% in 2007. Europe is the main trading region, however, close to
three-quarters of European trade is intra-regional and within the EU. Asia is the second most significant trade region with just under one-fifth of external trade going to each North America and Europe (Cavusgil, Knight, and Riesenberger 2012; Dicken 2011).

Secondly, the growth of foreign direct investment is a strong indicator of global interconnectedness. Global foreign direct investment flows rose moderately to $1.24 trillion in 2010, but were still 15 per cent below their pre-crisis average. This is in contrast to global industrial output and trade, which were back to pre-crisis levels. UNCTAD estimates that global FDI will recover to its pre-crisis level in 2011, increasing to USD 1.4–1.6 trillion, and approach its 2007 peak in 2013 (UNCTAD 2011).

As China has become not only one of the world’s fastest growth markets but also one of the world’s largest recipients of FDI, a closer look at FDI flows, both inwards and outwards, is warranted. Researchers have examined China not merely in terms of its position in global trade flows (Jacques 2009), its advantages as a manufacturing location with a pool of cheap labour and in terms, but also in terms of the volume and distribution of FDI in- and outflows (Buckley, Clegg, and Wang 2002; Lall and Albaladejo 2004).

1.2 Shifting directions of global FDI flows – the importance of China

For the first time, developing and transition economies together attracted more than half of global FDI flows. At the same time, outward FDI from those economies also reached record highs, with most of their investment directed towards other countries in the South. In contrast, FDI inflows to developed countries continued to decline (UNCTAD 2011).

An interesting observation with these dimensions of global economic growth is the fact that trade has grown faster than output, FDI has grown faster than trade and structural imbalances have emerged (Dicken 2011). Trends in the growth of FDI and
trade are interlinked, with transnational corporations (TNCs) serving as link between the two. In 2009, 82,000 TNCs controlled more than 800,000 foreign affiliates generating value-added of approximately USD16 trillion in 2010 and accounting for about a quarter of global GDP. Foreign sales, employment and assets of TNCs are continuously increasing with foreign affiliates of TNCs accounting for more than 10 per cent of global GDP and one-third of world exports in 2010. Much of world export of goods and services is between TNCs and their foreign affiliates and, therefore, intra-firm. By some estimates approximately one-third of global trade is intra-firm (Gereffi and Korzeniewicz 1994; O'Neill 2011).

In addition, State-owned TNCs have emerged as an increasingly important source of FDI. There are at least 650 State-owned TNCs, with 8,500 foreign affiliates across the globe. While they represent less than 1 per cent of TNCs, their outward investment accounted for 11 per cent of global FDI in 2010. The ownership and governance of State-owned TNCs have raised concerns in some host countries regarding, among others, the level playing field and national security, with regulatory implications for the international expansion of these companies.

1.2.1  FDI inflows into China

An important shift in FDI is taking place in China. Inflows into China climbed by 11 per cent to USD 106 billion in 2010, making China the largest recipient of FDI in the developing world and second globally only to the United States of America (see Figure 2).
FDI inflows are increasingly directed towards high-tech industries and services as offshoring of labour-intensive manufacturing to China has considerably slowed down due to rising wages, salaries and production costs.

When measuring FDI’s relative importance to a country’s GDP as an indicator of global integration, we find that developed countries as a group receive a smaller share of global FDI flows than their share of in global GDP. At the same time their ranking has fallen in the after-crisis period as compared to the pre-crisis period of 2005-2007, suggesting a continuous negative trend. In stark contrast, major emerging regions, such as East and South-East Asia and Latin America experienced strong growth in FDI inflows with China leading the pack.

As a result, the flows of trade and FDI have created significant structural imbalances in the world economy with some countries at huge current account and trade surpluses whilst others have large deficits.
Some changes took place in 2005 (or the 2003-2005 average) of rankings by the United Nations Conference on Trade and Development (UNCTAD) Inward FDI Performance Index reflecting uneven developments with respect to FDI inflows. Despite a slowdown in the growth of inflows in 2005 East Asia nevertheless remained the most important sub region for inward FDI due to a continued rise of FDI inflows into China and the Special Administrative Region (SAR) Hong Kong (UNCTAD 2006). The increase recorded for China (of 13% to reach USD 72 billion) included - for the first time - data on Chinese inward FDI inflows to financial industries. In terms of product diversity and market breadth, futurity and pro-activeness, resource commitment, and R&D intensity FDI inflows from developed economy investors show strong strategic traits and performance implications (Luo 1998a). Comparison of reports from several years, clearly show the significant importance for China, not only in Asia, but increasingly on the world stage (UNCTAD 2005, 2006).

1.2.2 China as a source of investment – the outflow perspective

More recently, even the outflow of FDI from China has been covered in papers, suggesting that China is being viewed as an ever stronger part of world business even in academic research. In their 2007 paper Buckley et al. analyse China from the perspective of becoming the eighth most important source of FDI amongst developing nations (Buckley 2007). More recent UNCTAD data show China rising to rank six amongst the top-20 home economies for global FDI outflows with the Special Administrative Region of Hong Kong counted separately (see Figure 3)
At more than USD 1.3 billion, global FDI outflows in 2010 are still more than 35 per cent below the 2007 peak. However, FDI flows from developing and transition economies picked up strongly, reflecting the strength of their economies, the dynamism of their TNCs and their growing aspiration to compete in new markets. Outward FDI from developing and transition economies reached $388 billion in 2010, a 21 per cent increase over 2009. Their share in global outflows of 29 per cent was up from 16 per cent in 2007, the year prior to the financial crisis.

Mainland China and its Special Administrative Region Hong Kong are the largest FDI sources of the developing economies group. Outflows increased by more than USD10 billion each, reaching historical highs of USD 68 billion and USD 76 billion, respectively. Chinese companies continued their buying spree, actively acquiring overseas assets in a wide range of industries and countries, and overtaking Japanese companies in total outward FDI. Witness the takeover of Volvo by Geely and the takeover of Putzmeister by SANY as examples.
In the 2005 UNCTAD report a survey of national investment promotion agencies finds that the rise in its foreign currency reserves accelerates the growth of outward FDI from China, helping reshape the pattern of outward FDI from Asia. The report predicts that China will become a top-four source country of FDI over the period 2005 – 2008 (UNCTAD 2005, 2006). In its 2010 world investment report UNCTAD reports that China’s outward investment in the non-financial sector continues to expand, driven amongst others by a continued search for the M&A opportunities created by global industrial restructuring (UNCTAD 2010).

Suggestions such as establishing an investment fund targeting high quality assets both at home and abroad (UNCTAD 2006) have been taken seriously and are being followed. Against this background, the strong growth in China’s overseas investment can be expected to continue in the coming years.

To win trust with potential takeover targets in this context, the Chinese government is embarking on a charm offensive (Kurlantzick 2007) as can be seen by the recent investment into a European Chinese Centre (ECC) in Slovakia. The ECC is intended to serve as a bridgehead for Chinese banks, insurance companies and corporations as well as a steppingstone for Chinese culture into Europe and is intended to show the nice and smiling face of Chinese investment into Europe as has been reported by the media (e.g. Thanei 2010). According to Rhodium Group, a New York based research group, China’s foreign direct investments into Europe are expected to increase to more than two trillion dollars from 2010 to 2020. If the trends seen over the past years continue, then Europe could see between USD 250 bio and USD 500 bio in new Chinese mergers, acquisition, and greenfield investment (Hanemann and Rosen 2012).

In a statement on existing regulations concerning the outward foreign direct investment (OFDI) approval process, the Ministry of Commerce of the People’s Republic of China (MOFCOM) stated that Chinese firms are guided via the approval process to invest in a feasible project in an economically and politically stable host...
country that has concluded a bilateral treaty with China on investment and taxation. (MOFCOM 2011) The investment should also carry benefits for the firm and for China’s economy by promoting China’s exports of goods and services, enhancing the firms’ technological capacity and R&D activities and enabling the firm to create and establish an international brand (Alon 2009).

The goals that China wishes to achieve by macro-managing the flow of outward FDI are, therefore, clearly outlined in MOFCOM’s policy interpretation. This macro-management of Chinese OFDI is likely to be facilitated by the so-called “Outbound Catalogue” issued jointly for the first time by MOFCOM and the People’s Republic of China National Development and Reform Commission (NDRC) in 2004 and updated twice since its introduction. This catalogue lists the governments’ preferred host countries and industries and tries to direct Chinese firms to invest in them by offering preferential access to finance, tax concessions and other incentives (Alon 2009). Other researchers have, however, found that that Chinese direct investment in Europe is driven by commercial motives and that direct political guidance currently plays only a minor role in Chinese investment in Europe (Hanemann and Rosen 2012). Further analysis on the development of China’s OFDI and how well it fits with China’s political objectives will surely be quite interesting.

In terms of today’s situation it is clear that China is not only a major FDI recipient, but is very likely to become an even more important source of FDI in the near future with a clearly outlined long-term strategic focus on where to direct that outward FDI, which industries to target and how to advance Chinese interests in industrial development.
The impressive development of China’s FDI inflows and outflows is depicted in Figure 4. In light of this development academic researchers are following politicians and managers in continuing to show increasing interest in the analysis of China in the context of global economic development, FDI in- and outflow development, the development of specific industries in China and socio-economic consequences of China’s rise (e.g. Anderson, Li, and Harrison 2003; Bjorkman and Kock 1995; Bjorkman and Lu 1999; Carlsson, Nordegren, and Sjoholm 2005; Christmann and Taylor 2001; Ebrahimi 2000; Graham and Lam 2003; Kumar and Worm 2003; Leung 1993; Lieberthal and Lieberthal 2003; Lin and Germain 1998; Lin and Miller 2003; Ming and Williamson 2003; Naumann 1993 ).

1.3 Business landscape in China

In 2001 Goldman Sachs came up with the label “BRICs” to coin a term for the future major players in the world economy. If we look at the situation today, China is by far the largest of the four in terms of share of world GDP, boasts the highest growth rates, accounts for more than half of the BRIC’s share of world production and world exports. Clearly, China’s re-emergence onto the world stage in terms of economic,
political and – increasingly so – military clout is indisputable and singular within the BRIC economies, it has most obviously moved ahead of the pack.

The strong international focus on the growth of the Chinese economy, resulting in considerable “China bashing” in the world press, is, therefore, understandable. In its July 30th – August 5th 2005 edition the influential British weekly magazine “The Economist” ran a headline reading “Great Wall Street: How China runs the world economy”. In its Nr 37 Edition of September 2006 the cover of the influential German weekly “Der Spiegel” read “Angriff aus Fern-Ost: Weltkrieg um Wohlstand” “Attack from the Far-East: World War on Wealth” and focused four of the thirteen pages of its analysis on China on the automotive industry. More recently, “The Economist” ran a 14-page special report on China’s economy in its May26th – June 1st, 2012 edition, suggesting the Chinese economy was much more stable than its critics would think.

According to the World Investment Report 2010, China comes out on top of the most attractive global business locations (UNCTAD 2010). According to Luo and Tung (Luo and Tung 2007) China has tremendously benefited from inward internationalization at home by cooperating with global players, MNCs and TNCs from the West in particular, who have transferred technological and organizational skills.

The process of China’s deepening integration with the world economy that was begun again in the modern era by the ‘Open Door’ policies put forward by Deng Xiaoping in 1978, strengthened by his visit to Southern China’s economic development zones with his famous visit to Shenzhen in 1992 and culminating in China’s accession to the World Trade Organization (WTO) has led to numerous studies focusing on China as a booming economy and the implications this has for managers, corporations, business strategy and the like (Luo 1995; Peng and Luo 2000). China’s accession into the WTO combined with sustained economic reform and restructuring efforts, has induced a gradual, yet irreversible, convergence towards internationally accepted norms and standards of economic interaction and increasingly market-conforming business strategies (Alon 2009).
With the opening up the country has been largely seen as a great opportunity for FDI (Luo 1998a, 1998b), particularly with respect to outsourcing and as a pool of cheap labor. Different modes of entry, legal forms of organizational development were at the time and are still available (Anderson and Gatignon 1986; Cui 1998; Gaba, Pan, and Ungson 2002; Luo 1998a, 1998b; Pan 2000). A detailed look at economic agents of the auto industry and their legal form can be found in chapter 3.4 of this study. The tremendous implications for the organizational governance that this has had have been studied by academic researchers (Alon 2003; Guillen 2003). More recently, China has come to be viewed as a huge potential market (Cui 1998; Luo 1995, 2003) in particular so in the automotive sector with estimates ranging from sales of compact cars per year of more than three million in China by 2015 (Gao 2004), to a passenger car market demand of almost 22 million units by 2020 (McKinsey&Company 2012), in any case making China the world’s largest market for passenger cars, compact or other.

In 2005, China’s foreign currency reserves increased by $209 billion to reach $819 billion, equivalent to 37% of the country’s GDP. Having exceeded those of Japan, they have become the world’s largest in 2006, topping USD 1 trillion in October that year.

At a financial forum on April 18, 2011 the Chairman of The People’s Bank of China (PBOC), China’s Central Bank, Zhou Xiaochuan, stated that China’s central government considers foreign currency reserves to be “substantially above any reasonable level”. The resulting liquidity in the markets constituted “a considerable problem for the PBOC”. He continued to say that it was never the State Council’s intention to have foreign exchange holdings of such a scale. The current holdings are the result of a number of complementary factors. In 1978 China’s foreign exchange holdings amounted to USD 1.67 billion. Between 1979 and 1989 they never exceeded USD 20 billion. Following continuous market reforms, the visit of Deng Xiaoping to Shenzhen in 1992 resulted in the government embracing a policy of promotion of exports and recruitment of foreign direct investment. Since then foreign exchange holdings continued to grow, surpassing USD 1 trillion in October 2006 and amounting
to USD 3,04 trillion in April 2011. According to Zhou Xiaochuan large holdings of foreign currency reserves are used to “prevent capital drain and ensure stable exchange rates” (Oliver 2011).

One year later, on April 14, 2012, the PBOC announced that it would widen the RMB’s trading band against the U.S. dollar in the foreign exchange spot market to 1 percent starting April 16, 2012, the first such measure since 2007 when the trading band was widened from from 0.3 percent to 0.5 percent. This is widely regarded as a sign that China continues to accelerate the market-oriented reform of the RMB exchange rate and preserve the stability of China’s economy. The PBOC says this is to meet market demands, promote price discovery, and improve a managed, floating exchange rate regime that is based on supply and demand and operates in reference to a basket of currencies.

Despite these changes and the strong efforts at currency diversification, a major share of China’s reserves is still in United States dollars. In view of the relatively low returns and high risks associated with these “China dollars”, the Chinese Government is considering alternative uses for them. In the 1980s, the rapid accumulation of foreign currency reserves in Japan led to a surge in Japanese outward FDI (UNCTAD 2006). A similar situation is now evolving in China. Indeed, the pressure from the large and ever-increasing amounts of “China dollars” have made the promotion of outward FDI an imperative for the Chinese Government, leading it to adopt a “going global” strategy and take concrete measures to promote the internationalization of Chinese companies.

1.4 China’s 12th 5-Year Plan and its implications

The People’s Republic of China’s latest, 12th five-year plan, which was adopted by the Fifth Plenum of the 17th CPC Central Committee and runs from 2011 to 2015, represents a shift away from focusing on economic basics and building infrastructure toward acquiring advanced expertise, with the explicit charge of strengthening the
country’s “own capacity for innovation.” In the context of this research this is highly relevant and warrants additional analysis.

The 12th five-year plan outlines six major themes: the adjustment of the GDP growth rate, the boosting of domestic consumption, the upgrade of industry and focus on innovation, energy saving and environmental protection, regional coordinated development and, last but not least, internationalization.

Figure 5: Visualization of major themes of the People's Republic of China's 12th 5-year plan

In terms of GDP growth, the shift in the most recent 5-year plan is clearly from mere growth of the economy to its development in terms of quality and sustainability. In terms of growth planning, this is indicated by a reduction of the growth target from 7.5% in the last 5-year plan to 7% in the current one and rephrasing from “moderately fast” to “stable” economic development. This shift is driven by the need to focus more

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2 The Delegation of the European Union in China has made a full English translation of China's 12th Five-Year Plan available for download (http://eeas.europa.eu/delegations/china/index_en.htm)
on sustainability, develop high value-added industries and eliminate outdated capacity.

The second, and strategically most important, pillar of the 12-5 strategy plan is the boosting of domestic demand and consumption by working to increase domestic household income. This element of the plan has been elevated to strategic focal point with the clearly stated goal to achieve a balance between exports and domestic consumption. One of the main themes of Hu Jintao, the current president and head of state of the People’s Republic of China, is social harmony and stability. Clearly, this new strategic focal point is put in place in order to maintain social stability and counter the trend of strong GPD per capita growth not reflected in any way in Chinese households’ disposable income growth. One likely implication for the auto industry is continued subsidizing of small-engine vehicle purchases in rural areas (Song and Vernooy 2010).

With regards to the 12-5 strive for industry upgrade and innovation, the most interesting element in the context of the automotive industry is the building up of “7 industries with strategic significance”. Amongst six others, electric vehicles are explicitly named in this section of the plan and have been singled out with the clearly stated goal of achieving global leadership.

Of the remaining major themes in the plan the last important one in the context of this research is energy saving and environmental protection. New targets to control energy consumption and emissions are set, additional emission indicators defined. China’s auto and automotive supply industry companies are particularly vulnerable to the new focus on green development as this element of the 12th five-year plan will most likely not only drive up costs related to environmental protection, energy conservation, reduced pollution and raw materials, but targets on energy efficiency and carbon dioxide–emission will lead to a revision of the model strategy of auto manufacturers focussing more on small, low-emission vehicles, possibly shaking up existing vehicle introduction schedules and plans.
In addition, the government is taking a direct approach to shaping the auto industry landscape. In a drive to create national champions, it has set clear guidelines encouraging accelerated industry consolidation. Domestic players, including the large auto conglomerates Shanghai Automotive Industry Corporation (SAIC) in Shanghai and First Automotive Works (FAW), now also known as First Automotive Group Corporation, in Changchun, can now count on the government’s support build credentials as national champions.

In short, the People’s Republic of China’s ambitious 12th five-year plan builds on decades of unprecedented economic growth with a clearly defined and outlined goal to transform the economy from an investment-led powerhouse focused exclusively on GDP growth to a sustainable model that balances growth with social harmony, and innovation with environmental protection. In the context of the auto industry in China the challenge is to recognize the risks and identify opportunities moving forward.

2 Preliminary research agenda

Against the background of the changing environment of the Chinese market environment and in light of the aggressive growth targets set out by the Chinese central government for the auto industry to build up competitive large automakers who should strive to acquire advanced technology and achieve a high level of quality in the localization of components through partnerships and joint ventures with global lead OEMs, and, thereby, develop independent manufacturing as well as sales, logistics and brand building capabilities, this research aims shed some light at the role that knowledge plays in the supplier-customer relationship in the auto industry in China. In this particular setting, this study will aim to take the position of Western multi-national lead companies in the auto supply industry and analyse the role of knowledge and its protection against the backdrop of the challenges faced by multinational auto supply industry companies in China. In particular, an analysis of how global lead suppliers interact with the local market environment and how they utilize growth opportunities, maintain their innovative edge and adapt their products to the Chinese market requirements while mitigating risks associated with supplier-
customer relationships and partnerships in China will form the research agenda of this study. This study will, therefore, take a look at the rise of the heavily regulated automotive industry in China.

In the context of this rise this study will pay particular attention to managerial challenges involving partnerships (Kotabe, Martin, and Domoto 2003), supplier-OEM relationships and IJVs in China (e.g. Alon 2003; Bruun and Bennett 2002; Child and Tse 2001; Child and Yan 1999; Hoon-Halbauer 1999), the drive towards innovation generation on a global basis (e.g. Roy and Sivakumar 2010, 2011) and the challenges that MNCs face with regards to coordinating their global supply chain (Autry et al. 2010; Bello, Lohtia, and Sangtani 2004; Parente, Baack, and Hahn 2011); managing adaptive product innovation in China (Koufteros, Edwin Cheng, and Lai 2007; Lau, Tang, and Yam 2010; Li and Atuahene-Gima 2001) and overcoming institutional constraints in emerging markets (Peng 2003).

In addition, recent academic research concerning topics surrounding the rise of the auto industry in China will guide this research. In particular, drivers and outcomes of supplier innovation (e.g. Hauser, Tellis, and Griffin 2006; Sood and Tellis 2009) and literature on non-cooperative incidents and the “dark sides of relationships” (Cavusgil, Deligonul, and Zhang 2004; Griffith, Zhang, and Cavusgil 2006) will help framing this study. In doing so, this research will be aiming to address the fact that limited empirical work on innovation activities in the supply chain context in emerging markets has been undertaken so far (Roy, Sivakumar, and Wilkinson 2004).

3 The Auto Industry

The global automobile industry was hit by the global economic crisis in 2008 with the greatest force, second only to financial services industries itself. Major players in the industry faced bankruptcy, General Motors (GM) had to be rescued by the United States government as part of an emergency loan of US$21 billion to prevent US car makers collapse, Germany introduced the “Abwrackprämie” – a car scrapping bonus scheme – to support small and mini car sales, governments injected massive financial assistance into the automobile industries in their respective countries and tried to ride out the crisis.
At the heart of the automobile industry is a set of complex relationships between the auto manufacturers, called OEMs (original equipment manufacturers) and their first-, second- and third-tier suppliers. OEMs have begun to pass on more and more responsibility to their suppliers who have increasingly become module and system suppliers accounting for between 50 and 70 per cent of the cost price of an average car, thereby altering the structure and systematic of the automotive supply chain.

Two elements within the set of relationships between suppliers and OEMs appear to be of particular interest in the context of this study. On the one hand, first-tier suppliers have moved into increasingly close cooperation and collaboration with automotive OEMs and on the other, the degree of first-tier suppliers’ involvement into the development and design of vehicles and their main components has increased dramatically. For this research the increasing responsibility of suppliers in the design and development of components that are essential to the functionality, quality and value of the vehicle (Azadegan and Dooley 2010; Liker et al. 1996) is of great importance. First-tier suppliers account for an increasing proportion not only of the cost price of, but, more importantly, the innovation built into a new vehicle model (Liker et al. 1996; Petersen, Handfield, and Ragatz 2003). In particular, the cooperation between first-tier suppliers and the lead firms amongst automotive OEMs in terms of pre-development projects, co-development and co-design have been identified as a source of innovation and new product development ideas in the literature (Parente, Baack, and Hahn 2011; Ragatz, Handfield, and Scannell 1997). In the context of China such co-development projects warrant additional scrutiny due to the peculiarities of the legal framework in which lead OEMs are allowed to operate in China, a topic analysed in detail in chapter 2.4. of this study.

From a geographic point of view, the world automotive industry is continuing to shift from a series of discrete national industries to a strongly integrated global industry (Dicken 2011). We will examine the growth of the Chinese auto industry which to great extent was fuelled by investment in anticipation of strong growth opportunities as one example of this process. In the auto industry global integration has been accompanied by strong regional patterns at the operational level (Dicken 2011).
particular political pressure on automakers to achieve certain levels of localization and build the vehicles where they are sold (witness localization regulations in China and Brazil for example) has strongly encouraged the dispersion of final assembly, which now takes place in many more places than it ever did. A mere seven countries accounted for about eighty per cent of total world auto production in 1975. In 2005 eleven countries accounted for the same share (Sturgeon, Van, and Gereffi 2008).

In his best-selling international business book, Peter Dicken, (Dicken 2011) identifies a geographically differentiated macro-structural framework within which the production, distribution and consumption of commodities, goods and services occur through complex webs of production circuits and networks. Following his definition, global production networks (GPN) are a circuit of interconnected functions, operations and transactions through which commodities, products, goods and services are produced, distributed and consumed. This basic structure depends on inputs in terms of technology, energy and services and logistical, financial and regulatory systems.

What is of interest in the context of this research is the fact that individual production circuits are identified to be entangled in networks of inter- and intra-firm relationships. In the context of the auto industry in China, these networks encompass globally active players on the supplier and OEM side, as well as Chinese manufacturers and suppliers. Following Dicken (Dicken 2011) it can be argued that the web of connections in the auto and auto supply industry in China is made up of complex structures with horizontal, vertical and diagonal links that form multidimensional, multi-layered matrixes of economic activity.

The GPNs in the context of the supplier-OEM relationship in China are not merely mechanisms for the production and distribution of components, modules and vehicle systems. They are simultaneously economic agents with considerable political importance, as regularly demonstrated by governments throughout the world. Drawing on Dicken the automotive GPNs exist within a transnational space that is ‘constituted and structured by transnational elites, institutions, ideologies’ (Dicken
2011). The GPN research framework can help understand increasing collaboration between suppliers and OEMs not only in the Chinese market environment, but on a global scale.

In this context, the automotive industry is special in so far as it is neither fully global, but consists of a set of specialized clusters, neither is it tied to nation states such as China. Global integration has proceeded at the level of design and vehicle development as firms have sought to leverage engineering effort across products sold in multiple end markets. Large first-tier suppliers have taken on a larger role in design as will be described in more detail in chapter 3.2. In order to facilitate their new, enhanced roles in the process of designing a vehicle, suppliers have established their own design centres close to those of their lead customers to facilitate collaboration, co-design and co-development (Sturgeon, Van, and Gereffi 2008).

In terms of production, political pressure has driven automakers to set up final assembly plants in a variety of established market areas and, more recently, in large emerging market countries, such as China. Parts production tends to follow, indeed most lead auto manufacturers require their suppliers to follow into new markets as a precondition to be considered for receiving a request for quotation (RFQ) on a new part, and then feeds final assembly plants producing in different regional markets (Sturgeon, Van, and Gereffi 2008; Zhao, An, and Mitchell 2005). As large OEMs tend to manufacture their vehicles in multiple regions, OEM–supplier relationships typically span multiple production regions and extend into emerging market economies, in particular into China where all global lead OEMs have set up shop through equity joint ventures (EJVs) with local Chinese partners.

Within regions a gradual investment shift toward locations with lower operating costs – such as Mexico in North America or Slovakia in Europe, for example – is taking place, leading in particular to automotive parts which are more heavily traded between regions than finished vehicles to be manufactured wherever most profitable. Within national economies, automotive production and employment are typically clustered in one or a few industrial regions (Sturgeon, Van, and Gereffi 2008). Because of deep
investments in capital equipment and skills, regional automotive clusters have been found by researchers to be very long-lived (e.g. Sturgeon, Van, and Gereffi 2008). In chapter 3.3 we will be taking a look at the specifics of China in this context.

In addition to this complex economic geography of the automotive industry, that has led to strong global integration between OEMs and first-tier suppliers, recent technology changes in the automotive industry present considerable challenges to procurement and purchasing departments across the automotive and auto supply industry, and executives must consider taking urgent steps to prepare their supply chains for the new realities in the industry.

Many of the materials needed for new technologies such as hybrid drives are scarce, subject to price volatility or sourced from politically unstable regions. The availability of these resources is becoming one of the major risks to progress and both OEMs and suppliers must ensure that their corporate purchasing departments are adequately prepared for these challenges.

Next to the complex economic geography of the automotive industry and the ensuing geographical multiplication undertaken by lead OEMs in this field (Sturgeon, Van, and Gereffi 2008) increasingly tough global competition creates a strong need for swift strategic response on behalf of lead OEMs in the auto industry. Rapid response to the market and coordinated planning to remain successful and profitable in the different vehicle market segments require ever stronger functional integration of the roles of operations, logistics, marketing, research and development, and finance and accounting in order to continuously improve the process of creating customer value and profitability (Anderson 2000). Functional integration, exemplified by cross-functional teams, is at the forefront of improving coordination between previously somewhat independent departments (Anderson 2000).

For this study, the implications that the geographical multiplication undertaken by lead OEMs, such as Volkswagen (VW), have for the management and dissemination
of knowledge that enables product innovation, are of great interest, in particular when looking at lead OEM’s foray into China. Furthermore, functional integration is understood to be necessary to manage and coordinate knowledge and innovation during such a process of geographical proliferation (Anderson 2000; Gereffi, Humphrey, and Sturgeon 2005; Sturgeon, Van, and Gereffi 2008).

As this research deals specifically with the automotive and automotive supply industries in China, a closer look at recent developments and technological shifts, consumer demands and their effects on innovation, as well as the use of modular systems to manage quality and innovation standards across geographically dispersed manufacturing locations, in particular modularity in vehicles, warrant additional analysis. In addition, the development of the auto industry in China and the growing importance of China, both as a producer nation and a market need to be looked at in more detail.

3.1 Recent developments and technological shift

The automotive industry is in the midst of a new revolution. Having gone through two previous revolutions with the invention of the assembly line by Henry Ford between 1908 and 1915 and the invention of the lean production and manufacturing system by Toyota as Toyota Production System (TPS) in 1980, the auto industry is now in the midst of a third revolution that is completely changing and defining anew the inner life of cars.

3.1.1 Consumers demand more than just ‘cars’

Driven mainly by the buyers of small and mid-size cars who demand increasingly ‘more’ passenger car for the same or even lower prices, the automotive industry is pushed into a race to innovate (Baldwin and Clark 1997; Tsai 2009). Auto companies can no longer afford to just look at the vehicle itself to attract new buyers. Technology applications to reach out to younger buyers, such as the integration of Apps into vehicles or the utilization of motion-sensing technology in vehicles are en vogue.
Some researchers have found that the consumer push to innovate may lead firms to form buyer-supplier networks to execute strategies of rapid innovation as they attempt to move away from a low cost focus and provide more value-added to their customers (Campbell 1997). The emergence of this new generation of consumers who are often referred to as digital natives and who have had lifelong use of communications and media technologies such as the World Wide Web, instant messaging, text messaging, MP3 players, mobile phones and YouTube, is fuelling these new trends and will make media integration into vehicles commonplace. Mobile computing technology is being leveraged to make car service more consumer-friendly. The resulting strong increase of use of electronics in vehicles has also attracted researchers’ attention (Dat Tien et al. 2009; Kassakian and Perreault 2001).

While technologies are being developed to improve service and enable personalization and individualization of vehicles for ever more individually-minded buyers, the same new generation of customers are fuelling yet another key trend: environmental friendliness, exemplified by the increasing demand for bio-based, sustainable materials and, in particular in urban environments, a growing interest in car sharing models.

Consumers, and governments for that matter, are increasingly aware of environmental issues related to the auto industry, greenhouse gas emissions, the CO2-footprint of auto manufacturers and their products. This has led to an emerging industry trend toward deployment of bio-based materials in vehicles, in particular the adoption of bio-based plastics and foams into a variety of applications in modules and components. Bio-based materials are industrial products made from renewable agricultural and forestry feed stocks, which can include wood, grasses, and crops, as well as wastes and residues and may replace fabrics, adhesives, reinforcement fibres, polymers, and other materials.

The drivers of this consumer-pull trend are the emerging middle classes in China. This newly emerging middle class has been found to be changing the global balance of power, enabling China to account for growing export demands and play a major
role as a regional powerhouse and strong actor in trade, intellectual property rights, and as targets for investment and borrowing (James Scott 2010).

The middle class in China tend to have a strong interest in Western products, a high level of brand awareness and who tend to be first buyers of passenger cars, often the first in their families. The Economist Intelligence Unit, a British research company, predicts the number of middle-class households in China, defined as households with annual income exceeding USD 10000, to grow to just under 100 mio by 2015 from 52 mio in 2010 (EIU 2012). These middle-class first-time buyers not only demand a lot for low prices, but inform themselves thoroughly about car brands, vehicle reliability and features and tend to be very brand aware, even before making their first purchase (Hoffe, Lane, and Nam 2003).

3.1.2 Modularity in cars

At the same time, continuing price erosion forces the industry to reduce costs dramatically. The shift resulting from these pressures is leading to new strategies, in particular the adoption of modularity into not only the production processes, but increasingly into the design of the vehicles – witness the Volkswagen Group’s Baukasten-System as an example (Neubauer and Rudow 2012).

OEMs, such as General Motors, Ford or Volkswagen are increasingly deploying modularity as a strategy for organizing their vehicles and the complex processes of developing, designing and manufacturing them efficiently. In a modularity system, such as the VW Baukasten System, the vehicle is composed of units and modules that are designed independently but still function as an integrated whole (Neubauer and Rudow 2012). OEMs’ lead designers achieve modularity of their vehicles by partitioning information into precisely defined, unambiguous and complete design rules and design parameters. Research has found modularization to be a key competitive strategy in attaining high levels of flexibility and product variety, allowing OEMs to cater to customers’ different tastes while reducing cost by allowing the reuse of existing components (Kotabe, Parente, and Murray 2007).
The Bayrische Motoren Werke’s (BMW) “GS” system, short for group standard, to which all first-tier suppliers and any design studio working with BMW have to sign up to, is a good example of such a system of rules and parameters, in which the partition is clearly and precisely defined, unambiguous and complete, and, therefore, beneficial (Baldwin and Clark 1997). In order for modularity to succeed when designing a passenger car vehicle that needs to fulfill a series of legal and homologation standards, most notably the ECE (put forward by the World Forum for Harmonization of Vehicle Regulations as a working party of the United Nations Economic Commission for Europe), SAE (Society of Automobile Engineers) and CCC (China Compulsory Certificate) standards for Europe and most of the world, the USA and China respectively, visible design rules that affect subsequent design decisions must be established early in a design process and communicated broadly to the first-tier suppliers involved. Following Baldwin (Baldwin and Clark 1997) design rules can be classified into three categories:

- Architectures that specify what modules will be part of the system and what their functions will be.
- Interfaces that describe in detail how modules will interact, fit together, connect, and communicate.
- Standards for testing conformity to the design rules and for measuring modules’ performance relative to other modules in the vehicle.

In the context of the automotive industry it is important to differentiate between

- Materials
- Constructional elements,
- Components,
- Modules
- Systems
In line with industry practice a constructional element is understood to be an un-mounted individual component part. A component consists of two or more constructional elements and is itself part of a module or a system. A module is defined to be a de-limitable, ready-to-install unit in terms of the vehicle assembly process. A module typically ends at or within the outer boundaries of the vehicle, a good example being a front-end-module that includes amongst others the bumper, radiator, headlamps and fog lamps, represents the “face” of a vehicle and is mounted to the vehicle in one piece (see Figure 6).

Figure 6: Front-end module visualization, Mini ©HBPO GmbH

A system is understood to be the integration of two or more elements, components and modules into a functional unit, the elements of which need not necessarily be physically connected. A system can also extend beyond the vehicle itself, such as telematics and online services that are fully integrated with a vehicle’s navigation and Bluetooth telephone system or the vehicle lighting system that distributes light outside the vehicle boundaries.
As modularity has become a well-established way of doing business in the auto and auto supply industries, competition among first-tier suppliers is becoming fierce. Automotive OEMs will search for both, the best performing and lowest cost modules, driving first-tier suppliers into a race for innovation in search for the best features and lowest cost (Aggeri 2009; Baldwin and Clark 1997).

This strong drive towards modularization of vehicles leads to OEMs, no longer fully controlling the final vehicle. First-tier suppliers of key modules gain leverage and take on responsibility for design rules (Baldwin and Clark 1997). New, much closer forms of cooperation between OEMs and their system and component suppliers have evolved and continue to gain in importance. One core result of this shift is the continued migration of value created by the industry away from the OEMs towards suppliers. Recent research suggests that while in the 1990s OEMs accounted for approximately 40% of the value of the vehicles, OEMs currently account for a mere 25% - 30% of the value of vertical production integration. In addition, modularity transforms relations among companies, as module designers rapidly move in and out of joint ventures, technology alliances, subcontracts, employment agreements, and financial arrangements as they compete (Baldwin and Clark 1997).

This trend leaves OEMs no longer fully in control of the final product. First-tier suppliers, in particular suppliers of key modules, gain leverage and take on responsibility (Baldwin and Clark 1997). To balance this trend OEMs traditionally maintain a strong focus on the segments that they consider core to the vehicle, namely the car body and the drive train (Neubauer and Rudow 2012). However, consistent improvements in vehicle safety technology, such as ABS and ESP systems, airbag systems that most recently include airbags for pedestrian protection, and the increasing inclusion of comfort in vehicles, such as automatic climate control systems, surround sound systems and navigation systems with integrated traffic jam warning have led to suppliers being nominated for the development and production of complete passenger compartment modules, chassis frame modules and underbody modules. These have, therefore, become the main driver of growth for suppliers and the core element of the value shift from OEMs to their suppliers (Takeishi 2002;
Wagner and Hoegl 2006). In this context a classification and definition of suppliers is warranted.

3.2 Classification of automotive suppliers

In terms of hierarchy suppliers are generally divided into three tiers.

Tier-1 or first-tier suppliers supply ready-to-install parts, components or modules directly to the auto manufacturers (OEMs). Most importantly, they are responsible not only for the development and design of their products, components and modules, but also for advanced technology development and preliminary development in their field of expertise which they do both, in cooperation with their lead customers and by themselves.

Tier-2 or second-tier suppliers manufacture parts and components that are subsequently further processed by tier-1 suppliers.

Tier-3 or third-tier suppliers are generally understood to be suppliers of raw materials or of services such as surface treatment, powder coating, lacquering, etc. Typically, tier-2 and tier-3 suppliers are summarized as so-called sub-suppliers reflecting the fact that they deliver their products to a supplier higher up in the supplier hierarchy.

Suppliers can also be classified according to the degree of vertical integration of their products: material, constructional element, component, module and system. Chapter 2.1.2. has given some insight into the modularity of vehicles and its implications as well as the definition of materials, constructional elements, components, modules and systems along industry practice.

The classification of suppliers according to the degree of vertical integration of their products, following that definition, is not, however, directly proportional to the classification as tier-x. While a material supplier most likely will be a tier-3 supplier, it might as well be that the material is technologically advanced and complex and the
supplier is in a tier-1 supplier relationship with the OEM, e.g. suppliers of lightweight, sound absorptive, recyclable textiles for thermo-acoustic engine encapsulations which are delivered direct and not via another supplier.

This shift of responsibilities and the ensuing creation of several hierarchy tier-x-levels of suppliers who develop, design and manufacture parts, components and modules for the OEMs is very much in line with the development of global value chains found in the academic literature. It has been found in the literature that a single firm may consist of only one link in the value-added chain process which is described as the process of combining technology with material and labour inputs, and then assembling, marketing and distributing (Gereffi, Humphrey, and Sturgeon 2005; Kogut 1989).

Auto suppliers are in this sense caught in the midst of the rising integration of world markets through trade that has brought with it the outsourcing of an increasing share of non-core manufacturing and service activities both in a national and global context and has led to components and other intermediate goods making up a large proportion of international trade (Gereffi, Humphrey, and Sturgeon 2005).

### 3.3 The Chinese Auto Industry Market environment

According to the latest reports from the Chinese Association of Automobile Manufacturers, the USDOC Office of Automotive and the SMMT (Society of Motor Manufacturers & Traders) China has in 2006 overtaken Germany to become the third-largest and in 2009 overtaken Japan to become the second largest manufacturer of automobiles (O'Neill 2011).

In 2010, of 77.6 mio vehicles produced worldwide, China accounted for manufacturing of 18.3 mio, by far the largest manufacturer of vehicles, followed by Japan with 9.6 mio, the USA with 7.8 mio, Germany with 5.9 mio and South Korea with 4.3 mio.
In terms of passenger vehicle production, China has overtaken the United States of America, Germany and Japan to become global number one.

In 2001 car sales in China climbed by 5.2 percent, the slowest pace since the nation's car culture took off at the turn of the century, as consumers shunned local brands after Beijing scrapped tax incentives for small cars. A total of 14.5 million sedans, sport utility vehicles and multi-purpose vehicles were shipped to dealers last year, the China Association of Automobile Manufacturers (CAAM) said (CAAM 2011).
In addition, the Chinese government has nominated the automotive industry as a “key industry” for development as highlighted in detail in chapter 1.4 on China’s 12th 5-year plan and its implications. Even though September 2011 showed a market drop of 7% (single month compared with last year), the general trend remains very bullish. The prognosis for 2011 is for 14 mio passenger cars to be sold in China. This is despite the fact that China is actively trying to cool passenger car sales by establishing ever stricter policies for the registration of vehicles.

Shanghai has established a bidding process for license plates, a policy that is in the process of being copied in Beijing. In Beijing, meanwhile, regulations mandate car-free days for vehicle owners: every week the days of the week are published on which owners of vehicles are not allowed to drive, e.g. no driving on Tuesdays for any vehicle with a license plate number ending in “5”. Beijing has also frozen the total number of license plates issued per year and set a quota for government fleet vehicles.

Figure 9: limitation on passenger vehicles - government policy overview for Beijing, Shanghai and Guangzhou (2011)

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<td>License Plate Limit</td>
<td>240 K per year</td>
<td>License Plate bidding</td>
<td>No Limit</td>
</tr>
<tr>
<td>Control Over Government Fleet</td>
<td>Government Fleet Quota Frozen</td>
<td>No Limit</td>
<td>Government Fleet Quota Frozen until 2015</td>
</tr>
<tr>
<td>Traffic Congestion Fee</td>
<td>Under Discussion</td>
<td>Under Discussion</td>
<td></td>
</tr>
<tr>
<td>Satellite Town Development</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Public Transportation Development</td>
<td>561 km Metro System by 2015</td>
<td>600 km Metro System by 2015</td>
<td>470 km Metro System by 2015</td>
</tr>
<tr>
<td></td>
<td>(300 km in 2010)</td>
<td>(420 km in 2010)</td>
<td>(236 km in 2010)</td>
</tr>
</tbody>
</table>

Recently, further cities in China with inhabitant numbers of more than 2 mio have announced to be contemplating following in the footsteps of Beijing, Shanghai and Guangzhou in an attempt to limit the number of new vehicle registrations. Nevertheless, the upward trend continues with China forecast to overtake the US in
terms of car park by 2018 or 2019, a dramatic increase from today with China accounting for a mere third of the US vehicle parc.

Figure 10: Total vehicle parc: China - US 2010 comparison and forecast

In their latest analysis of the Chinese auto market McKinsey, a consulting company, projects that passenger car market demand could reach 21.7 million units in 2020, up from 12.8 million in 2011. Despite the market’s already large size, passenger car sales are expected to continue climbing due to the country’s low car penetration levels. China’s number of cars on the road per 1,000 people was 24 in 2009. For comparison, Brazil had 119 and Russia 231, while at the other end of the spectrum, Italy had 560 and the US 435 (McKinsey&Company 2012).

For Volkswagen, the world’s largest passenger car manufacturer, for example, China is the single most important market, larger and more profitable than the home market of Germany. In 2012 Volkswagen will be the number 1 car company in China, selling approximately 2 mio vehicles which resembles a market share of 17%. By 2015 production capacity of the Volkswagen group in China will have reached 3 mio vehicles.
The outlook for 2017 is to double to more than 28 mio passenger car sales in China. Taking into account that in saturated European economies there is a ratio of between 500 and 800 cars per 1000 inhabitants, whereas two of the most highly developed regions in China, namely Beijing and Shanghai, have a ratio of 184 per 1000 and a mere 63 per 1000 respectively, the projected growth will serve to narrow that gap.

A look back shows that in 2006 CAAM data showed that China had grown to become one of the top-3 car manufacturers and was on due course to overtake Germany and become world number two passenger car manufacturer by 2009 (CAAM 2006). It was also assumed that China would be closing the gap towards Japan and the United States as number one and number two vehicle manufacturers respectively, possibly becoming the world’s number one manufacturer by 2020 (CAAM 2006). Five years on and China has become the number one already with more than 18,3 mio vehicles built in China of a global total of 77,6 mio (CAAM 2011).
An even more dramatic development can be seen in sales of passenger cars in China. In this important segment, China has overtaken Italy, Germany and Japan in the course of only two years, almost trebling sales from just above 2 million vehicles per year to more than 5 million vehicles in 2006. As of 2011 China will have become the world’s leading nation in terms of vehicle sales with more than 14 mio passenger cars projected to be sold by the end of 2011 (CAAM 2011; McKinsey&Company 2012).

**Figure 12: Vehicle Sales Development by Nation (2006)**

![Vehicle Sales Chart]

**Figure 13: Passenger Car Sales Development by Nation (2006)**

![Passenger Car Sales Chart]

Analysing the compound average growth rate (CAGR) of the global car market, it can be found that Asia, though making up the majority of global production, shows the highest CAGR only after Eastern Europe, a relatively small production market with
strong growth. The strongest growth in Asia is experienced by China, with 12% on a high base, making China the main growth region in the automotive market both in Asia and worldwide.

**Figure 14: Global Car Market Development Forecast (2007)**

Interestingly, China has had a high number of entrants into the automotive industry and continues to have a large number of small car manufacturers. Though large in size, this development can be considered comparable to the development of the auto industry in its early beginning in Europe and the United States. China is currently the auto market with the highest number of producers. Judging from experience in the European, US-American and Japanese auto markets, the maturing of the auto industry and necessary economies of scale, will lead to a reduction of car manufacturers over time in the form of consolidation, mergers and takeovers. Also, the Chinese government has clearly outlined industry consolidation as a target included in the 12th 5-year plan’s major theme industry upgrade and innovation as outlined in chapter 1.4.
Yet another specialty of the Chinese Auto Market is that large international OEMs often have multiple JVs with competing Chinese partners, e.g. the Joint Ventures of the Volkswagen Group with both First Automotive Works (FAW) and Shanghai Automotive Industry Corporation (SAIC). The same applies the other way around with Chinese OEMs partnering with competing international OEMs, e.g. the SAIC Joint Ventures with Volkswagen, General Motors, Daewoo, etc. This is due to the legal requirements that will be further outlined in chapter 3.4.1.

Not only the sheer number of OEMs in China and their inter- and cross-relationships can be identified as a specialty of the auto market in China, also the geographical spread warrants some discussion. Whereas in Europe, and even more so in the United States of America and Japan certain clusters have developed that host a high number of automotive OEMs and their long-standing first-tier suppliers, who in turn attract a host of second-tier suppliers to the clusters, China’s automotive OEMs are widely spread geographically.
This geographic spread, reminiscent of the European automotive market in the early 1900s, has lead analysts of the market to predict an integration process in the Chinese auto industry that is widely believed to centre around three or four auto groups. However, following the 12-5 strategic initiative of trying to foster growth not only in the densely populated coastal areas and urban centres, but also in the countryside, some automotive OEMs have begun spreading out even further; witness for example the set-up of a subsidiary of FAW-VW (the joint venture between First Automotive Works and Volkswagen based in Changchun) in Chengdu, the capital of Sichuan Province in the heart of China.

Not only have Chinese automotive OEMs entered into multiple partnerships with foreign OEMs, but the same Chinese OEMs have also partnered with multiple international reputable first-tier automotive supply industry companies. Of the top-25 international automotive suppliers only 3 do not have subsidiaries or JVs in China, while the majority has more than one JV in China. Therefore, consolidation is
expected to continue. A possible development of the Chinese OEM is depicted below. It suggests that a minimum of three strong groups, centring around Dongfeng, SAIC and FAW will develop out of the existing network of OEMs, with the two groups’ around BAIC and Changan future development uncertain and some automotive OEMs’ future cooperation plans as of yet unclear.

**Figure 17: OEM relationships China - possible future groupings (2010, source: Rieter Automotive)**

Recently, Chinese OEMs have strengthened their efforts to develop and brand their own vehicles in addition to the ones they produce in their international joint ventures with global lead OEMs. Next to strong government pressure and a clearly defined strategy guideline in this direction in the 12th 5-year plan (see chapter 1.4), a possible explanation of this trend could be that the market attractiveness of China most obviously has positively influenced the propensity of globally established OEM brands to be launched into China, a factor researchers have found to be importance (Yeniyurt, Townsend, and Talay 2007). Following successes in the introduction of “new” brands (globally established, but new to China) Chinese OEMs who have developed experience in brand-launching have begun to be interested in launching their own brands and building them. This is in line with research findings that suggest
companies are more likely to introduce additional brands when they already have an established presence (Yeniyurt, Townsend, and Talay 2007).

Witness the landmark US$1.8 billion acquisition of Volvo by Geely in 2010 as culmination of a process begun in 2007 with the purchase of the production license for the Rover 75 by SAIC, which has been released to the Chinese market as Roewe 750 in February 2007, priced slightly below a comparable VW Passat model and has undergone two facelifts since. Further mega-deals have yet to materialize, with Chinese companies perhaps being wary of repeating the experience of past automotive industry transactions, where value was destroyed rather than created.

SAIC started central government-supported negotiations with Nanjing Automotive Group - the buyer of the MG and Rover brands – to extend the cooperation between the two groups in 2007. SAIC kept the Roewe brand – which in Mandarin Chinese is hardly distinguishable from the Mandarin Chinese name for Rover – and Nanjing Auto will keep its MG and Rover brands. The cooperation, however, has resulted in the SAIC Group obtaining access to a world-renown automotive brand (AutoSohu 2007).

A fairly new development is the forced introduction of new brands for the Chinese market by the large IJV manufacturers. GM announced the creation of its new Baojun brand, aimed at entry-level car buyers, in the summer 2010 and introduced the brand at the Shanghai Auto Show in November 2010. The first car for the China-only Baojun car brand, the Baojun 630, a mid-sized sedan, was developed in China by GM’s Chinese partnership, SAIC-GM-Wuling and introduced at the Shanghai Auto Show in 2011. Baojun, which means "treasured horse," is GM’s first car brand specifically for China, which has become the automaker’s largest car market and has issued regulation requiring all MNC OEMs to introduce China-only brands.

The Volkswagen CEO Martin Winterkorn announced in the 11/2011 issue of “Auto Motor und Sport”, a German periodical on the automotive industry that VW China
was planning the introduction of a new brand for China. The brand „KaiLi“ will be used for electric vehicles manufactured by the Volkswagen's joint venture with First Automotive Works of China, FAW-VW. The KaiLi brand was awarded a production licence by the respective Chinese authorities in May 2011. The first KaiLi model will be the KaiLi FV7002 also known E88 and is planned for market introduction early 2014.

Figure 18: Car brands on sale in China (2011)

Following these government directives global OEMs’ joint ventures in China have taken to establish brands in addition to the global brands under which vehicles are manufactured and sold in China. Most notable are the following:
Following the above analysis, it is clear that China’s overall growth and in particular the rapid development of its automotive and automotive supply industries allow for fruitful research in the field of these industries. The following chapters try to narrow down the object of analysis set in the context of China.

3.4 Legal framework for the Auto Industry in China today

For Western companies working in China the legal framework provides a major challenge, in particular so in the automotive and automotive supply industries. Even after the opening of China to foreign investment and China’s accession to the WTO in 2001, the auto industry remains regulated to the extent that all foreign-invested automotive OEMs in China are forced by law to be operated as equity joint ventures (EJV) with maximum equity participation by the foreign joint venture (JV) partner limited to 50%. In terms of the legal and institutional framework under which automotive manufacturers can operation, the Chinese automotive industry can be considered to be one of the most heavily regulated in the world.

In addition to equity joint venture requirements, there are limitations not only on the maximum equity participation allowed to a foreign-based investor in this business segment, but also on the number of JVs that the foreign multinational can enter into.
In line with the importance of the auto industry for the economic development planned for China by the central government authorities, imported vehicles are heavily taxed and localization requirements put forth for locally manufactured vehicles, non-compliance with which results in taxation resembling that for imported vehicles.

Last, but not least, the protection of intellectual property in China continues to be a major challenge for intellectual property rights (IPR) owners in the context of the automotive and auto supply industry. Though laws and regulations tend to be up-to-date and in line with international standards, enforcement of those laws is not. A closer look at the legal framework for the auto industry in China, in particular JV requirements and limitations, tax legislation for passenger cars and other vehicles, and intellectual property (IP) laws and their enforcement is, therefore, necessary.

3.4.1 50:50 and 2+2 regulations

China’s comparative advantage as a manufacturing location has received considerable attention in academic literature (Rowen 2003). With the opening of China to incoming FDI, beginning in 1978 as outlined in chapter 1.2.1, the investment into the automotive industry and auto supply industry has been amongst the strongest and one of the major growth drivers in China over the past decades (Chen and Chen 1998; Li 2004; Luo 1998b). The process of China’s deepening integration with the global economy that began with the Open Door policies of the late 1970s strongly accelerated with the Peoples’ Republic of China’s accession to the World Trade Organization in 2001. Several studies examine this process both in terms of its position in global trade flows (Lall and Albadejo 2004) and in terms of the volume of the FDI flowing into China, its distribution and the impacts of that FDI (Buckley 2004; Buckley, Clegg, and Wang 2002).

Chapter 2.1 of this study provides in-depth insight into the different forms of FDI in China and the two most important forms of FDI in the context of the auto industry. In addition to the outlined forms of FDI recent changes to the law have made other
ventures also possible, such as limited-liability companies which can raise capital by issuing shares or holding companies which are vertically integrated companies established by firms that already have some presence in China. Moreover, licensing agreements are a legal option and have been chosen by numerous automotive supply industry companies when they first entered the Chinese market. The key feature of a joint venture contract, which will be analysed in more detail in chapter 2.5.2. of this study, as opposed to a licensing agreement, is that the JV-contract does not specify in detail what exact technological expertise each partner will contribute to the venture. Normally, each partner agrees to contribute what is necessary to achieve the agreed objective, e.g. build passenger cars or design, develop and manufacture front-end modules for passenger car manufacturers. In the framework of a JV neither partner commits itself to supplying all it knows. However, the IJV contract does frequently restrict the technology supplied as explicitly and rigidly as a license agreement would (Child and Yan 1999; Hoon-Halbauer 1999; Luo 1995; Newburry, Zeira, and Yeheskel 2003; Walsh, Wang, and Xin 1999) The transfer of specified technologies into the automotive IJV in China is mostly separately regulated in technology-transfer agreements which regulate royalty payments by the IJV to the investing MNC for the transfer of explicitly defined technologies (Posth 2006). When looking at the legal framework for the auto industry in China, license agreements, therefore, are of limited significance (Bosworth and Yang 2000).

Automotive manufacturers are required to operate in the form of an EJV by law (1979; 1986a; 1986b; 2001). Even though the automotive industry is not mentioned in the Catalogue of Restricted Foreign Investment Industries or the Catalogue of Prohibited Foreign Investment Industries, which would entail dramatic limits to the investment or participation by foreign companies, there is a chapter in the Catalogue of Encouraged Foreign Investment Industries that explicitly restricts the proportion of foreign investment in manufacturing of automobiles and motorcycles to 50%, thereby forcing MNC to enter EJVs with a maximum proportion of shares of fifty percent when operating in China (2005). There is also a downward limit, stipulating that “the proportion of the investment contributed by the foreign joint venture(s) shall generally not be less than 25% of the registered capital of a joint venture” (2001), so any
investment by a global automotive OEM will be in the form of an equity joint venture with the foreign company holding equity shares of 25% - 50%.

Yet another distinctive feature of China’s regulation of foreign investment into the auto industry is the so-called 2+2 regulation. It stipulates that any global OEM be limited to maximum 2 Joint Venture investments in passenger car manufacturing and maximum 2 Joint Venture investments in heavy duty truck manufacturing (1986a; 2001; 2005).

If we take a look at the Volkswagen group, for example, the limits on 2+2 have already been reached by the investments in FAW-VW with First Automotive Works in Changchun and S-VW with Shanghai Automotive Industry Corporation in Shanghai for passenger cars with 2 JVs invested by Volkswagen in this field. The investment into S-VW is split amongst the equity holders as follows: Volkswagen AG 40%, VW (China) Invest 10% and SAIC 50%, putting the Volkswagen-total at 50%. For FAW-VW the split is Volkswagen AG 20%, VW (China) Invest 10%, Audi AG 10% and FAW 60%, putting the Volkswagen-total at 40% (VWGC 2012). In both cases the investment of the foreign multi-national is within the maximum fifty per cent stipulated by law (1979; 1986a; 2005).

Covering the North of China and the greater Shanghai region with those two JVs, but not Southern or Central China, Volkswagen decided to move into Chengdu, the capital of Sichuan province. Setting up a Volkswagen-owned factory is legally prohibited (50:50 regulation) as is entering into a joint venture with a local partner (2+2 regulation). The expansion into Central China had to be done via a subsidiary of either FAW-VW or S-VW with FAW-VW being chosen for the investment.

The FAW-Volkswagen Chengdu Factory is operational at 350,000 vehicles per year with production of A-grade vehicles, such as the Golf, the new Jetta and Sagitar, A0-grade vehicles and expansion plans into grade-B vehicles, four-wheel drives and hybrid electric cars. In light of the economic growth of Central China, FAW-VW now
contemplates establishing an Audi branch in Chengdu in the future in stark contrast to the original strategic positioning of the Chengdu base as a manufacturing hub for economical vehicles (VWGC 2012).

General Motors who had sold 1% of its joint venture with Shanghai Auto Industry Corporation, S-GM, to its JV-partner SAIC in 2009 before going through a restructuring in U.S. bankruptcy court following the global economic crisis, thereby giving SAIC a controlling 51% stake and the right to record the venture's revenues on its own books has announced that it expects to restore GM's 50% stake in in the near term and recover equal ownership which is the maximum allowed under the law. SAIC will continue to report the joint venture's sales on its own books under the 50-50 structure (Priddle 2012).

In light of the fact that the opening up of the Chinese market as a result of WTO membership in 2001 has led all internationally active car manufacturers to establish a presence in China with joint venture partners, there is increasingly fierce competition with pressure on the entire sector stepping up. Successful manufacturers with strong brand recognition, such as VW as explained above, are very strongly limited by the 2+2 50:50 regime.

Automotive suppliers are somewhat better off. With the introduction of the wholly foreign-owned enterprise (WFOE) as a mode of investment into China in 1990 (1986b), foreign investors were generally allowed to assume full equity ownership of their businesses. The legal form of WFOE will be closely examined in chapter 2.5.3.

Whereas auto manufacturers continued to be limited in their investments by the laws, rules and regulations explained above, it has been made possible for foreign auto suppliers who had invested into EJVs to buy out their Chinese partners and convert their EJVs into WFOEs or set up WFOEs anew. Many automotive supply industry companies have taken the opportunity, analysed their EJVs and converted them into WFOEs wherever the Chinese partner was found to be of limited benefit to the venture (Chadee and Feng 2003). Some decided to establish WFOEs for design centres that would sell design and development work to their JVs, others would
expand by setting up wholly-owned firms in addition to their existing JVs and newcomers could chose freely from the mode of investment that they prefer (Chadee and Feng 2003).

3.4.2 Tax legislation

A well-known problem in China is that some companies are protected from foreign takeover by their governments as “national champions” (Buckley and Casson 1996; Fagre and Wells 1982). This is taken to an extreme in the automotive industry with the legal requirements for automotive OEMs outlined in chapter 2.4.1.

Interestingly, China uses not only the Catalogue of Encouraged Foreign Investment Industries to limit the equity shareholdings of global OEMs, but supports local development by tax legislation that defines the value and percentage of “local content” that an automotive OEM in China must achieve in order to qualify for preferential tax treatment. This regulation requires local content of forty percent in Chinese-assembled or Chinese-manufactured vehicles. It has led to the MNCs in IJV automotive OEMs with Chinese partners to request their trusted suppliers to enter China and localize parts, components and modules that are built into the vehicles they assemble, so as to qualify for preferential tax treatment. Many OEMs try to avoid localization of core technologies, such as engine and transmission technology that they control themselves (e.g. Hoon-Halbauer 1999; Posth 2006) and put strong efforts into localizing the rest.

Because of this legislation, practices commonly used in the auto industry world-wide and also frequently employed during the beginning stages of automotive production in China, known as CKD and SKD, completely-knocked-down and semi-knocked-down respectively, have been dramatically reduced due to this regulation, making locally assembled CKD-vehicles or SKD-vehicles with a local content of less than forty percent almost as expensive to Chinese consumers as imported ones.
3.4.3 IP laws

Managers in the auto industry have come to the realisation that the knowledge brought into joint venture partnerships in China is at stake and might be taken up by opportunistic partners (Child and Tse 2001; Child and Yan 1999; Wang and Nicholas 2005). Western companies who have entered partnerships in China are increasingly facing problems with regard to the management, protection and retention of their knowledge. As the euphoria of entering China has subsided a more realistic view is now spreading, exemplified by Volkswagen who find that their innovations have rapidly spread to competitor products (e.g. Posth 2006; Roberts et al. 2005).

In the context of the legal framework in China it is safe to say that the legal situation is very strict (1982; 1984). Laws on knowledge protection, patents and their protection, IP and its infringement are in place and are generally found to be well-written (EUCCC 2007). With its accession to the WTO in 2001, China’s IPR system was brought into line with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). On June 9, 2007, the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT) came into force in China. It is, therefore, safe to say that China has the right laws and regulations in place. It seems to be application of those laws and enforcement that allow for further improvement (e.g. AmCham 2011).

China’s laws provide two routes to enforce intellectual property rights (IPR). Foreign companies can either initiate legal proceedings in the People’s Court or request administrative action through a government body—the Intellectual Property, Offices for patents; the State Administration of Industry and Commerce (confusingly also abbreviated SAIC) for trademarks; or the National Copyright Administration for copyrights.

In the context of this research it is important to note that the actual practice of IP protection differs greatly from the sound legal basis and can be considered proof to the fact that Chinese Central Government understands the value of knowledge and
intellectual property, but that local governments continue to some extent to protect and defend breaches of IPR, patent infringement and theft of know-how in the interest of economic development and employment in their provincial sphere of influence.

3.5 Economic agents in the auto industry in China

Since her gradual opening process beginning in the late 1970s, China has long served as the workbench of the world. It is quite natural, then, that companies of all kinds of different configurations are active in the Chinese market environment. When looking at the auto industry, we find that out of the top-15 car manufacturers in China 12 are International Equity Joint Ventures between a globally active MNC lead OEM and a Chinese partner, while the remaining three are Chinese manufacturers in alliances with MNCs. In the automotive supply industry, the 20 largest first-tier suppliers in China are all subsidiaries of MNCs in China or IJVs between MNCs and Chinese partners. Therefore, MNCs whether operating in China through wholly-owned subsidiaries or through joint ventures with local partners, are an interesting unit of analysis in the context of the auto industry in China.

Generally, foreign companies are obliged to use one of five channels for undertaking FDI into China (see chapter 1.2.1) which have been created by the Chinese government with the goal of embedding strong encouragement regarding the transfer of technology and manufacturing know-how into China into the legal framework of operations (Chadee and Feng 2003). This is in line with the principal belief that the primary advantage that a firm brings to foreign markets through FDI is its possession of superior knowledge (Kogut and Zander 1993).

The five legal channels for undertaking equity investments into China are: Equity Joint Ventures (EJVs), Cooperative Joint Ventures (CJV), Wholly Foreign-Owned Enterprises (WFOEs), Joint Development Ventures (JDVs) and Other ventures (1979; 1986a; 2001).
A short description of these options for undertaking FDI into China and an analysis of benefits and downsides to each one is needed.

The flow of information and learning in CJVs has been analysed in the academic literature (Wang and Nicholas 2005). However, as CJVs, which used to be the single most important mode of investment in the early stages of the opening of the Chinese economy, but began to decline after government provided EJV and WFOE investment options to foreign investors, are of no relevance in the context of the automotive and automotive supply industries in China, CJVs are not important economic agents in the context of this study.

The same applies to JDVs which are cooperative agreements between foreign and Chinese partners mainly for development projects such as mineral or petroleum exploration (Chadee and Feng 2003) and are of no relevance in the auto industry in China.

Licensing agreements have been chosen by numerous automotive supply industry companies when they first entered the Chinese market in the early 1980s. Commonly, it is assumed that licensing as an entry option helps avoid the set-up costs and risks associated with the foundation of an IJV (Anderson and Gatignon 1986; Davidson and McFetridge 1985), an option chosen by many first-tier suppliers when they were first asked by Volkswagen to support the set-up in China in the early 1980s (Posth 2006). While licensing agreements continue to be a legal option for doing business in the auto industry in China, they are of no relevance today (Posth 2006). Currently, it is mostly technology-transfer agreements which regulate royalty payments by the IJV to the investing MNC for the transfer of explicitly defined technologies into the automotive IJV in China by the investing MNC (Posth 2006). They are, therefore, part of the set of contract governing the relationship between the MNC and local partners within the IJV. Licensing agreements per se are, therefore, not to be considered units of analysis in the context of this study.
In the context of this research the two most important forms of investment are an equity joint venture between a MNC and a Chinese partner, i.e an IJV, and a WFOE, with the foreign investor being a lead global first-tier supplier. The economic agents in the automotive and auto supply industry in China in the context of this research will, therefore, either be Chinese companies of different legal forms, state-owned enterprises, private firms, limited companies or public companies, and multi-national enterprises entering China either through an equity joint venture with a Chinese partner or by setting up a WFOE.

MNCs are not only key agents and key players in the automotive industry on a global scale, but also in the Chinese market environment in specific. For this study, it is, therefore, important to talk about the particular Western headquarters decision making in the context of entry into the Chinese automobile market and the strategic growth and expansion planning going forward. Consequently, the following economic agents need to be analysed in more detail:

- MNCs
- EJVs
- WFOEs

3.5.1 Multinational corporations as key players in the auto industry in China

Multinational corporations (MNCs), defined as a group of geographically dispersed and goal-disparate organizations that include its headquarters and different national subsidiaries (Ghoshal and Bartlett 1990), have witnessed considerable academic interest since the early 1970s (Kogut 1989) and have been studied by many researchers, because the MNC is frequently seen by researchers as a superior creator of new advantages through global exploration (Zander and Sölvell, 2002). Authors have also defined MNCs as physically dispersed groups of organizations in environmental settings that represent very different economic, social and cultural milieus (Hofstede 1980).
Drawing on the literature describing MNCs as social communities that specialize in the creation and internal transfer of knowledge (Kogut and Zander 1993), chapter 6.5.1.1 will analyse the flows of knowledge in MNCs in the context of this research setting. The view developed by Kogut and Zander in their 1993 paper is that firms can be understood as social communities which serve as efficient mechanisms for knowledge creation and which transform their knowledge into products and services for which they will be economically rewarded (Kogut and Zander 1993). In the context of this study this view can serve as the foundation of our analysis of MNCs’ interaction with the local environment, in particular how multinational first-tier automotive suppliers’ Chinese subsidiaries – be they wholly foreign-owned or joint ventures with local partners – utilize the knowledge of the MNC, create local knowledge for adaptation and transform this into products that will be commercially successful with their OEM customer base in China.

In this context this study will draw on literature that has found multinational corporations to be internally differentiated in complex ways to respond to organizational and environmental differences in different businesses, functions and geographic locations (Ghoshal and Bartlett 1990), in particular in China with its institutional peculiarities (see chapter 6.3) and special legal framework for auto industry companies (see chapter 3.4.1).

The set-up of (often multiple) subsidiaries in China to participate in the opportunities arising in the Chinese auto market environment, leads to MNC suppliers’ dispersal and a high level of differentiation which in turn forces MNCs to set up effective internal linkages and coordination mechanisms that represent many different kinds of dependencies and interdependencies in their exchange relationships and respond to those in their inter-unit exchanges (Ghoshal and Bartlett 1990; Ghoshal and Nohria 1989). Also, the expansion into China has been found by researchers to mark a turning point in large OEMs’ core strategy, such as putting an end to General Motor’s bi-centrism with polarization around two major regional operations, namely North America and Europe, (Bélis-Bergouignan, Bordenave, and Lung 2000, p. 46), or pushing Volkswagen from acting within the framework of a world-wide configuration
and multi-nationalizing in a very traditional manner towards configurations of a
global nature and the abandonment of the traditional centre-periphery approach of
concentrating all core competences at headquarters towards the integration of
activities on a regional base (Bélis-Bergouignan, Bordenave, and Lung 2000, p.50).

The shift in the academic interest in the late 1980s that changed the focus of research
away from previously assessed headquarters-subsidiaries relationships in MNCs and
specific decisions of a company on investments in foreign locations, to the analysis of
the managing of a network of established foreign subsidiaries and the competitive
advantages that arise from the potential scope of economies of such a network
(Ghoshal and Bartlett 1990), which is particularly interesting in the context of this
study. How MNC suppliers manage their network of subsidiaries in China that are
often in partnerships with different Chinese local companies and serve automotive
OEMs in China with different state-owned enterprise affiliations (see chapter 3.3)
appears to be an interesting element in this research setting. Do MNCs manage to use
multiple mechanisms of knowledge transfer flexibly and simultaneously to move,
integrate, and develop technical knowledge between their Chinese subsidiaries and
back into the corporation as the results of some academic researcher would suggest
(Almeida, Song, and Grant 2002)? Previous research has shown that such knowledge
transfer mechanisms lead to the superiority of MNCs (Almeida, Song, and Grant
2002).

When looking at the auto industry in China, MNCs cannot be looked at as a unitary
organization, but have to be more appropriately conceptualized as an inter-
organizational grouping (Ghoshal and Bartlett 1990), often with multiple partnerships
involved. MNCs as units of analysis in this study need to be looked at in terms of
economic and organizational theory, as well as from the politics perspective when
accounting for the legal specialities in China. Researchers have divided the study of
multinational corporations between economic, organizational theory, history and
politics perspectives (Kogut and Zander 1993).
In light of increasing globalization of the world economy, effective entry and expansion of multinational corporations in the global market have been of considerable interest to researchers (Anderson and Gatignon 1986; Barkema 1998; Cui 1998; Johanson and Vahlne 2009; Tse, Pan, and Au 1997). Also, the mode of entry of MNCs into China and their formation of alliances in the context of the Chinese market environment has received coverage in the literature (Tse, Pan, and Au 1997). In the context of this research assessing an MNC’s market commitment, expansion plans and strategy and, most importantly, the importance attached to the Chinese subsidiary is of considerable interest. However, the focus for this research will be on product innovation and knowledge protection in the context of supplier-customer relationships rather than on MNC suppliers’ entry modes or their expansion.

The emphasis on the role of knowledge creation as a basis for competitive advantage found in both, economic and capability-based theories of the MNC (Ambos, Ambos, and Schlegelmilch 2006), provide justification for further research into knowledge, its protection, application and influence on product innovation in the context of this research. Drawing on literature surrounding knowledge creation, knowledge protection, learning, and product innovation in the MNC (Andersson and Forsgren 2000; Andersson, Forsgren, and Holm 2001, 2002; Bjorkman and Lu 1999; Contractor and Lorange 2002; Lau, Tang, and Yam 2010; Li and Atuahene-Gima 2001; Pei, Kamel, and Eric 2010; Petersen, Handfield, and Ragatz 2003, Buckley, 1999 #52) this study will analyse product innovation and knowledge protection in the relationship between first-tier suppliers and OEM customers in the auto industry in China. In particular, studies analyzing the knowledge flows within MNCs from the intra-organizational perspective (Andersson, Forsgren, and Holm 2001; Foss and Pedersen 2002; Lee et al. 2008) and, more importantly, from and to the MNC in inter-organizational contexts (Chi, Nystrom, and Kircher 2004; Luo 2003; Yamin and Otto 2004) will be drawn on for this research.

Adopting the evolutionary perspective in investigating MNCs’ entry into and expansion in China, Cui (Cui 1998) analyses four stages of development of MNCs in China: preparation, entry, expansion, and experience; and explores the evolving
nature of MNCs' objectives in each stage. For this study the strategic transitions with respect to mode and scale, operations management, marketing strategies, and human resources of MNCs in China (Cui 1998), will offer insight, as one of the modes of protecting ones proprietary knowledge in China has been found to be a strong focus on human resources and retention of qualified employees (Bjorkman and Lu 1999; Law, Tse, and Zhou 2003; Wong and Law 1999). Knowledge and intellectual property have been found to be at the core of the competence of firms (Carayannopoulos and Auster 2010; Chi, Nystrom, and Kircher 2004; Dunning 2002; Grant 1996b; Grant and Baden-Fuller 1995). It is, therefore, not surprising that MNC subsidiaries in China may routinely ask employees to sign nondisclosure contracts that have IP defence clauses clearly mentioned (Roy and Sivakumar 2011) or even establish such clauses as company guidelines and in company handbooks.

In the context of the auto industry in China yet another MNC specialty is that they are not only interesting units of analysis per se, but that MNC’s interconnections with local partners offer interesting perspectives for analysis. MNC OEMs often have multiple JVs with competing Chinese partners (see chapter 3.3) within the boundaries of the 2+2 and 50:50 regulatory framework (see chapter 3.4.1) - witness the joint ventures of the Volkswagen Group with both FAW, and SAIC as a prominent example. As outlined previously, the same applies the other way around with Chinese OEMs, often state-owned enterprises under local provincial or municipal government control, partnering up with competing international OEMs, for example the SAIC group’s joint ventures with Volkswagen, General Motors, Daewoo, etc. The following chart illustrates the cross-relationships between Chinese and International OEMs in the Chinese auto market.
Figure 20: Illustration of Joint Venture Cross-Relationships (2008)

Depicted above (Figure 20) are MNC global lead OEMs cross-relationships with local players as they enter into China through joint ventures with government-assigned local partners. MNCs also enter into China as major auto supply industry players who follow their global lead OEM customers into the Chinese market. In light of this fact – that global players dominate both, the first-tier supplier and OEM environment in China – this study will be drawing on the above mentioned literature strings to help understand a number of phenomena in the context of knowledge protection and product innovation in the auto industry in China.

As described already in chapters 1.3, 3.3 and 3.4, joint ventures, mostly in the form of equity joint ventures with at least one international partner are the strongest and most common players in this field. Let us take a closer look.
3.5.2 Equity Joint Ventures and International Joint Ventures and their relevance in the context of China

Equity Joint Ventures (EJVs) have become one of the most popular forms of investment in China since the opening of the Chinese economy in modern times in December 1978. By the end of 2000, EJVs accounted for more than 60 per cent of all foreign-invested enterprises that foreigners had signed, totalling more than two hundred thousand (Chadee and Feng 2003).

EJVs are governed by a body of laws, the most important of which is the Law of the People's Republic of China on Joint Ventures Using Chinese and Foreign Investment (1979; 2001). Numerous changes have been made to that law over the course of the years. However, the basics remain unchanged. The EJV takes the form of a limited liability company, has the status of a legal entity with equity investment being in the form of cash, equipment, land usage rights, the rights for the use of sites, factory buildings or industrial properties. Profits and losses are shared based on registered capital contributions (1979; 2001). As pointed out in chapter 3.4 the auto industry in China is governed by rules that stipulate that MNC OEMs enter into EJV partnerships with local companies, therefore the OEMs in this study will either be Chinese companies, such as Chery, Geely, FAW, etc. or EJVs between large global OEMs, such as GM, VW, Daimler, BMW, Ford, etc. and local partners, most notably SAIC, FAW, Changan and Dongfeng on who the Chinese government focused from the beginning of auto industry development and subsequently Beijing Automotive Industry Holding Co Ltd., better known as Beijing Automotive Group or Beijing Auto (BAIC), Guangzhou Automobile Industry Group Co Ltd., better known as Guangzhou Auto (GAIG), Chery, and Sinotruk for heavy-duty trucks. An overview of the passenger car industry multiple joint venture relationships between Western MNCs and Chinese companies, both state-owned enterprises and private firms is given in Figure 20.

The representative equity-based joint venture between two private firms, which today is the most commonly used form of joint venture in the automotive industry in China, is generally established to combine complementary resources. The resources comprise
firm-specific knowledge, with each firm sharing its knowledge with the other through the combination effected by the IJV (Buckley and Casson 1996). Normally, a firm does only share a subset of its knowledge through an IJV, with the geographic scope with which technology is exploited normally being wider than that of marketing expertise, which tends to be of a more localized nature (Buckley and Casson 1996), in this case limited to China.

The operationalization of IJV performance has been a controversial topic in the literature. Traditional indicators such as profitability may not always reflect truthfully the extent to which an IJV has achieved its objective, because it seldom reflects true financial returns to parent companies which are not made up of dividends only, but also include management fees, technology licensing fees, technology transfer payments, royalties, etc. In the case of joint ventures in China, and in particular in the automotive industry, the latter parts constitute a substantial portion of financial benefits to the MNC parents (Ding 1997; Posth 2006). This study will draw on literature on operational experiences in equity joint-venture settings in China (Vanhonacker and Pan 1995) and on operationalization of performance in IJVs in general and in the context of China in particular (Ding 1997; Geringer and Hebert 1989; Luo 2002; Zhang and Li 2001) for criteria to analyse the influence of product innovation on performance of first-tier auto suppliers in China from the perspective of Western MNCs.

As IJVs in the automotive industry in China most prominently take the form of the combination of technology provided by the MNC with marketing expertise and market access provided by the Chinese partner, and not so often the form of R&D collaboration or contribution of marketing expertise in two different localities, the focus is put on the first. In IJVs which combine new technology with marketing expertise there is an asymmetry between the globally oriented asset contributed by the high-technology firm, in our setting the global lead OEM or MNC supplier, and the locally oriented asset contributed by its partner (Buckley and Casson 1996). In terms of knowledge flows, this usually implies knowledge transfers from the high-technology partner whose headquarters are located in a more developed nation.
towards the host economy, China, as the less developed partner (Gupta and Govindarajan 2000).

Due to the special legal situation in China, the rationale for choosing an IJV that is common in the literature, namely that it allows both partner firms to acquire some of the benefits of internalizing knowledge flow without incurring the set-up costs of a merger (Buckley and Casson 1996), does not necessarily apply. Suppliers have gained the freedom to form WFOEs in China, so to enter into a joint venture they might be driven by the rationale identified in the literature. For OEMs this rationale is not applicable, as they are forced by the legal system to enter into IJVs with pre-selected partners under a regime of strong legal restrictions. Neither do the common assumptions apply that licensing could be chosen as an entry option to avoid the set-up costs of an IJV forfeiting the benefits of internalization (Bosworth and Yang 2000). The Chinese government very openly welcomes investment into IJVs in the automotive industry leaving no doubt about the government support to be expected by the IJVs as has been analysed by academic researchers (e.g. Luo 2001; Luo, Shenkar, and Nyaw 2001).

Drawing on literature looking at international joint ventures from a more global perspective, participation in an international joint venture can be seen as an important strategic option to reduce the potential threats posed by opportunism and small numbers (Beamish and Banks 1987) and may, therefore, be preferred over wholly owned subsidiaries. Using the transaction cost paradigm, Beamish and Banks conclude that those threats can be reduced to a point where JVs become a more efficient means of dealing with environmental uncertainty (Beamish and Banks 1987), a reason why some international players in the auto supply industry have continued to operate in China or invest into China through IJV constructs even after the loosening of legal restrictions (Johanson and Vahlne 2009; Pan 2002; Pei, Kamel, and Eric 2010) which resulted in opportunities for other legal forms of operations, most notably wholly foreign owned companies.
Research on IJVs has found that under the assumption that profit maximization will lie at the heart of firm’s objectives the choice of an IJV as the legal form will be driven by the structure of revenues and costs (Buckley and Casson 1996). In the context of the automotive industry in China, however, this assumption cannot hold true. It is not up to the firm to decide entry into the Chinese automotive market on the basis of profit-maximization objectives or as a choice driven by the structure of revenues and costs. Rather it is a legal obligation to establish an IJV with a local partner, which today still is the law (1979). Automotive Supply Industry companies have been given the option of buying out their Chinese partners and setting up wholly foreign-owned enterprises (WFOEs) (1979; 1986b). Those in China for longer than just the last few years, had to enter the market by setting up IJVs as well. Therefore, the choice of market entry in the form of IJV still being a pre-requisite for being allowed to build cars in China and having been the only option for entry even for supply industry companies just a few years back, the view on China can differ from what one would assume when analysing the literature that deals with IJVs in a global context.

This study will draw on research taking into account the peculiarities of China when looking at relationships within the IJVs and between the IJV and their investing mother companies, as well as management of those relationships (Hoon-Halbauer 1999), the difficulties of aligning targets for growth after entering the “forced marriage” (Walsh, Wang, and Xin 1999) and, amongst others, the evolution of IJVs in China to becoming more independent as the control design of the IJV moves forward over time (Zhang and Li 2001). However, the units of analysis of this research will be first-tier suppliers in their relationships with OEM customers and will be taking the Western MNCs’ perspective. Therefore, this research will draw literature analysing not solely the IJV as such, but more importantly its knowledge flows (Tsang 2002; Wang and Nicholas 2005; Zhao and Anand 2009), its embeddedness within the investing mother companies (Andersson, Forsgren, and Holm 2001) and the local institutional environment (Beamish and Banks 1987; Fang and Zou 2009; Luo 2002; Pan and Li 2000).
3.5.3 Wholly foreign-owned enterprise

The wholly foreign-owned enterprise (WFOE) was introduced as a mode of investment fairly late, regulated by the Law on Enterprise Operated Exclusively with Foreign Capital (1986b) which came into effect in December 1990. WFOEs allow foreign investors to assume full equity ownership of their business and have increased rapidly immediately following their introduction in China, accounting for more than 51 percent of FDI as early as 2000 (Chadee and Feng 2003).

With this law, it has also been made possible for foreign investors in EJVs to buy out their Chinese partners and convert their EJVs into WFOEs, an option most famously first chosen and allowed by Chinese Authorities by Philips, following the introduction of this regulation.

Many automotive supply industry companies have taken the opportunity to analyse their EJVs strategically and convert them into WFOEs wherever the Chinese partner was identified not be of positive contribution to the venture. At the same time wherever the Chinese partner was identified as being beneficial to the JV and, subsequently, to the foreign MNC investor, the EJV structure was maintained, sometimes without changes, sometimes with the MNC investor increasing his or her share in the venture (Guillen 2003).

In the context of this research it is important to note that this option is not available to automotive manufacturers who are still required to operate in the form of an EJV by law (1979; 1986a; 1986b; 2001). Though the automotive industry is not mentioned in the Catalogue of Prohibited Foreign Investment Industries or the Catalogue of Restricted Foreign Investment Industries, there is a chapter in the Catalogue of Encouraged Foreign Investment Industries that explicitly restricts the proportion of foreign investment in manufacturing of automobiles and motorcycles to 50% (see chapter 3.4 for more detail on the legal framework), thereby forcing MNC OEMs to enter EJVs when operating in China (2005).
One of the reasons for the Chinese government’s continued restrictions on automotive manufacturers might be the anticipation of significant changes to the industry and the institutional environment faced by domestic firms in the course of market liberalization and the entry of multinational firms. Research has shown that market liberalization tends to be disruptive to domestic firms, and negatively affect their performance and survival prospects at times when MNCs enter markets following liberalization and quickly gain the upper hand over domestic firms (e.g. Suarez and Oliva 2005). While recent research has found that backward domestic companies can successfully apply upgrading and catch-up strategies in response to market liberalization (Kumaraswamy et al. 2012), it is unlikely that China will liberalize the set of regulations governing the auto industry any time soon. If anything, the latest 5-year plan suggests a strengthening of the grip that the government will keep on this industry (see chapter 1.4).

3.5.4 Summary

In the context of this research setting the units of analysis will be first-tier suppliers who most commonly operate as WFOEs in China (Buckley, Clegg, and Wang 2002), but as explained before also maintain or establish IJV structures wherever seen to be beneficial in terms internalizing knowledge, providing local marketing expertise and market access, navigating rough institutional waters, etc. (Child and Yan 1999; Fang and Zou 2009; Zhang and Li 2001). When looking at supplier-customer relationships, the OEM customers will either be EJVs under the abovementioned limitations whenever a global lead OEM is involved or Chinese private firms, public firms or state-owned enterprises whenever the OEM customer is a local Chinese vehicle manufacturer.

For the purpose of this research, the wide variety of legal forms, first-tier supplier OEM-customer relationships and the resulting multitude of partnerships consequently need to be narrowed down. Only one type of partnership interaction will be analysed.
This research will focus on supplier-customer partnerships between first-tier automotive suppliers and automotive OEMs, regardless of the legal form of either of the two, thereby disregarding any intra-organizational flow of knowledge and, more importantly, the flow of knowledge between JV partners wherever the supplier or OEM take the legal form of EJV. Consequently, this research will not cover investigation of the partnership within the automotive OEM IJVs, i.e. the partnership between the high-technology partner – the foreign MNC – and the local partner. This choice accords with the theoretical literature on knowledge and technology spill-overs, which typically defines a spill-over as an inter-organizational knowledge flow (e.g. Álvarez and Molero 2005; Feldmann and Kelley 2006; Meyer 2004). It also accords with previous practice in the empirical literature (Frost 2001). The following figure illustrates the first-tier supplier – customer relationships that will be looked at.

Figure 21: Illustration of partnerships for analysis

The object of analysis in this study will always involve at least one MNC, be it as a wholly-owned first-tier supplier involved with an OEM, be it as a partner in an IJV first-tier supplier involved with an OEM or be it a MNC in an IJV with a Chinese partner as an OEM in a customer-supplier relationship and cooperative partnership with a first-tier supplier. Therefore, research analysis on the MNC as such as well as
its knowledge flows and its role as an innovating entity and a centre of excellence will
have to serve as theoretical foundation of this research project.

Due to automotive OEMs’ tendency to strongly integrate their key first-tier suppliers
into research, design and development and the launch of new, the relationship
between a first-tier supplier and an OEM must be understood as a partnership in co-
design and co-development which involves a great deal of explicit coordination and a
close dialogue between suppliers and their OEM customers with both parties
contributing key competencies to the relationship (e.g. Cattaneo, Gereffi, and Staritz
2010; Gereffi 2011; Sturgeon, Van, and Gereffi 2008). This research will, therefore,
draw on extant literature to analyse this complex set of partnership interactions (e.g.
Sturgeon, Van, and Gereffi 2008) and not reduce it to a mere supplier-customer
relationship.

4 Qualitative pre-study

Analysing the legal framework of the auto industry in China and the governments’
clarly stated goals of obtaining knowledge in that industry it becomes quite clear that
IP, IPR, knowledge and knowledge protection are important topics for managers. The
importance of these topics can be seen from numerous books (e.g. Clissold 2005), the
management literature, special brochures, such as the “Roadmap for Intellectual
Property Protection in China” series by the European Union’s IPR SME Helpdesk
supports that comprises five volumes on such sub-topics as trademark protection,
customs enforcement, etc.; by the existence of such organizations as the EU’s IPR
SME Helpdesk who support enterprises protecting and enforcing their knowledge and
property rights in China; training offers that are received by foreign managers in
China, and from the size of the respective working groups in the large international
chambers of commerce.

The largest working group within the European Union Chamber of Commerce in
China (EUCCC) is its Intellectual Property Rights working group. Within the
American Chamber of Commerce in China (AmCham China) the Intellectual Property
Rights Forum is the most active of all forums. Also, IP issues have consistently taken approximately 50% or more of the annual EUCCC Position Paper from 2005 – 2011 and 12 pages of the AmCham China’s 2011 annual White Book, both of which are presented to the Chinese Central Government on a yearly basis and serve as a guideline for international and bilateral trade negotiations between China and the EU and US respectively. In the 2011 AmCham China business climate survey conducted with a total of 331 companies 47% of respondents considered the protection of their intellectual property and knowledge “very important” when working in China. 19% went so far as to find it “critically important”. With 21% of respondents stating that the protection of intellectual property is “slightly important” (AmCham 2011) a mere eighth of respondents deemed this topic to be of limited or no importance to their doing business in China.

In order to explore and further solidify the assumption of this study that knowledge issues are a topic of great interest and concern in the context of the auto industry in China and to develop an understanding for the topics of greatest interest to major players in the automotive and auto supply industry environments in China a qualitative pre-study made up of semi-structured interviews with both Western and Chinese senior executives of Western, Chinese and IJV companies in the automotive industry in China was conducted. A key aspect of conducting the interviews was to get the managers’ insight into what lies at the heart of the auto industry in China at the moment.

A total of seven in-depth interviews were conducted from late 2006 to early 2007. Three respondents were Chinese nationals (43%), three were German nationals (43%) and one a US national (14%). On average they worked with their organization for just over seven (7.43) years and had held in their current positions in China for an average of 3.4 years. The non-Chinese respondents had lived in China for an average of 3.7 years at the time of the interview. All respondents had university education with one Bachelor and six Masters. In terms of hierarchy, one respondent was a divisional manager; one an HR country manager; two respondents held director-level, one respondent vice-president-level positions and two were managing directors.
The companies the respondents work for are multinational automotive first-tier supply industry companies with market-leading positions in their fields of expertise, an average annual turnover of EUR 11.12 bio and a median global workforce of more than 75,000 employees.

Table 1: Qualitative pre-study topic ranking and summary

<table>
<thead>
<tr>
<th>Description and company background</th>
<th>Interviewees</th>
<th>Ranking of the most frequently mentioned topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GermanCo1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GermanCo1 is a world-market leading tier-1 supplier in automotive lighting systems and a strong player in electronics</td>
<td>Interviewee1: German Interviewee2: German Interviewee3: German</td>
<td>(1) Transparency (2) Knowledge protection (3) Co-design</td>
</tr>
<tr>
<td><strong>GermanCo2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GermanCo2 is a tier-1 manufacturer and market leader in transmissions, steering systems and axles</td>
<td>Interviewee4: Chinese</td>
<td>(1) Transparency (2) Selection of partners (3) Trust</td>
</tr>
<tr>
<td><strong>USCo1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USCo1 is a leading tier 1 supplier of seating and electrical power management systems</td>
<td>Interviewee5: US Interviewee6: Chinese</td>
<td>(1) Transparency (2) Trust (3) Knowledge protection</td>
</tr>
<tr>
<td><strong>USCo2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USCo2 is a world-market leading tier-1 supplier with a diversified portfolio of automotive parts</td>
<td>Interviewee7: Chinese</td>
<td>(1) Transparency (2) Knowledge protection (3) Co-design</td>
</tr>
</tbody>
</table>

The interviews were conducted through the use of a semi-structured, open-ended, questionnaire opening with two critical incident question (“Describe the most significant challenges you face in Chinese activities” and “Which are the critical success factors for your operations in China”) and subsequently covering a wide range of issues relating to automotive supply companies’ business, operations, knowledge, technology and intellectual property in China. The defined goal of the qualitative pre-study was to confirm the importance and relevance of knowledge and knowledge protection in the context of product innovation in the auto industry in China and explore any important dimensions, antecedents or mediators in this context.
The interviews were tape-recorded, transcribed, converted into textual data and analysed making use of NVivo7 software, a computer assisted qualitative data analysis software that enables researchers to perform sophisticated archival views, grouping and sorting activities following Sinkovics and Penz (2009) approach for software-based analysis of multilingual interviews.

Several topics reappear. In all interviews the question of transparency (100% of respondents) and communication both within the Chinese OEM customers and from the customer to the supplier organizations is raised as an important obstacle to doing business professionally. Understanding the set-up and decision making processes of both Chinese and large MNC OEMs (which by definition are JVs, see legal framework chapter 3.4) is critically important to doing business successfully. Also, transparency in terms of the institutional framework, in particular in departments within state-owned enterprise joint venture partners in large global lead OEM auto joint ventures in China, as well as political interference by different government bodies, agencies and officials with limited transparency mentioned as important topics in this context.

Another recurring question is how best to define who a local JV partner will be and how to ensure that knowledge that is brought into a JV partnership will be sufficiently protected. In the context of this research setting, however, the flow of knowledge within an IJV will not be at the centre of interest. It is worth mentioning, therefore, that also without a JV-partner the protection of knowledge is being stated as critical for success in the Chinese market environment by six respondents (86%).

One respondent reports that in many instances, if a Chinese company copying technology offers its products to an automotive OEM customer, the Chinese company will have great difficulties ensuring necessary product quality and homologation when awarded a contract, sometimes leading the proprietary owner of the technology being awarded the contract even at higher prices after failure by the local competition. However, the respondent mentions that increasingly the quality of local competitor
products is deemed acceptable and manages to obtain release by automotive OEMs. The respondent particularly mentioned an RFQ (request for quotation) during which his company knew a local competitor who had obtained knowledge from his company was bidding for the same contract and decided to let him go ahead hoping to see him crash. In the end, the customer gave a release for series delivery.

In summary the subsequent questions and constructs need to be included in the framework that helps us understand shifts and developments of supplier – manufacturer interaction in the automotive industry in China following the qualitative pre-study result:

- Transparency and institutional environment (all respondents)

All interviewees face difficulties when working in China with regards to transparency. Interestingly, transparency is the main topic mentioned as a response when interviewees are prompted to describe the most significant challenges they face in the context of their operations in China, given by three respondents (43%). One respondent reports that transparency of his own company, at the customer and at government agencies pose equally perplexing challenges with unclear decision making authority and hidden networks that are impossible for foreigners to understand, but can also hardly be understood by Chinese managers:

„Erste Geschichte ist Transparenz: sowohl in der internen Organisation, als auch beim Kunden, als auch bei staatlichen Stellen, daß man häufig nicht versteht, wo eigentlich die Entscheidungswege herlaufen, wer mit wem irgendeine Verbindung hat, sprich Dinge, die man als Ausländer sehr schlecht durchschauen kann, die aber der Chinese auch nicht gut durchschauen kann, also es sind im Hintergrund sehr viele Netzwerke, die man vielleicht nicht von Anfang an versteht. …“ (Original: German)

„The first and foremost topic is transparency: in our internal organization as well as in the customer organization as well as with government bodies and authorities, most of the time one just can’t understand who has decision making authority, who is connected with whom, all topics a foreigner can impossibly understand, but Chinese can also not understand, there are in a nutshell numerous networks in the background that you just don’t understand, if you’re new to this market…”

Several different elements of transparency issues are being raised. First, transparency of responsibilities within OEM customers is mentioned as a major challenge for doing
business successfully in China. In particular, unclear decision making processes, Sino-
Foreign-Double Management for all important functions and a party liaison office with responsibilities and decision making authority that are unclear and not easily understood by outsiders, are mentioned as a challenge to be overcome by suppliers with Western background.

Secondly, transparency from the customer to the supplier organizations is raised as an important obstacle to doing business professionally. Understanding the set-up and decision making processes of both Chinese OEMs and IJV-OEMs is stated as critically important to doing business successfully.

Third, transparency with regards to the institutional environment is mentioned, in particular, the unclear influence that central, provincial, municipal and local government agencies yield, the decision processes for which vehicles to allow at auto assembly plants, for which partners to select for cooperation in auto assembly plants, etc.

For this study the responses suggest that institutional environment, open or covert government interference, decision making by different levels of government and possible legal hostility need to be considered as important moderators and should be included in research design.

• Knowledge protection (6 respondents)

Interviewees agree that the protection of intellectual property, knowledge, process know-how, and so forth is amongst the major topics when working in China and represents a stark contrast to the working environment in either a US-American or European automotive industry setting. Six out of seven interviewees (86%) mention this topic as a major obstacle to working in China.
One interviewee reported that OEM customers his company had worked with had knowingly and, most probably, intentionally passed on data and designs to third party local suppliers:

“…wir haben negative Erfahrungen gemacht. Unsere Produkte sind kopiert worden. Häufig auch mit Unterstützung unserer Kunden. Das heißt, unsere Kunden bauen bewußt lokalen Wettbewerb auf und geben unsere Daten illegaler Weise weiter an Dritte. Sehr schlechte Erfahrungen, ja. …“ (Original: German)

“… we have made quite some negative experiences. Our products have been copied. Quite frequently with support by our customers. What I’m saying is our customers intentionally help our local competition and illegally pass on our data to third parties. Yes, indeed, very bad experiences. …”

Also, the difficulties of China bridging the need to accumulate knowledge from foreign lead companies for a future home-grown auto industry with the need to protect proprietary knowledge in order to attract enough investment into research and development, as well as the need to protect the knowledge of Chinese inventors in the auto industry is acknowledged by several respondents with one interviewee saying that all foreign-invested companies are correct in paying ever closer attention to the protection of their proprietary knowledge:

„IP 从大类来说, 涉及到 3 个, 一个是商标, 一个是版权, 另一个是专利。所以我个人的看法，行业发展的最初来说，国内的企业有一个商标侵权的现象比较多。然后发展到后来，版权主要在娱乐领域或者文艺领域比较多，汽车行业则主要是外形和设计的侵权。现在来说，专利的侵权则上升为主要的问题，这是一个很复杂的问题，所以我觉得，专利是区性和时间性的，商标在参加了某一个组织之后，可以涵盖的国家和地区可能会很多，同时得到保护。所以在汽车行业，我个人感觉，外资公司越来越重视这一方面的问题。“ (Original: Mandarin Chinese)

“Ip if looked at from the bird’s eye view consists of three large elements: one is the brand, the second is copyright, the third is patents. So my personal view is that in China the protection of brands and the legal situation protecting the brand is rather strong. From the perspective of China’s recent development the advancement of copyright and enforcement of copyright have become better and better as well. The auto industry is all about exterior design anyways. Now, if you look at patents then this is the main question and, quite certainly, is a very, very complicated issue, so I feel the question of patents it is a question of place and time. As established brands enter the Chinese market, it is safe to assume that the protection of patents is a major issue. I personally feel, that MNCs will start paying more and more attention to this issue…”

In order to mitigate risks in this context, one respondent reported on an elaborate corporate system at group headquarters with a “technology and know-how
committee” that defines the strategy of which technologies to implement in which regions and subsidiaries, including China:

„….aber es gibt einen know-how Ausschuß. Und da wird schon genau geguckt, welche Technologie soll in welche Region transferiert werden. … (Original: German)

„….but we do have a know-how committee. And there they take a very close look at which technologies will be transferred into which regions…”

- Trust (5 respondents):

Interviewees who worked for German-headquartered MNC subsidiaries in China reported on a number of managers who had studied in Aachen as part of the first batch of exchange students sent to Germany for education following the 1979 decision by Deng Xiaoping to open China to the world also in terms of education. Some of these managers utilized the entry of German MNCs into China in the 80s and 90s to build networks of suppliers and service providers that they of their families owned or co-owned. One interviewee referred to that group of managers as the “Aachener Bande” (the ‘gang of Aachen’):

“…. Die ganze Aachener Bande agiert doch so. Bauen Netzwerke zur Selbstbereicherung auf. Da kannst Du ja gar kein Vertrauen mehr haben. … Mittlerweile hat sich das herumgesprochen, die finden bald keine Jobs mehr….“ (Original: German)

„…. the whole Gang of Aachen operates in such a manner. They’re building networks for personal gain and unjustified enrichment. How can you trust anybody in such a situation. … But in the meantime it has become known across the industry. Quite soon they won’t be finding jobs anymore…”

Another interviewee reported that trust is often a more effective basis for the decision making process than the contractual base on which the relationship is founded:

“…. They have a very strange understanding of contracts and contractual obligations. The weird thing is that the legal system seems to share their views! … I have learned that it’s quite important to build a relationship that is based on mutual trust. If you know a guy and he knows you, that’s worth more than any contract in this country. He’ll help you fix any problem, if he can. …“

- Selection of partners (5 respondents)

Another recurring topic is how best to select partners, both in terms of customers seen as partners by respondents as soon as co-development and co-design activities are begun and in terms of local JV partners. Respondents not the importance of
anticipating the benefits in terms of marketing expertise, market access and support with institutions that the selection of a particular partner will bring. Evaluating the downsides of a particular partner is also found to be critical, in particular limitations to growth that a specific partner will bring. One interviewee referred to the up- and downsides of partner choices as follows:

“… In order to gain access to BAIC we decided to bring our WFOE venture in Beijing into a joint venture with BAIC. … It is expected this will bring us greater access to the vehicles manufactured by the different BAIC-OEM-JVs as bringing in new business will be part of BAIC’s obligations in the JV contract. … Of course, establishing the JV means that we will have to move all FAW business from that factory, as FAW will definitely not accept purchasing parts from a BAIC supplier. They are competitors, of course. … This means that we now need to set up transfer plans, include those in our JV negotiations, discuss with the unions, quite a hassle. …”

Another recurring theme within the “partner selection” topic is how to ensure that there is a balance between the contributions of both partners in the supplier-customer relationship:

“… You really need to watch out who you do business with. … Some of them are bastards, I tell you. They’ll take all from you they can get and not pay you back accordingly, not awarding you full volumes, continuously arguing about agreed prices for ramp-up and the like. … You have to carefully choose who to work with. …”

- Co-design with OEM and involvement in design process
  (4 respondents)

The fourth of the recurring themes from the interviews is co-development and co-design with OEM customers and the suppliers’ involvement in the design process with the customer. Respondents report that as suppliers they are at the centre of a set of complex relationships their OEM customers who pass on more and more responsibility to them. Respondents report that they witness the need for ever closer cooperation and collaboration their customers and find that increasing involvement into the development and design of main components of the vehicles manufactured by their customers is necessary.

One interviewee stated:
“… Without co-development and co-design between suppliers and OEMs a modern vehicle is entirely unthinkable. … You don’t really believe that our customers could do all the d&d by themselves? They supervise us, steer us, give the guidelines, yes, and, of course, they scrutinize every element of our co-design activities, but go the way alone? No way. They’d have to find somebody else and would end up co-designing again. … Also, from our perspective, if we weren’t willing to enter into such close cooperation and collaboration with GM, we wouldn’t have come to China to support them in the first place…”

Another interviewee responded along the same line:

“… Alle wichtigen Komponenten machen wir in enger Zusammenarbeit mit unseren Kunden, da gibt es immer ganze Projektteams. … Die Technologie ist hier bei uns und wird oft 1:1 übernommen, aber Adaptionen, Anpassungen sind immer notwendig…Man muß ja auch sicherstellen, daß die Teile mit dem Fahrzeugsystem kommunizieren können. … Das geht heute gar nicht mehr anders.” (Original: German)

“… We important components are done in close cooperation with our customers, we always form joint project teams … The technology is provided by us and most of the time is transferred to China 1:1, but there’s always a need for adaptations and adjustments … You need to ensure that the components communicate with the vehicle system … Nowadays, it’s no longer possible in any other way…”

The necessity and benefits of co-design are generally shared. However, as suppliers find that they account for a growing share of the innovation built into a new vehicle model and are increasingly required to work with their customers in pre-development projects, the exchange of data between suppliers and customers and the framework for such close cooperation gain in importance. In particular, guidelines for giving out not full data, but “raw data” with which customers can perfectly work, but would have difficulty copying the full product or have some other supplier copy the product are mentioned by two interviewees as an important element of co-development activities:

“… es sind CAD Daten und da gibt man halt immer nur, wir nennen das Rohdaten, also so wenig detailliert wie möglich. …Die für den Kunden ausreichend sind, um mit uns zu arbeiten, aber die möglichst nicht ausreichend sind, um das Produkt wirklich zu kopieren. … da gibt Vorgaben … das ist dann … Thema der Produktlinie und des Projektmanagements.” (Original: German)

„… well, it’s mostly CAD data and you just give them what we call raw data, what I mean is you give them data without any great details … enough for the customer to work with us, but data that preferably is not detailed enough to copy the product … there are company guidelines regulating this … it is then … the responsibility of the product line and project management …”
"… In der Elektronik … geht es mehr um Softwarecodes, da geben wir natürlich keine Softwarecodes raus, sondern auch nur Informationen, mit denen eigentlich keiner was anfangen kann. …"

"... when looking at electronics ... it is more about software codes, we of course don’t share any software codes, but only information with which in effect are of no use to anybody..."

In this context the sensibilization of employees for how to share data and what to keep from the customer is mentioned by one interviewee as an important element in co-design activities:

„Ich glaube das Wichtigste ist wirklich, die Mitarbeiter zu sensibilisieren, welche Information darf der Kunde haben und welche darf er nicht haben. Und das ist das Wichtigste würde ich sagen.” (Original: German)

"I believe sensibilizing your employees is the most important, having them understand which information is ok to share with customers and which not. This, I believe, is the most important by far ..."

Other important elements mentioned by interviewees to mitigate risks associated with co-development activities are to have clear procedural guidelines in place and to ensure that confidentiality and non-disclosure agreements are signed and adhered. One interviewee reports not only on project-by-project confidentiality agreements with customers, but also on lists of products and technologies that are more heavily scrutinized for co-development than others:

„Wir haben bestimmte Kriterien … bei denen Referenzen im Allgemeinen eine Rolle spielen und wir machen Geheimhaltungsvereinbarungen .... Es gibt bestimmte Produkte, bei denen wir vorsichtiger sind und da kucken wir uns das dann genauer an ... “ (Original: German)

„We have certain criteria ... where references play an important role and, of course, we insist on confidentiality agreements... There are certain products where we are more cautious and where we take a closer look. “

It is interesting to note that three respondents think of “trust” (see above) as a particularly important pre-condition to establishing close connections with their customers in terms of co-development and co-design. From the statements made, it can also be concluded that managers are undergoing a shift in perception and are increasingly coming to realization that their knowledge might be taken up by
opportunists amongst their Chinese OEM customers and partners with strong direct or indirect support from Chinese authorities.

Alluding to the input from the qualitative research several topics that may have an influence on success in the Chinese market environment can be extracted and put into relation, most notably the protection of knowledge, product innovation, trust and the navigation of unclear institutional, political and legal environments. These topics are mentioned to have an impact on the performance of China-based MNC subsidiary first-tier suppliers in the context of their operation in the local market environment vis-à-vis their OEM customers and other economic agents in the auto industry in China. The following sketch tries to put these elements into a framework (see Figure 22).

**Figure 22: Framework of elements alluding to input from qualitative pre-study**
5 Central Research Question

As highlighted in the previous sections there is a gravitational shift of global economic activity, in which China’s rise in the global economy plays a major role and marks a significant and noteworthy alteration. The manifold implications of this development are widely discussed in the IB literature. In the context of this research the implications of the shift that is currently taking place with Europe in economic turmoil and the long-term development of the US, still the world’s largest economy, and Japan, its number three, unclear; the implications of this shift in the specific context of supplier – original equipment manufacturer relationships in the automotive industry in China will lie at the heart of analysis.

As my qualitative pre-study has indicated China is no longer a classical developing economy, but in many regards has become an economic powerhouse, in particular so in the auto industry where China has overtaken many of the traditional “auto nations” already and is en route to becoming the global, undisputed number one nation, both in terms of its market size and the ensuing sheer number of vehicles sold and in terms of manufacturing capability with the number of vehicles produced in China. Researchers, politicians and managers alike are coming to the realization that China will continue to be one of the world’s main drivers for future growth. In no industry is this more evident than in the automotive industry as has been described in great detail in chapters 1.3 and 3. Following these previous chapters which provided comprehensive insight of the automotive industry in China my qualitative pre-study has helped put together a rough framework of dimension and items for further research and, thus, set the "context framework" of this research by providing a framework alluding to the input from the qualitative pre-study (see Figure 22).

The key dimensions outlined in the pre-study are:

- Transparency
- Institutional environment
- Trust
- Selection of OEMs and partners to work with
• Co-design and co-development activities with OEMs
• Supplier involvement in the design process

These key dimensions highlight a specific need to carry out a comprehensive empirical analysis to investigate how multinational suppliers in China can best balance two seemingly opposing goals: to develop adaptive product innovation; and to limit the spill-over and theft of knowledge. Consequently, this study will try to explore how multinational suppliers can develop adaptive product innovation in the Chinese market environment in order to create a sustainable competitive advantage in the auto industry setting in China and how suppliers can employ knowledge management strategies and practices to best retain and protect their knowledge, limit the flow, spill-over and theft of knowledge by third parties and, thereby, sustain their competitive advantage in China vis-à-vis existing current and potential future competitors.

In this context the central topic for this research is to analyse knowledge protection and product innovation in the relationship between automotive first-tier suppliers and OEMs in China. In particular, this study will strive to address a gap identified in the literature, namely that most of the academic literature in this field is rather descriptive, by developing an empirical understanding for how MNC first-tier suppliers balance the need for protection of their knowledge with the need to innovate. Moreover, by connecting knowledge protection to product innovation, this study aims to provide implications for innovation-management practitioners working on the organisational level in the auto industry in China.

Previous sections (see chapters 1.3, 3, 3.5) have highlighted how lead firms in the auto and auto supply industries are increasingly finding that their most important asset – knowledge – is at stake and might be taken up by opportunistic partners in the Chinese market environment. Western companies who have entered partnerships in China are facing growing problems with regard to knowledge management, knowledge protection and product innovation. As the euphoria of entering China, the
market with the greatest growth and potential, has subsided a more realistic view is now spreading. Auto manufacturers are finding that their innovations are rapidly spreading to competitor products. The Chinese government’s growing self-confidence has recently led to compulsory Chinese-brand-creation for electric vehicles manufactured by global OEMs in China who are no longer welcome to develop this future market segment using their own, established brands.

As pointed out in chapter 3.5.2, much has been written about IJVs in general (Child and Yan 1999; Fang and Zou 2009; Geringer and Hebert 1989; Luo 1995, 2002; Newbury, Zeira, and Yeheskel 2003; Zhang and Li 2001) and in the context of China in particular (Bjorkman and Lu 1999; Child and Yan 1999; Fang and Zou 2009; Hoon-Halbauer 1999; Luo 1995, 2002; Newbury, Zeira, and Yeheskel 2003; Pan and Li 2000; Selmer 1999b; Vanhonacker and Pan 1995; Walsh, Wang, and Xin 1999; Wang, Wee, and Koh 1998; Wang and Nicholas 2005; Wong and Law 1999; Zhang and Li 2001). Also, bringing know-how and managerial skills into the host-country partner of an IJV has been analysed by academic researchers in the context of China (e.g. Bjorkman and Lu 1999; Hoon-Halbauer 1999; Walsh, Wang, and Xin 1999; Wang and Nicholas 2005). It has also been studied that foreign direct investment is not only viewed as a valuable source of capital, but also as an effective means of transferring technology by the Chinese government (e.g. Bosworth and Yang 2000; Tackaberry 1998; Wang and Nicholas 2005). In academic research, it is widely accepted that the flow of knowledge and know-how is implicit in an IJV set up between a high-technology firm and a local partner with market-access (Jane Zhao and Anand 2009).

However, it is not implicit that knowledge from an IJV partner or supplier will be taken and passed on to another legal entity owned by or associated with the host-country partner, in order to build up competition against the Western IJV partner or an MNC first-tier supplier.

Following the qualitative pre-study this research will draw on the knowledge based view and transaction cost economics and aims to empirically investigate the drivers of product innovation in the specific setting of the Chinese auto industry’s supplier-customer relationship from the Western MNC suppliers’ perspective and how product
innovation is linked to performance. Also, following the results from the qualitative pre-study the role of the institutional environment in this context will be investigated. In particular, the following research questions will be addressed:

» What are drivers of product innovation in inter-firm supplier-customer relationships between Western MNC suppliers and their OEM customers in China?
  • Organizational (supplier involvement, knowledge protection, trust)
  • Environmental (technological uncertainty)

» How and to what extent does product innovation in supplier-customer relationships in China affect supplier performance?

» What is the role of the institutional environment?

6 Conceptual framework and development of hypotheses

Over the last 15 years the academic literature has been making considerable contributions to our understanding of international business and many of the aspects of importance in the context of global shifts of economic activity. Taking out the most salient dimensions from the framework of elements alluding to input from the qualitative pre-study, this study will use theoretical lenses from the extant literature to identify key drivers of product innovation in the context of the auto industry in China, and will utilize extant literature for the identification of empirically usable dimensions, antecedents and moderators in this context. The focus will be on product innovation and on the effect that knowledge as a key resource has in enabling product innovation in the context of the complex supplier-customer relationships in the auto industry in China. Consequently, the protection of knowledge the correlation of knowledge protection with product innovation will be analysed.
6.1 Knowledge-based view

Following the qualitative pre-study’s respondents replies, it becomes clear that practitioners in the auto supply industry in China view the knowledge, technological know-how and innovation capacity that Western MNCs bring into partnerships, supplier-customer relationships and the market environment in general, as the most valuable resource, actively sought after by competitors in China. This is very much in line with academic research that has become labelled the knowledge-based view.

Originating in early articles by Birger Wernerfelt (1984) a micro-economic foundation to understanding resource advantages has been established and combined with previous research on activity analysis and barriers to entry (see Kogut and Zander 2003). In his 1984 paper Wernerfelt (Wernerfelt 1984) develops economic tools for analysing a firm’s resource position and looks at strategic options. In this regard, he further expanded a well-established tradition of academic research to look at categories such as labour, capital and land when analysing the resource endowments of economic units or firms. He took the research further to look at a broader set of resources and to analyse the relationship between resources and profitability and the management of resources over time (Wernerfelt 1984). Some academic articles trace the resource-based view back to Bain’s (1956) emphasis on barriers to entry (Kogut and Zander 1993). Also Penrose’s (1958) proposal that firms’ growth depends on the balance between discovering and using existing productive resources and developing new productive resources is often viewed as one of the roots of the RBV, in particular when discussing the relationship between resources market competition and economical rent (Penrose 1958).

In the context of this research, knowledge, its flows and protection and the ensuing influence on product innovation in the context of adapting vehicle parts, components and modules to meet the specific requirements of Chinese auto manufacturers who in turn are reacting the Chinese customers’ taste and dispositions, is of interest. While the resource-based perspective is of particular importance in setting the general frame of this research, specific focus will have to be given to the KBV in this regard as in the context of the auto industry in China knowledge is the key resource.
This is in accordance with the literature where knowledge has been found to be a key resource (e.g. Cheung, Myers, and Mentzer 2010; Chi, Nystrom, and Kircher 2004; Norman 2002; Tsang 2002), a notion that supports the interviewees’ take on critical issues in the auto industry environment in China expressed in the qualitative pre-study in chapter 4. With respondents clearly identifying knowledge as the key resource in the context of the auto industry in China, the KBV will be the primary theoretical driver of this study.

In order to better understand how the KBV will fit in this research, the origins of the KBV with knowledge originally identified as a resource amongst others in the resource-based view of the firm have to be understood. One of the basic premises of the resource-based view is that the resources of different firms have different characteristics. In this regard the RBV is often understood by academics to be a counterpoint to the ‘Positioning School’, which emphasizes the influence of environment and industry on the competitive advantage of the firms. The positioning school believes that firms in the industry are consistent on the strategic resources. The resource characteristics can only exist in the short-term, and in the long-term, the resources are possible to flow freely. Rumelt’s (1984) research indicates that the dispersion degree of long-term profit margin in one industry is significantly greater than the dispersion degree of the industries. The most important economic rent originates from the firm, but not from the industrial relations. The term rent as a a key outcome variable in this context has been taken over by the strategy literature from economics. The forms of rent described in the economics literature are primary sources of rent generation discussed in the strategy literature (Coff 2003).

In this context firm’s internal factors have become the focus of many researchers in this area. Wernerfelt’s (Wernerfelt 1984, 1995) exploration of ways to analyse the competitive advantage from an enterprise’s internal non-uniform resource aspects has found its way into academic research in the field. Studies from other scholars that followed Wernerfelt’s research, indicated that the enterprise resources have the non-uniformity, and certain resources can cause the enterprise to obtain the sustainable competitive advantage (Rumelt 1984).
Barney (Barney 1991) extended the scope of firm’s resources for research to include all properties, a firm’s ability, its organization processes, enterprise character, information base and knowledge that enable the firms to enhance its efficiency and the potency strategy by design and implement. In his research he also classified the resource into physical capital resources, human resources and organizational capital resources (Barney 1991) and examines the link between firm resources and sustained competitive advantage. Building on research that has focused on isolating a firm’s opportunities and threats (e.g. Porter 1980, 1985) and describing its strengths and weaknesses (Penrose 1958) to analyse the source of sustained competitive advantage, he works out a set of assumptions that contradict the assumptions made, for example, in Porter’s (1980) “five forces model” describing the attributes of an attractive industry, namely that resources that firms use to implement their strategies are highly mobile (Barney 1986a, 1986b). His examination of the link between a firm’s internal characteristics and performance, that is the basis of the resource-based view on competitive advantage, cannot and does not build on those assumptions (Barney 1991).

The model assumes that firms within an industry or group may be heterogeneous with respect to the strategic resources they control and that these resources may not be perfectly mobile across firms. Therefore, this heterogeneity can be long lasting or durable (Barney 1991). Resources are defined as including all assets, capabilities, information, knowledge, organizational processes controlled by a firm that enable it to establish and implement strategies that improve its efficiency and effectiveness.

The often very broad definition of resources is put in context with competitive advantage and sustained competitive advantage. Competitive advantage is defined as the implementation by a firm of a value-creating strategy not simultaneously being used by any current or potential competitor (Barney 1991). A sustained competitive advantage can, however, only be achieved, if, in addition, other firms are unable to duplicate the benefits of the strategy. It is important to point out in this context that a firm’s competition is assumed to include not only all of its current competitors, but also any other companies who might enter an industry at some future date, i.e.
potential competitors which is of particular interest when looking at the automotive clusters being built in China around SAIC, FAW, Changan, Dongfeng, etc in China as depicted in Figure 17.

Following established academic research (Lippmann and Rumelt 1982; Rumelt 1984) this study will define knowledge that fosters product innovation as a competitive advantage that is sustainable only if it remains in place even after efforts to duplicate it have been made. In other words, the sustainability of a competitive advantage depends on the possibility of competitive duplication (Barney 1991), a concept that will be of importance in the context of this research setting, in particular in light of comments made during the qualitative pre-study by respondents regarding the active support of competitive duplication given to local companies by the institutional and legal environment.

Of course, if changes in an industry redefine which of a firm’s attributes are resources and which not, it might well happen that resources in a previous industry setting become irrelevant in the new setting, or even turn into weaknesses. At the same time a sustained competitive advantage cannot easily be neutralized by competing firms duplicating the benefits of it (Barney 1991). In short, firm resources must be of value, rare, not easily imitable and without equivalent substitutes in order to hold the potential of bringing sustained competitive advantage to the resource-owner, a concept that this research will draw upon.

Resources have to enable a firm to implement strategies that enhance its efficiency and effectiveness in order to be of value to the firm. In the context of the traditional SWOT model of firm performance, such strategies can only improve a firm’s competitiveness, if they either make use of opportunities or serve to neutralize threats. The resource-based view suggests that additional characteristics are necessary, if resources are to generate sustained competitive advantage for a firm (Barney 1991). The necessity of resources to be rare or scarce, in order for them to be the source of competitive advantage, is the logical consequence of the definitions introduced earlier. A competitive advantage is only enjoyed, if a firm is not implementing a
value-creating strategy simultaneously with a large number of other firms. According to Barney (1991) this same definition can be applied to whole bundles of resources, for instance, a required particular mix of physical, human and organizational capital. The importance of managerial talent as a firm resource required for the definition and implementation of almost all value-adding strategies is explicitly stressed, which can be considered to be of great interest when looking at global lead OEM’s Chinese IJV subsidiaries where management functions are taken up by co-managers nominated each by the Western and Chinese JV-partner who subsequently share responsibility for decisions made at the JV. In the context of this research setting, however, the focus will be on product innovation in the supplier-customer context; the above concept will, thus, not be at the centre of this study.

As stated before, imperfect imitability as a pre-requisite for sustained competitive advantage, i.e. the fact that firms that do not possess these resources cannot easily imitate or obtain is used to explain under which circumstances rare and valuable resources can be a source of advantage (Lippmann and Rumelt 1982) Contrary to Porter’s (1980) argument that history is not relevant to understanding a firm’s performance, it can be argued that a firm’s ability to acquire and exploit some resources depends largely on their place in time and space (Barney 1991). This connection between the ambiguity of a firm’s resources and imperfect imitability has received attention in the literature (Barney 1986a; Lippmann and Rumelt 1982; Rumelt 1984) and is of interest when attempting to understand the knowledge and experience necessary for adaptational product innovation in the auto supply industry in China.

Another important notion is that resources controlled by a firm are often very complex and interdependent, often implicit and taken for granted rather than being subject to explicit analysis by firms. In the context of this research setting, knowledge that is taken for granted will not likely be subject to special protection by the firm and will not be seen by management as a source of product innovation and, thereby, competitive advantage. The literature has also extensively investigated social complexity of a firm’s resources, for example analysing a firm’s reputation amongst
its customers and citing them as sources of competitive advantage (Porter 1980, 1985), or the level of trust that a firm manages to build in its supplier-customer network (Parkhe 1998a, 1998b; Sabel 1993; Walsh, Wang, and Xin 1999; Wang et al. 2008; Zaheer and Zaheer 2006), or a firm’s culture (Barney 1986a). This is in line with respondent comments during the qualitative pre-study which put trust and the lack of trust that results from frequent replacements of decision makers on either side, and the reputation of a customer in the partnership to the forefront of the relationship.

In the context of this research, the most important notion is that, in general, physical technology, whether machinery, machine tools or robots in factories, or information management systems is typically imitable and can, therefore, not easily constitute a resource that will help an automotive first-tier supplier create a sustained competitive advantage. As this research strives to analyse product innovation and the protection of knowledge in the context of the automotive and automotive supply industries in China, this is a very important notion. If any one automotive supplier can purchase machines or machine tools and thereby implement its strategies, then other firms should also be able to purchase the same physical machine tools and implement similar or identical strategies. Therefore, such machines, tools, etc. cannot be a source of sustained competitive advantage and will not be the subject of analysis of this research.

However, socially complex firm resources needed to exploit physical technology in implementing strategies can make the difference. How to use the machines, which processes to establish and how to establish them and engrain them in the people working at the firm, just might make the difference, also in the context of developing, designing and manufacturing auto components and modules in China. It might be that only one firm possesses the social relations, company culture, traditions, and processes necessary to take full advantage of otherwise widely available physical technology, obtaining a sustainable competitive advantage that other firms might be in no position to obtain, even though they do not vary in terms of the technology they possess or can acquire (Barney 1991; Lee et al. 2008; Takeishi 2002). These findings support feedback obtained during the qualitative pre-study, during which knowledge
was repeatedly identified as the key resource in the context of the auto supply industry in China. This research will, therefore, draw on the knowledge-based view and focus analysis on knowledge as the key resource. Naturally, this research will pay attention to analysing resources in such a manner as to ensure that the knowledge identified as key driver for product innovation in the context of this research setting has no strategically equivalent valuable resource to substitute for it.

In short, the essential quality necessary for a resource to become the origin of a sustainable competitive advantage is how to make it difficult for the competitors to obtain it. Hence, putting knowledge management strategies and knowledge protection in place in order to limit the spill-over of knowledge to third parties and potential competitors carries great weight when operating in the auto supply industry in China and will be at the center of the analysis in this research context. Academic analysis has focused on the three aspects of scarcity, imperfect mobility and imperfect imitability. The scarcity reflects that a certain kind of resource is unable to be owned by massive firms and shall be very difficult to flow, imitate and substitute. For a first-tier supplier in China it, consequently, is important to employ that make its resources hard to imitate by other firms (Rumelt 1984), thereby making its resources more likely to produce competitive advantages for the firm’s China operations.

The notion that a firm’s endowment with resources, and in particular knowledge as the key resource identified by respondents in the qualitative pre-study, will have influence on its profitability and sustained competitive advantage, as put forward by KBV research, will serve as the underlying theoretical foundation of this study. In particular, this research will stay in line with the knowledge-based view in arguing that knowledge is a primary resource of the firm and include procedural (know-how) and declarative (know-what) knowledge into the study (Gupta and Govindarajan 2000; Kogut and Zander 1993; Simonin 1999).

Some of the KBV’s early proponents describe the knowledge-based view of the firm as commonplace and no longer noteworthy. In his 10-year review paper on the resource-based view Wernerfelt (Wernerfelt 1995) states that it can be considered a truism that firms have different resource endowments which to change takes time and
money. Taking entry and exit patterns in business into consideration that ensure that firms will always be up against the best in whatever markets they chose to compete, it is unlikely that strategies that are not resource-based will succeed (Wernerfelt 1995).

Rather than contrasting the KBV against other strings of literature, this research will draw on literature that identifies the knowledge-based view as an important and integral part of the theories needed when probing into an emerging market such as China, the other theories identified by the literature as being integral to the understanding of emerging economy market environments being transaction cost economics and the institution-based view (Peng, Wang, and Jiang 2008). In this context, this study will follow the KBV when looking at first-tier auto suppliers’ knowledge as a resource spread out to local competitors without a contractual relationship. Knowledge spill-overs will be dealt with in more details in chapter 6.5.2. As the Western MNCs’ Chinese subsidiaries that are be looking at are profit-maximizing firms, they are unsurprisingly not interested in creating benefits for others, most notably local competitors who have supplier-customer relationships, or aim to establish such relationships with the very same OEM customer base, without being paid (Meyer 2004). Drawing on the existing literature, this study argues that the acceptance of positive externalities by MNC-invested first-tier suppliers in China depends on the opportunity costs of sharing the knowledge, and the transaction costs of protecting knowledge and establishing barriers to knowledge flows (Meyer 2004).

In the context of this study, knowledge will be seen as a critical resource on which the success of supply-industry companies in the auto industry in China largely depends (Chi, Nystrom, and Kircher 2004; Coff 2003; Grant 1996a; Kogut and Zander 1993). In this context the knowledge-based perspective is of particular importance for the framing several dimensions.

Supplier involvement and close collaboration with OEM customers in the form of co-design and co-development activities and projects can be seen from the KBV and organizational learning perspectives to facilitate knowledge sharing and learning between suppliers and their customers in the exchange relationships.
Knowledge protection, amongst the most frequently mentioned dimensions during the qualitative pre-study, can be seen as a governance mechanism against opportunistic behaviour in the exchange relationships when knowledge and intellectual property are accepted to be at the core of the competence of the firms as stipulated by the KBV. More generally, the KBV helps frame supplier-customer relationships in the auto industry by extending the view from from cost minimization and safeguarding against opportunism to a more broader view incorporating the capability creation processes and the ensuing knowledge creation that are inherent in relational value chain relationships.

For the purpose of this research the knowledge-based view is particularly important in motivating hypotheses surrounding the influence of supplier involvement in co-design on product performance and innovation and the influence of knowledge protection on supplier product innovation.

### 6.2 Transaction cost economics and Behavioural governance

One of the specifics of the auto industry is the network of complex interactions in the multifaceted relationship between suppliers and OEMs. In the auto and auto supply industry in China this complex network is extended to include partners involved in this relationship on one or both sides. During the qualitative pre-study respondents mentioned the network of co-design and co-development activities as being at the core of the relational value chain linkage between suppliers and their OEM customers.

Drawing on the literature, the relationship between supplier and OEMs can best be classified as that of a “relational value chain” (Gereffi, Humphrey, and Sturgeon 2005, p.84). In a relational value chain relationship, a set of complex interactions between buyers and sellers (automotive OEMs and their first-tier suppliers in the context of our research) connected with a certain level of mutual dependence and asset specificity characterizes the relationship. In line with input from interviewees during the pre-study who emphasized the importance of trust, literature finds that the relationship may be managed through trust and reputation (Gereffi, Humphrey, and Sturgeon 2005).
In first-tier auto supplier-OEM relationships tacit knowledge is exchanged, because suppliers are competent specialists in their field of expertise, possess elaborate experience and high capabilities, thereby providing a strong motivation for lead OEMs to co-develop and co-design with their suppliers and outsource manufacturing to gain access to complementary competencies. This relationship leads to a level of mutual dependence that needs regulation which can be done through mechanisms that impose costs on the party that breaks a contract (Williamson 1981, 1983). This study argues that supplier-customer relationships in China cannot be seen only from a cost-perspective and based on contractual agreements as the TCE would suggest (Williamson 1979, 1981). Instead, an integration of TCE and KBV is helpful in explaining the supplier-relationship in the auto industry in China beyond the contract alone, leading both parties to remain within a relationship because of the performance enhancement that it is expected to bring over time as both partners derive improved efficacy from the continuation of their relationship (Lakshman and Parente 2008).

Gereffi et al (Gereffi, Humphrey, and Sturgeon 2005) have developed an interesting model of different types of value chain compositions that depicts different governance types (see Figure 23: Five global value chain governance types, Figure 23). In the context of the supplier-customer relationship in the auto industry in China, the power balance between firms is not entirely symmetrical, but involves a great deal of explicit coordination and a close dialogue between suppliers and their OEM customers with both parties contributing key competencies to the relationship.
Following the transaction cost perspective, many researchers have focused on exploring effective governance mechanisms to safeguard against the cost of opportunism in channel relationships and partnerships (e.g. Hewett 2001; Lusch 1996). Opportunism in this context is mostly understood to be behaviours of treacherous and guile nature in the pursuit of self-interest (Williamson 1975) and as all actions that are contrary to the set of shared expectations of the supplier and OEM customer (Aulakh, Kotabe, and Sahay 1996). While it is generally recognized that the potential for opportunistic behaviour exists in all supplier-customer, manufacturer-distributor, etc. relationships, studies have shown that opportunism will negatively affect the partner’s relationship satisfaction (Deligonul et al. 2006). While it is neither practical neither possible to completely eliminate opportunistic behaviour (Deligonul et al. 2006), it is safe to assume that complex supplier-customer relationships in the auto industry in China that involve openness and knowledge sharing on behalf of both partner to enable effective co-design and co-development activities (Baldwin and Clark 1997; Liker et al. 1996) will be damaged or disrupted, if opportunistic behaviour exists.
However, researchers have found that the importance of safeguarding against the cost of opportunism need not automatically lead to the conclusion that complex and tightly coordinated production systems – as we find in the relational value chain networks of the auto industry in China – will eventually vertically integrate (Gereffi, Humphrey, and Sturgeon 2005). Trust and mutual dependence stemming from co-development and co-design projects reduce opportunistic behaviour (Álvarez and Molero 2005; Ding 1997; Mayer, Davis, and Schoorman 1995; Sabel 1993). In addition, asset specificity, opportunism, and coordination costs can be managed through the effects of repeat transactions, potential sanctions, reputation, and social norms (Gereffi, Humphrey, and Sturgeon 2005).

Moreover, research has found that social and personal relationships are an integral part of any economic transaction and that the behavioural dimension of governance captures how suppliers might manage inter-firm interactions with their customers in order to develop self-enforcing safeguards guided by relational contracting (Roath, Miller, and Cavusgil 2002). As Roath et al put it: “contractual arrangements have guidelines, but must be managed through relational means” (Roath, Miller, and Cavusgil 2002, p.5).

By utilizing the above-mentioned inter-firm management measures and setting up social and personal relationships complex relationships can be established between the auto manufacturers and their first-tier suppliers with increasingly close cooperation and collaboration between both parties and a high degree of first-tier suppliers’ involvement into the development and design of vehicles and their main components with much more complex divisions of labour and responsibility and a much higher interdependence than would be predicted by transaction costs theory (Gereffi, Humphrey, and Sturgeon 2005).

Drawing on extant research this study argues that technological capabilities enable firms to effectively monitor progress in supplier-customer relationships, thereby allowing for the sharing of knowledge in co-design projects in that relationship, and,
consequently, avoiding or reducing costs imposed by contractual hazards (Mayer and Salomon 2006).

This study will follow recent research in drawing on the KBV and arguing that complexity of supplier-customer relationships in the auto industry, and particularly so in China, make it crucial to extend our view from cost minimization and safeguarding against opportunism (e.g. Kale, Singh, and Perlmutter 2000) to a more broader view incorporating the capability creation processes and the ensuing knowledge creation that are inherent in relational value chain relationships (e.g. Wu et al. 2007). In this context it is advantageous for first-tier suppliers to enter into close partnerships with their lead OEM customers, develop organizational competence to exploit local market opportunities while simultaneously minimizing the costs of opportunism (e.g. Cavusgil 2004; Williamson 1996; Wu et al. 2007). Transaction costs, asset and location specificity have also long been the main focus of researchers focussing on supplier relations (Takeishi 2001; Zhang, Henke Jr, and Griffith 2009) and have been extended to include knowledge management, knowledge sharing and modularization (Kotabe, Parente, and Murray 2007). Lakshman and Parente (Lakshman and Parente 2008) integrate knowledge management and supplier relations literatures in the context of the Brazilian auto industry.

6.3 Institutional perspective and legal hostility

The institutional perspective is of growing importance in the international business literature with researchers finding that the two traditional perspectives addressing the success or failures of firm, the industry-based view based on Porter (Porter 1980, 1985) and the resource-based view based on Barney (Barney 1991) pay little attention to the formal and informal institutional foundation and context of the competition that leads to success or failure (Peng, Wang, and Jiang 2008). Researchers have argued that an institution-based view of international business has emerged, or as Sturgeon et al (Sturgeon, Van, and Gereffi 2008, p.298) have pointedly put it: “Institutions—labor unions, industry associations, legal and cultural norms, industry-specific standards and conventions, etc.—matter.”
Peng et al (Peng, Wang, and Jiang 2008) analyse how institutions matter in the context of international business and put forward a “strategy tripod” adding the institutional perspective as a third pillar next to the knowledge- and industry-based views on which strategy rests (Peng, Wang, and Jiang 2008). In the context of the auto industry in China this perspective is of considerable importance.

While globally the auto industry has been shifting from a series of national industries with national champions towards a more integrated industry resulting in the consolidation of the industry’s players depicted in Figure 15, in China the legal framework (see chapter 3.4) has led to strong regional patterns around the selected state-owned enterprises chosen as joint venture partners for MNC entrants into the Chinese market by central, provincial and municipal government agencies.

Regardless of these regional patterns, however, the pivotal engineering work of passenger car development, translating conceptual designs into the components, parts and modules that can be assembled into vehicles that pass certification and adhere to homologation requirements remain to great extent to be included within the design clusters near global lead OEMs’ headquarters (Sturgeon, Van, and Gereffi 2008). The automotive industry can, therefore, be considered to be a hybrid between a global industry and a specialized cluster industry and is neither fully global neither tangled up within a specific locality; a peculiarity that Sturgeon et al. label “nested geographic and organizational structure” (Sturgeon, Van, and Gereffi 2008, p.304) and that is particularly eminent in the context of China.

The institutional framework has been found by researchers to be a composite of rules, norms of behaviour and constraints, and enforcement characteristics that together define the humanly created constraints which shape human interaction (North 1990). Coined “rules of the game” by Douglass North (North 1990), they define the way business is done. In the context of this research it is important to note that not only traditional constraints, such as technological capability or capital investment, will define the opportunities available to firms, but the institutional setting and its
constraints has considerable influence on the type of knowledge, coordination and learning-by-doing-skills a firm will invest in in order to maximize its profitable potential (North 1990). In particular, strategic choices in the auto industry in China are not only driven by industry conditions and firm capabilities, but are also a reflection of the formal and informal constraints of the institutional framework that managers confront (Peng, Wang, and Jiang 2008). Consequently, business decisions that would run counter the institutional framework tend to be unprofitable (North 1990) and will, therefore, not be undertaken.

Researchers have found that emerging economies tend to have more “fundamental and comprehensive changes introduced to the formal and informal rules of the game that affect firms as players” (Peng 2003). In the context of this study, the transition from a communist to a semi-capitalist socialist market-economic system labelled “socialism with Chinese characteristics” (中国特色社会主义”) by Deng Xiaoping, are so significant and pervasive that adapting to a set of changing and not completely known rules in China poses a considerable challenge for firms operating under that set of rules. Drawing on literature from the network theory this study argues that adaptation to the set of rules in China is both necessary and risky. On the one hand scholars agree that well-established connections with powerful political actors and institutions in China constitute a critical element of business success (Pei, Kamel, and Eric 2010). Researchers have analysed the effects of having good relationships and being strongly embedded in China, called having good “guanxi” in Chinese, on market access, protection from competition and firm performance (Davies et al. 2003; Luo 1997; Standifird and Marshall 2000). For multi-national automotive OEMs and suppliers alike, the case for embedding themselves in China’s political and economic networks is frequently viewed as an effective means to overcome the liability of foreignness and outsider-ship (Johanson and Vahlne 2009) and limit risks and negative effects associated with foreignness (Johanson and Vahlne 2011).

As highlighted already, the Chinese Central Government has been carrying out strategic industrial policies by nurturing competitive big businesses in key strategic sectors, most notably in the context of this study the automotive industry, a policy
continued in the most recent five-year plan. The objective set forth by the central government is to build up competitive large automakers, all of which, through joint ventures with global lead OEMs, would achieve high rates of localization of components, acquire advanced technology, and in the end develop independent manufacturing capability (Pei, Kamel, and Eric 2010). It is precisely in this context that MNC suppliers and OEMs alike find it difficult to navigate as the central government continues to have considerable leverage over foreign firms that seek access to China's domestic market and makes aggressive use of that leverage. As described earlier in great detail (3.4.1), the central government does not allow the creation of wholly owned foreign auto firms and limits foreign equity stakes in JVs. (1979; 2001; 2005). In addition, the government has powers to approve or decline the creation of new assembly JVs, takes responsibility for the partners involved, the terms of the deal, and to some extent even for the models that would be produced (Pei, Kamel, and Eric 2010).

While central government policy as outlined in chapter 3.4.1 created the framework for auto sector investment in China, firm-level performance is heavily influenced by the local governments as well, which try to maximize local fiscal revenue and generate employment opportunities from their industrial sectors (Pei, Kamel, and Eric 2010). In the auto industry, the domestic partners assigned to global lead OEMs setting up JVs for the manufacture of automobiles were mostly state-owned enterprises controlled by local governments. For example the JV-partner within the Shanghai Volkswagen joint venture S-VW, Shanghai Automotive Industry Corporation (SAIC), is essentially a division of the Shanghai municipal government, whereas the JV-partner within the FAW Volkswagen joint venture FAW-VW is essentially a Jilin provincial government division. Local authorities tend to welcome auto industry related foreign investment as long as it helps generate tax revenues, employment and, thereby, social harmony through investments into assembly plants and R&D centres and the build-up of local supply networks (Pei, Kamel, and Eric 2010).
Drawing on the literature that has shown the impact of institutional environment on innovation and performance (Bello, Lohtia, and Sangtani 2004; Peng 2003), this study will keep in mind a moderating effect of the Chinese institutional environment while accepting that a deep level of embeddedness in the Chinese institutional framework may lead to a higher degree of cost-inefficiency through structural lock-in and less developed market-based capabilities when markets are increasingly liberalized (Pei, Kamel, and Eric 2010).

6.4 Integrating the knowledge-based view, transaction-cost economics and the institutional perspective in the context of this research setting

According to the knowledge-based view, knowledge and intellectual property are at the core of the competence of the firms. Firm knowledge, which is valuable, rare, inimitable is identified as the source of firms’ competitive advantage. KBV addresses issues on how organizational knowledge can be the most strategically significant resource. Because crucial knowledge often resides beyond firm boundaries, firms often need to acquire or create new knowledge through external collaborations with different partners. Accordingly, the KBV has been expanded to inter-organizational relationships to explain how inter-firm collaborations can drive innovation and knowledge creation (Grant and Baden-Fuller 2004). More generally, performance enhancements are expected from collaborative relationships, with researchers finding that formalization of such relationships improves decision making, encourages continuation of the relationship and creates customer satisfaction (Daugherty et al. 2006).

In the inter-firm innovation learning and relationship between exchange partners, one interesting dilemma is how to develop new knowledge and innovativeness through collaboration with partners without running the risk of losing its own core proprietary capabilities such as intellectual property to their partners. While the KBV emphasized the importance of knowledge as strategic asset, knowledge appropriation and leakage in the inter-firm relationship may be detrimental to firms’ competitive advantage. The TCE has emphasized the relevance of opportunism in inter-organizational
relationships and the rationale of employing certain governance mechanism to safeguard transactional risks. Accordingly, following the emerging stream of research on the integration of governance and capabilities perspectives (Bosch-Sijtsema and Postma 2009; Williamson 1999), it is logical to integrate the TCE and KBV in the current study to discuss how MNE suppliers can develop innovative capabilities through involvement in co-design with their Chinese OEMs but also try to safeguard opportunism through employing certain governance mechanism. Prior study has identified relational capital and knowledge protection as two approaches in governing transaction risks in the context cooperative innovation and learning (Bosch-Sijtsema and Postma 2009; Kale, Singh, and Perlmutter 2000). Therefore, these two constructs will be included in building the conceptual model.

The conceptual model draws on the KBV in complement with the TCE to discuss the drivers of supplier product innovation in customer-supplier relationships. The research model incorporates supplier involvement as a knowledge accessing and learning mechanism which can help MNEs auto suppliers gain access Chinese OEMs’ specific knowledge such as market, channel and customer taste. Hence, from the KBV perspective, supplier involvement can help MNE auto suppliers increase product innovation through frequent interactions, knowledge sharing and co-development and co-design activities. However, this study argues that supplier involvement does not always benefit to innovation generation because the potential risks of opportunism and appropriation in the exchange relationships. In addition, this study respects the findings of earlier empirical research that early supplier involvement in product design may have a negative impact on product performance by creating difficulties and costs in terms of the need for attunement and coordination (Lakshman and Parente 2008).

In addition, drawing on the TCE, the conceptual model incorporates knowledge protection and trust as two critical safeguard mechanisms in protecting knowledge leakage in the cooperation innovation relationships between first-tier suppliers and their OEM customers in China. Further, the KBV argues that the effectiveness and efficiency of knowledge transfer and integration may differ under environmental and
technological uncertainty. Thus, the research model relates technological and environmental uncertainties to product innovation in customer-supplier relationships.

In terms of innovation-performance relationships, the literature offers conflicting results. While some studies show that innovation generation is beneficial for firm performance (e.g. Han, Kim, and Srivastava 1998), others find no relationship or even a negative impact on financial performance (Hauser, Tellis, and Griffin 2006). Based on the KBV, this study argues that product innovation is the process of integration and creation of new knowledge, which can enhance firm performance in the customer-supplier relationships (Menguc and Auh 2006). This is also in line with studies that find a positive impact of supplier involvement in product innovation on business and product performance (Lakshman and Parente 2008).

Additionally, the institutional environment has been argued to play central roles in shaping innovation in supply chain management (Tangpong, Michalisin, and Melcher 2008). According to institutional theory, institutions constitutes regulative, normative and cognitive structures and activities which can provide stability and meaning to social behaviour (Scott 2001). Research suggested that institutional theory is an emerging theory can be applied to investigate firms strategic behaviours, particularly in emerging markets (Peng 2003; Peng, Wang, and Jiang 2008). However, empirical evidence on applying institutional theory to examine firm innovation behaviour is still limited. Hence, this study will strive to ground the model in institutional theory and argue that legal and institutional hostility can moderate innovation-performance links for inter-firm innovation in China.

In summary, this study identifies different antecedents of product innovation for MNC suppliers in their relationships with Chinese OEMs by integrating the knowledge-based view (KBV), the transaction cost economics (TCE), behavioural governance and the institution-based view. Furthermore, this study links different governance mechanisms to firm performance, and, thereby, moves away from the transaction cost approach of focusing on safeguarding opportunism towards the capability creation perspective of the knowledge-based view.
Following the results from the qualitative pre-study and the analysis of theory and prior research, this study looks at incorporating supplier involvement, knowledge protection, trust and technological uncertainty as drivers of supplier innovation.

6.5 Building blocks of the conceptual framework

Following the broad qualitative analysis, I will use the knowledge based view which identifies knowledge and intellectual property to be at the core of the competence of firms and as strategically significant resources, and integrate it with the transaction cost economics’ emphasis on the rationale of employing governance mechanisms to safeguard transactional risks and minimize the risk of opportunism. Literature review and the qualitative pre-study have pointed me towards several items and dimensions that I want to further develop in this research. The following figure highlights the elements that I will be looking at following review of the literature and input from the qualitative pre-study.

Figure 24: items for inclusion in this research following literature review and input from qualitative pre-study
6.5.1 Knowledge

In today’s global knowledge economy, a firm’s possession of knowledge, as well as its ability to acquire and absorb knowledge from the external environment and to utilize, share and protect it, has been found to be a very important determinant of a firm’s growth prospects, market success, product, business and, ultimately, economic performance (e.g. Andersson, Forsgren, and Holm 2002; Dyer and Nobeoka 2000; Lau, Tang, and Yam 2010; Yamin and Otto 2004). Extant literature has found knowledge to be highly relevant in the context of product innovation and firm performance (e.g. Ambos, Ambos, and Schlegelmilch 2006; Grant 1996b; Nonaka 1994; Nonaka et al. 1994; Simonin 1999) and as a resource that ranks high in the hierarchy of strategically relevant resources (Foss and Pedersen 2002; Grant 1996b). Knowledge has also been found to be a crucial factor for the competitive advantage of a firm and its sustainability in particular in light of the degree to which valuable knowledge can be imitated by rival firms (Lippmann and Rumelt 1982; Simonin 1999).

In this context, the creation of knowledge has become a popular item for research. A review of the literature reveals that there are numerous research papers on knowledge creation, the variables that comprise this construct, and how the process of knowledge creation can be managed to help organizations achieve and sustain a competitive advantage. For the sake of the definition of knowledge for this research project some of the theories and models surrounding the concept of knowledge and its creations need to be reviewed.

Since the late 1960s (Polanyi 1966) an important distinction between two different types of knowledge - tacit and explicit – has become widely accepted. According to Polanyi (Polanyi 1966), explicit knowledge, also referred to as codified knowledge, is knowledge that is transmittable in formal, systematic language, whereas personalized quality that makes it hard to formalize and communicate can be found in tacit knowledge. Tacit knowledge is deeply rooted in action, commitment and involvement of a specific context (Polanyi 1966).
Nonaka (Nonaka 1994) expands this idea in a more practical direction, stating that tacit knowledge involves both cognitive and technical elements. The cognitive elements centre on human beings forming working models in their minds by creating and manipulating analogies in their minds. Technical elements of tacit knowledge cover concrete know-how, crafts and skills that apply to specific context, by contrast (Nonaka 1994; Nonaka et al. 1994). Tacit knowledge creation is a continuous activity, whereas explicit knowledge is discrete and is captured in archives, databases and libraries where it can be assessed on a sequential basis (Nonaka 1994; Nonaka et al. 1994).

Nonaka (Nonaka 1994) identified different patterns of interaction between tacit and explicit knowledge using the ACT model developed by Anderson in 1983 (Anderson 1983). In the ACT model, Anderson divides knowledge into “declarative knowledge” that is expressed in the form of proposition, i.e. actual knowledge (Nonaka et al. 1994), and “procedural knowledge” which is used in such activities as remembering how to drive a car, ride a bicycle or play the violin, i.e. methodological knowledge (Nonaka et al. 1994).

One main aspect of tacit knowledge is that it can be acquired without the need for language, as for example in the case of the work of an apprentice with his mentor. The key to acquiring tacit knowledge is experience. In a business context, the on-the-job training makes use of this (Nonaka et al. 1994).

In an empirical test set out to build from his 1994 theoretical model and propose and test an a priori model of knowledge creation, Nonaka (Nonaka et al. 1994) concludes that organizational knowledge creation consists of four underlying constructs representing four knowledge conversion modes: (1) tacit knowledge to tacit knowledge, (2) explicit knowledge to explicit knowledge, (3) tacit knowledge to explicit knowledge and (4) explicit knowledge to tacit knowledge.
What is probably most relevant for this research project is Nonaka’s statement in his conclusion drawn from extended theoretical and empirical research in the field of knowledge and knowledge creation that he feels very strongly that “organizations will be required to rely more on tacit knowledge present in the organization in order to achieve and sustain global competitive advantage” (Nonaka et al. 1994).

The importance of transferring knowledge to subsidiaries of MNCs in foreign countries has been emphasized in articles since the late 1950s and has come to be commonly accepted as necessary (Dunning 1958).

In management literature a variety of articles have researched the characteristics of knowledge transferred (Simonin 1999) and explored methods and means for how to better facilitate knowledge transfers in MNCs (Gold, Malhotra, and Segars 2001; Gupta and Govindarajan 2000; Kogut and Zander 1993).

Both, the traditional transfer of knowledge from a MNCs headquarters to its subsidiaries, as well as the transfer of knowledge between subsidiaries of an MNC have received attention in the literature. Reverse knowledge transfers from a MNC’s subsidiaries to its headquarters, though explicitly investigated by few studies with a focus on providing insights on the determinants of knowledge flows from subsidiaries to headquarters (Frost 2001) have also been covered in academic literature and have, more recently, been analysed in more detail (Ambos, Ambos, and Schlegelmilch 2006). Also, the notion that knowledge flows are beneficial, a notion implicit in many studies (Gupta and Govindarajan 2000; Kogut and Zander 1993), has recently been challenged, with researchers suggesting to distinguish knowledge inflows from benefits and suggesting that not all inflows of knowledge will be equally beneficial to the recipient (Ambos, Ambos, and Schlegelmilch 2006). This research will incorporate this notion, trying to analyse which spill-overs of knowledge are most beneficial to the recipient and, therefore, most harmful to the MNC or supplier in the context of the automotive and automotive supply industries in China.
Innovation and knowledge have long played a central role in theories of foreign direct investment and in literature on the MNC, beginning with product life cycle models and analysis on the MNCs abilities to exploit knowledge advantages generated in the home base (Vernon 1966).

The capacity of MNC’s foreign subsidiaries to generate innovations based on resources resident in the heterogeneous host country environments in which they operate has also been analysed in the literature as a potentially important source of competitive advantage for multinational firms. (Bartlett and Ghoshal 1989; Bartlett, Ghoshal, and Birkinshaw 2004; Bartlett, Doz, and Hedlund 1990; Bartlett and Ghoshal 1990; Ghoshal and Bartlett 1988). In this context, some researchers have also interpreted FDI as a mechanism through which MNCs seek to develop resources and capabilities on a global basis (Frost 2001).

Frost’s 2001 paper (Frost 2001) contributes to the literature on MNCs by exploring geographic origins of knowledge sources, their utilization by foreign subsidiaries during the process of technological innovation and by empirically testing hypotheses that include the likeliness of subsidiaries to draw upon host country knowledge and ideas for their innovations, linking it amongst others to their age, size, and innovation scale. His results support the conjecture in multinational literature that FDI may be driven by the desire to gain knowledge from the diverse institutional contexts in which multinational firms operate. However, he focuses on the gaining of knowledge and does not conduct any research on its spill-over to the host country environment.

In the same string of literature, some papers have analysed the precise geographical dispersion of technological activity by the large multinational corporations and the flow of knowledge resulting from it (Cantwell and Janne 2000). Also, various characteristics that hinder the imitability of rent-yielding knowledge assets have been analysed by academic researchers, such as causal ambiguity (Lippmann and Rumelt 1982), complexity and tacitness (Barney 1991). Much of this research has taken place in the context of the resource-based (Barney 1991; Wernerfelt 1984) and the knowledge-based theory of the firm (Grant 1996b).
An important element for this research is that an automotive OEM’s or supplier’s proprietary knowledge need not and is highly unlikely to be solely tied to codified IP, but that it is likely to include firm-specific resources and capabilities (Barney 1991), that enhance its ability to continuously innovate and market the product (McGaughey, Liesch, and Poulson 2000), making it difficult to duplicate because of the causal ambiguity arising from the knowledge’s foundation in tacit knowledge accumulated over time.

In the context of this research setting, the influence of knowledge, its sharing, application and protection, and the influence of all activities surrounding an MNC first-tier supplier’s knowledge on product innovation, productivity advantages and performance in the relationship with OEM customers based in China, is at the core of analysis. In the literature the influence of network-level knowledge-sharing processes on competitive advantages have been analysed, for example by Dyer and Nobeoka (Dyer and Nobeoka 2000) in their analysis of the relative productivity advantages enjoyed by Toyota and its suppliers.

Drawing on the literature this study will incorporate knowledge as highly relevant in the context of product innovation, innovation capability and firm performance (e.g. Ambos, Ambos, and Schlegelmilch 2006; Nonaka et al. 1994), as a critical resource on which the success of supply-industry companies in the auto industry in China largely depends (Chi, Nystrom, and Kircher 2004; Kogut and Zander 1993), and as a crucial factor for the competitive advantage of a firm and its sustainability (Lippmann and Rumelt 1982; Simonin 1999). While doing so no differentiation will be made between the different forms of knowledge, be they tacit or explicit, hard or soft or related to the source of knowledge.

6.5.1.1 Knowledge flows in MNCs
MNCs have witnessed considerable academic interest in the past thirty years. One of the topics of interest for researchers in this context is the flow of knowledge within
MNCs, between its headquarters and subsidiaries and from its subsidiaries back to its headquarters. Even in such a particular research field several different research categories and a varying focus of examination can easily be identified (Michailova and Mustaffa 2012).

When examining knowledge flows in MNCs a large number of researchers focus mainly on the characteristics of the actors. Gupta and Govindarajan (1994) analyse in detail the different strategic role that MNC’s subsidiaries have and attempt to reveal systematic links between a subsidiary’s strategic role and the systems and processes that link the subsidiary to its headquarters and the rest of the corporation.

One of the conclusions of their research is that the role of the subsidiary to provide its knowledge to other subsidiaries is not necessarily assigned from corporate headquarters, but that the role of the subsidiary as a knowledge-sharing entity is driven by entrepreneurially responsible managers within the subsidiary as part of bottom-up autonomous strategic processes. Yet another interesting concept in this context is the absorptive capacity of firms defined as the ability to recognize the value of new, external information, assimilate it, and apply it (Cohen and Levinthal, 1990), a concept used to explain the innovative capabilities of a firm. Some researchers apply this concept of absorptive capacity in their studies of MNC subsidiary’s roles (Gupta and Govindarajan 2000). In the context of this research setting, the knowledge flows within MNCs and from MNC subsidiaries in China back to headquarters will not be the focus of research. Rather, this study will investigate the flow of knowledge from an MNC first-tier supplier to a OEM customer in China as a driver for product innovation and the protection of that knowledge in the specific context of the Chinese market environment.

6.5.1.2 Knowledge in IJVs
The more uncertain partners are about their competence, the greater the risks of accepting an obligation to supply specific skills (Buckley and Casson 1996). This is also related to the fact that the knowledge involved is often tacit knowledge (Polanyi 1966). Not only does tacit knowledge involve costs of communication to a partner,
but, more fundamentally, the question is also whether partners in an IJV can actually communicate what they know to themselves (Buckley and Casson 1996). As Buckley concludes in his economic model of IJV strategy, “the greater the firm’s uncertainty about its own technological competence, therefore, the stronger the preference for … an IJV is going to be” (Buckley and Casson 1996), arguably one of the reasons for why the Chinese government chose to encourage IJVs instead of trying to encourage its automotive and tractor manufacturers to purchase licenses.

Researchers have found that IJVs are less dependent on the laws that govern their establishment and the rights and obligations of the involved partners for their success, but more dependent upon culture, understood from an economic perspective as a set of shared values and beliefs (Buckley and Casson 1996). In particular shared values such as integrity and loyalty that underline the willingness to share knowledge are important, in order for the IJV to obtain knowledge that is crucial for its success from the high-technology partner in the IJV (Buckley and Casson 1996; Hoon-Halbauer 1999; Pan 1996, 2002). It is exactly in this context that managers in automotive OEM IJVs in China have come to realize that their knowledge might not be treated with the integrity so important for the IJV relationship, but rather taken up and passed on by opportunistic partners (Child and Tse 2001; Child and Yan 1999; Roberts et al. 2005).

In the context of this research the MNC first tier suppliers’ Chinese subsidiaries’ interaction with the local OEM customer base and market environment is of great interest, regardless of the legal form of the supplier subsidiary in China (IJV or WFOE) and irrespective of the legal form of the OEM customer (IJV or Chinese company). Kutschker and Schurig’s empirical analysis (2002) focusses on the subsidiary’s role in the knowledge development process based on a question about whether foreign subsidiaries can act as a technological change agent by passing knowledge from the MNC to the local environment, their customers and partners, and vice versa from their local environment to other units within their corporate network. Their research is interesting in the context of this study in that they investigate the external knowledge flows between an MNC’s subsidiary and external actors. The subsidiary’s function as a knowledge broker between the external environment and the other units of the corporation is closely examined and shows that a considerable number of MNC’s subsidiaries tend to function as knowledge brokers.
In their analysis of MNC’s subsidiaries position as centres of excellence Andersson and Forsgren (Andersson and Forsgren 2000) define the subsidiary's degree of centre of excellence to be linked to three different factors; the characteristics of the subsidiary's internal resources, the relationship between these resources and the rest of the MNC, and the characteristics of the business context in which the subsidiary is located. They look at the MNC as a business network and empirically test how the level of external network embeddedness by an MNC’s subsidiary can be used to enrich our understanding of its role as a centre of excellence (Andersson and Forsgren 2000). They find that by taking part, for example, in a product co-development or co-design with a lead customer, the subsidiary enhances its knowledge about the possibilities and future prospects of the product, a concept of great importance in the context of this research setting. This knowledge about future possibilities of the product in the Chinese market environment can in turn function as a valuable platform for the Chinese subsidiary to influence the strategic behaviour of the MNC, for example the MNC’s willingness to localize technology in China and allow adaptation of products and modules to Chinese customer demand. Furthermore, in the context of this research, co-design by a Chinese subsidiary of a MNC first-tier supplier with a China-based OEM customer would be of interest to the subsidiary also because of the fact that this would help the subsidiary establish a powerful position within its corporation.

Researchers have also analysed the characteristics of relationships between actors in great detail. Andersson, Forsgren and Holm (Andersson, Forsgren, and Holm 2002) explore the importance of relational embeddedness in external networks as a strategic resource for performance and competence development in MNCs and identify two different types of relational embeddedness at the subsidiary level - business embeddedness and technical embeddedness which are both found to have an influence on the subsidiary's market performance. Their results suggest that technical embeddedness in particular has a positive impact on the subsidiary’s role in the development of products and production processes in the MNC. In yet another paper, Andersson, Forsgren, and Holm (Andersson, Forsgren, and Holm 2001) suggest that the subsidiaries' embeddedness in a network of business actors can explain higher
achievements in terms of their market performance. They argue that the closer a subsidiary's external business relationships with suppliers and customers, the easier it will be to assimilate new knowledge from outside, the more it will be able to innovate and the more it will be able to advance its performance in the local market (Andersson, Forsgren, and Holm 2001).

Researchers have also investigated the outcomes of knowledge flows. Yamin and Otto (Yamin and Otto 2004) investigate the influence of inter- and intra-organizational knowledge flows across national and organizational borders on innovative performance in MNCs. Their focus is not so much to explain the determinants of knowledge flows in MNCs, but rather the consequences of knowledge flows for innovation. They find that subsidiary embeddedness in external knowledge stimulates innovation in MNEs, a crucial concept in the context of this research which will focus on the flow of knowledge from a first-tier supplier towards a China-based OEM and vice-versa and its influence on product innovation and, thereby, performance.

6.5.2 Knowledge spill-over

While the absorptive capacity of a firm describes a stock knowledge, knowledge spill-over implies a more dynamic process involving flows of knowledge that may be captured by participation in formal R&D partnerships (Feldmann and Kelley 2006) as well as through supplier-customer relationships (Castellani and Zanfei 2002; Feldmann and Kelley 2006) and mobile human capital. It has also been found that suppliers are likely to adopt new technologies when their customers provide engineering support, a notion that is of considerable importance in the context of this research, as the dissemination of knowledge from customers, i.e. automotive OEMs, in this case the Chinese partner within the OEM IJV, to suppliers, i.e. not the suppliers originally bringing in the knowledge, but local suppliers unrelated to the OEM, is one of the knowledge flows this research aims to investigate in detail.
Some empirical investigation in this area has concluded that the capacity of a firm to absorb knowledge spill-overs is related to its connectedness to other firms (Feldmann and Kelley 2006).

Research has also analysed the steps undertaken by firms to limit knowledge spill-over and keep it within the firm. Knowledge protection has been found to be costly and, at early stages, it has been found difficult for companies to determine what is valuable and, therefore, worth protecting (Liebeskind 1996). Furthermore, it has been found that the value of knowledge may be related to the degree to which it is communicated to outsiders and that only by sharing knowledge its value may be determined (Feldmann and Kelley 2006).

Some academic research analysed the existence of positive spill-overs using the importance of technological factors in the explanation of output growth, through the decomposition of total factor productivity, e.g in the country context of Spain (Álvarez and Molero 2005). The concern of the firm in establishing operations in a foreign economy is not to promote the development of that economy, but to earn satisfactory profits.

More generally, spill-over effects have been analysed in light of the optimal organization of the MNC which involves the minimization of profit losses due to leakage and spill-over of knowledge and technical information to competitors, suggesting that host-country firms within the MNC’s business sector will experience limited productivity gains ensuing FDI due to minimization of spill-over risks by the MNC (Kugler 2006). Kugler suggests that MNCs will chose to locate their subsidiaries in a manner that helps them avoid rent erosion due to local competition by designing their FDI to minimize the risk of propagation of specific knowledge to potential competitors and that, therefore, spill-overs for host-country firms from manufacturing activities by subsidiaries are unlikely (Kugler 2006).
This research will strive to prove the opposite. It has been argued that organizational choices can be employed to delay the emulation of knowledge by domestic producers with absorptive capacity by making use of market penetration strategies that emphasize the minimization of the probability of imitation, especially under imperfect intellectual property rights in the host-country (Kugler 2006). However, this argument does not hold true in China. In the context of the automotive industry in China, the legal situation deprives the MNC of its choice which mode of FDI to choose. As explained in the chapter on IJVs in China, the legal situation forces MNCs to enter into IJVs (1979). In addition, MNCs are not free to choose their location either, being set into automotive development zones, created by the Chinese government especially for the fostering of this industry and the transfer of knowledge as has been shown before. These automotive development zones create exactly the kind of proximity to potential competitors with absorptive capacity to reverse engineer that has been found by researchers to be detrimental to the MNC (Kugler 2006). The choice to set up a subsidiary where potential rivals cannot erode its market share to circumvent this threat, i.e. location choice to avoid knowledge flows, simply does not exist in the context of the automotive research in China. Last but not least, the Chinese government has been found by researchers to actively support local enterprises in their quest to catch up with Western technology leaders, with research showing that some managers believe that breaches go unpunished because of connections with local officials, while others believe a general disregard for the legal rights of foreign technology, trademark and copyright owners to be beneficial for those Chinese who misappropriate knowledge (Weldon and Vanhonacker 1999).

For this research, and in light of the definition of partnerships that shall be covered in this research, any knowledge spilled over, transferred or “stolen” shall be part of the analysis, be it tacit or explicit, hard or soft knowledge, as outlined in chapter 0. Building on the traditional forward transfer of knowledge, i.e. from an MNC’s headquarters to its subsidiaries (Ambos, Ambos, and Schlegelmilch 2006), this study will try to investigate which management strategies and practices can be employed in order to limit the loss of competitive advantage due to the misappropriation, leakage of theft of knowledge while at the same time enabling product innovation both within the MCN suppliers’ Chinese subsidiaries and in their relationship with their OEM
customers. In doing so this research will take the perspective of the Western MNCs when looking at knowledge transferred into China through technology transfers, knowledge created locally in Chinese subsidiaries and in the supplier-customer relationship, knowledge protection and product innovation.

6.5.3 Knowledge protection

This study defines knowledge protection as the extent to which firms use certain processes to govern and protect a firm’s proprietary knowledge (Nielsen and Nielsen 2009; Norman 2002).

As described in detail in chapter 2 of this research automobiles are developed and manufactured by OEMs together with their first-tier suppliers who take responsibility for between 50 and 70 per cent of the cost price, i.e. the value, of an average car. Consequently, the cost and quality of a car are a function of the productivity of a network of firms working in collaboration.

Academic literature has challenged the traditional trade-off view when looking at specific partners. Kale et al. (Kale, Singh, and Perlmutter 2000) argue that learning and knowledge protection can be compatible objectives by addressing concerns that the OEM supplier might have towards a supplier’s protection intent through building relational capital, establishing a trusting relationship and using an integrative conflict management approach (Kale, Singh, and Perlmutter 2000). According to Rivera-Santos et al. (Rivera-Santos, Dussauge, and Mitchell 2011) trust in the relationship and routines in working together can complement knowledge protection and enhance knowledge transfers. Their results suggest that operational incentives to protect, a strong involvement by top management with clearly stated protection intention, the firm’s overall culture and the creation of a central function to guide knowledge protection are needed to protect valuable firm resources (Rivera-Santos, Dussauge, and Mitchell 2011).
Looking at one of the success stories of the automotive industry, the rise of Toyota to become one of the top-3 car manufacturers in the world, researchers have found that Toyota is very successful in establishing a network of knowledge sharing with its first-tier supplier partner companies while solving the dilemmas inherent in a knowledge-sharing network (Dyer and Nobeoka 2000). Whereas Toyota encouraged suppliers to participate and openly share knowledge in its network by heavily subsidizing the network with knowledge and resources during the early stages of formation to ensure that suppliers realize substantial benefits from participation (Dyer and Nobeoka 2000), the situation in China is quite different. Multi-national automotive OEMs (including Toyota who is active in China through joint venture operations in the South of the country) are bringing know-how and knowledge into the JVs with local Chinese partners into which they are forced by law. At the same time, MNC OEMs, such as Toyota, request their global supply-base to follow their venture into China and support the build-up of the Chinese manufacturing base, thereby leading to MNC first-tier suppliers to set up shop in China, again with the possession of superior knowledge via local, mostly backward competition. Whereas suppliers of Toyota in Japan are motivated to participate in a well-developed knowledge sharing network because they quickly become aware of the fact that participation in the collective learning processes is enormously superior to the isolation of proprietary knowledge (Dyer and Nobeoka 2000), there is no such motivation for entering into knowledge sharing with Chinese OEMs whose contribution to such a network is limited (Wang and Nicholas 2005; Zhao et al. 2008) and who are dominated by the likes of SAIC, FAW, etc. as outlined earlier (see chapter 3.3), former state-owned enterprises now under municipal or provincial ownership and control who have a political and commercial interest in helping bring suppliers that they own or co-own to modern levels of management and technology. While Toyota found very effective means to address the free rider problem and backed those up by utilizing its ability to withdraw business from suppliers (Dyer and Nobeoka 2000), in China knowledge is found to be intentionally passed on to local competitors of MNC suppliers in support of their build-up (McGaughey, Liesch, and Poulson 2000), often support or at least tolerance on behalf of the OEM IJVs or their investing partners.
6.5.4 Techno-economic security aspects

Technology transfers which are an integral part of joint venture contracts in the automotive industry in China (Neubauer and Rudow 2012; Posth 2006) have to be looked at from the standpoint of the knowledge theories. From the point of view of China as the host country of such transfers in this research setting, there are three channels through which FDI can generate productivity growth: knowledge spill-overs, linkage externalities and competition (Kugler 2006). Generally speaking, technology transfers have significant benefits from the host-country point of view. In the case of China, for example, the strategy to catch up rapidly with the industrialized countries in a range of technology sectors and build up competitive large automakers with high rates of localization, possession of advanced technology and in independent manufacturing capability (Pei, Kamel, and Eric 2010) is considerably helped by knowledge and technology transfers (Bruun and Bennett 2002). In the context of the automotive industry as manufacturing industry, technology can be seen as a key part of the organizational knowledge of suppliers and OEMs alike, giving them their distinctive capabilities and competitive advantage (Kogut and Zander 1993).

In the short to medium term complementariness between the strategies of Western firms and their Chinese counterparts can be found. In the longer term, however, there are concerns about the loss of competitive advantages of Western companies to China (Bruun and Bennett 2002) that multi-national first-tier suppliers operating the Chinese auto industry environment are increasingly taking seriously.

Ensuring security of technology and protecting competitive advantage has, consequently, been found to become an increasingly important consideration for automotive MNCs who are investing in China and thereby transferring their knowledge and know-how into subsidiary companies or joint venture operations (Posth 2006; Roberts et al. 2005). In order to ensure competitive subsidiary operations, MNCs will not only supply hardware, but also applied knowledge, techniques and skills (Young and Lan 1997), exactly the skills sought after by China as the host country of these subsidiaries, thereby creating the need for knowledge protection (Li and Atuahene-Gima 2001; Tackaberry 1998; Yang 2003) and a focus on IP-related issues.
In this context, techno-economic security relates to the question how MNCs investing in China can maintain the business and profitability potential of their investments (Bruun and Bennett 2002) and how they can protect their core technology from imitation, theft and misappropriation when in China. This risk is exacerbated by insufficient legal protection and limited enforcement of intellectual property rights (Bruun and Bennett 2002), highlighted yet again in the most recent AmCham China Whitepaper (AmCham 2011).

Recent analysis has, of course, challenged the notion that knowledge transferred is, per se, beneficial for the recipient unit. Ambos et al (Ambos, Ambos, and Schlegelmilch 2006) argue that transfer of knowledge and benefit are two separate dimensions and that beneficial knowledge transfer is dependent on many other factors than mere knowledge inflows. However, research on the sharing of knowledge between customers and suppliers in general (Castellani and Zanfei 2002; Cooke 2005) and in the particular context of China (e.g. McGuinness, Campbell, and Leontiades 1991; Wang and Nicholas 2005) has found that knowledge transferred into China is likely to be disseminated to some extent and will be put to use in ways beneficial to local backward actors (Wang and Nicholas 2005), in the context of our research setting local auto suppliers.

Analysis of the connection of the knowledge and MNC strings of literature show that some researchers find empirical evidence to support the assumption that multinational corporations emanating from the most important locations in their industry are more likely to evolve towards technological strategies of geographically differentiating their innovative activities abroad (Cantwell and Janne 1999), adapting innovation activities conducted at regional R&D centres in China to the local institutional and legal and limiting their local innovation to product adaptation to local market requirements, for example. MNCs originating from weaker centres in the same industry, in contrast, tend rather to evolve towards a strategy of replicating the pattern of their home country specialization in the profile of their technological development abroad (Cantwell and Janne 1999) which in terms of techno-economic security aspects could
lead to such MNC suppliers minimizing the localization of technological development in China.

Drawing on literature that has found organizational capability for knowledge creation to be a potential source of competitive advantage in the global marketplace and has identified and studied companies which advance and improve their knowledge creation skills in such areas as developing and introducing new products, speeding up design cycle times and in overcoming barriers to entering new markets (e.g. Nonaka 1994; Nonaka et al. 1994), this study will incorporate techno-economic security aspects that allow MNC suppliers to maintain the business and profitability potential of their investments in China and to protect their core technology from imitation, theft and misappropriation (Bruun and Bennett 2002).

6.5.5 Intellectual property

Academic researchers have long recognized that subsidiaries interact with their local environment and exchange knowledge on this level (Ambos, Ambos, and Schlegelmilch 2006). In the automotive industry in China, foreign companies are obliged to use one of five channels described in detail earlier in chapter 1.2 for undertaking FDI. These channels have been created by the Chinese government explicitly in order to encourage the transfer of technology into China (Chadee and Feng 2003), in line with the principal belief that the primary advantage that a Western firm brings to the Chinese market through FDI is its possession of superior knowledge (Kogut and Zander 1993).

Some academic research has been conducted on technology transfer from the perspective of techno-economic security (e.g. Bruun and Bennett 2002). From the managerial point of view, some review on how companies respond to the possibility of losing competitive advantage through the leakage and misappropriation of their knowledge is warranted.
Until the 1990s, there was limited literature dealing with the protection of intellectual property outside the legal body of literature. With the increasing recognition of the importance of knowledge, intellectual property rights and their protection by firms, the situation has changed (Hanel 2006). The subject of IP and its protection increasingly ceased to be the domain of legal departments and became a major theme for managers across a variety of industries, as well as a topic for academic research in economics and business (Hanel 2006). Today, it widely accepted amongst academic researchers that intellectual property rights are assuming increasing importance in line with the growing importance of knowledge management in business, especially for highly innovative firms (Candelin-Palmqvist, Sandberg, and Mylly 2012).

The attention awarded to IP and its protection is a reflection of the recognition of knowledge as an important asset for a firm (Contractor and Lorange 2002; Hanel 2006; Sturgeon, Van, and Gereffi 2008). In this context, the motivation for this research can be detailed along the lines of a few indicators for the importance of knowledge, know-how and IPR-related challenges faced by foreign companies operating in the automotive and automotive supply industries in China.

For example, funds attributed to brand protection and protection of intellectual property rights by large MNC OEMs and first-tier suppliers serve as a reminder of the importance attributed to this topic by MNCs. General Motors, for example, has in 2009 an annual budget of USD 6 million for exclusive use for the protection of its brand and IP in Mainland China. GM has also set up a dedicated team of lawyers, technicians and strategists who identify strategies for GM how to best protect its know-how and best enforce its IPR. This organization is mirrored by most MNC OEMs and suppliers in China, with companies such as Bosch, Honeywell, Toyota, Daimler, BMW and Hella all setting up senior management positions in their China organizations in charge of brand and IP protection.

Another indicator for the importance of intellectual property and brand protection in China, is a unique specialty – the formation of an official agency to protect their brands by some 180 MNCs in China: the Quality Brands Protection Committee.
(QBPC) Founded in early 2000 its members by 2007 already included 28 voting members, more than one sixth of which from the automotive and automotive supply industries, and some 152 general members, more than ten per cent of which stemmed from the automotive and automotive supply industries. The member companies represented more than USD 70 billion investments in China, with hundreds of thousands of employment opportunities directly or indirectly created in China (QBPC 2007).

The organization states that while counterfeiting is not unique to China, the country’s unprecedented economic growth has led to a surge in counterfeiting that, in terms of size, scope and severity, appears to have no parallels in history. A huge domestic consumption market in China, coupled with a mature manufacturing ability and a to-be-improved law and enforcement environment, has nurtured illegal elements. This statement is in line with researchers’ findings (e.g. Bruun and Bennett 2002). Furthermore, the trans-border trade of infringing commodities has highlighted the situation to the international community in recent years (QBPC 2007).

The Quality Brands Protection Committee (QBPC), officially launched on March 2, 2000, is registered under the China Association of Enterprises with Foreign Investment (CAEFI) and serves as a good indicator for the importance of the protection of brands, patents, knowledge and know-how in China.

Another gauge for the importance of the protection of brands, knowledge and intellectual property in China is the size and activity of working groups on these topics in the European Chamber of Commerce in China (EUCCC), the American Chamber of Commerce in Shanghai (AmCham-Shanghai) and the American Chamber of Commerce in the People’s Republic of China (AmCham-China). The EUCCC issues a so-called “Position Paper” once per year that is presented to the EU Commission in Brussels and EU member states governments every year and is then handed over to the Chinese Prime Minister in a ceremony that give the EUCCC’s Chairman a one-hour opportunity to discuss issues included in the position paper directly with the Prime Minister every year. The position paper’s contents are analysed both by the EU Commission and the Chinese government and then taken up
in discussions between the two governments. Since 2004, the IPR working group has consistently taken up half of the entire space in the position paper, with the remaining 31 working groups sharing the rest.

Because of the high number of complaints received from foreign governments and companies from all continents, some provinces have recently begun to increase their efforts to calm things, yet another indicator for the importance of this topic and the need to expand academic research in this field. In Shanghai, the local government opened the ‘Shanghai Reporting, Complaint and Service Centre for IPR Protection’ which has since been host to numerous delegations from companies, agencies, chambers and consulates (EUCCC 2007).

The importance of IPR- and knowledge protection-related issues in the automotive industry in China can be also seen from the number of delegations from the European Union and the United States of America coming to China to discuss these issues. The China Daily reports in its March 5, 2006 edition on the visit of a US trade delegation, led by Mr Mendenhall, General Counsel at the USTR, in March 2006: “Mendenhall will focus on Intellectual Property Right (IPR) and the auto industry’s impact on US-China trade relations.” The same article also states the US Trade Representative Rob Portman as “criticizing China for ‘failure to enforce intellectual property rights, its protection and support for certain domestic industries and its refusal to fulfill certain market-opening commitments.’”. In her August 28, 2007 appearance at a discussion forum with students of the Nanjing University in Nanjing, Jiangsu Province, P.R. China, Ms Angela Merkel, Federal Chancellor of the Federal Republic of Germany, confirmed to students that the topic she spent most time discussing with the Chinese government in her discussions on August 27th and August 28th, 2007, was IPR issues, saying that “any law – no matter how well written – is useless, if it is disobeyed by the majority of the people” (DW-TV 2007).

On the official website of the Chancellery the statement reads “One of Chancellor Merkel’s key aims is to get the Chinese government on board in the fight against piracy and theft of intellectual property” (Anonymous 2007).
Some authors suggest that many multinational companies are losing the battle to protect their intellectual property in China (Dietz, Lin, and Yang 2005) and that Western governments are aiming to improve the investment environment in China through convincing the Chinese authorities to construct a sound and transparent regulatory framework for investment and a better enforcement of Chinese regulations on intellectual property rights (Bruun and Bennett 2002).

The fact that the legal situation is very strict (1982; 1984), but that actual practice differs greatly is proof to the fact that Central Government gives strong signals and bows to international pressure, but that local government continue to some extent to protect and defend breaches of IPR, patent infringement and theft of know-how in the interest of economic development and employment in their provincial sphere of influence. With its accession to the WTO in 2001, China’s IPR system was brought into line with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). On June 9, 2007, the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT) came into force in China. It is, therefore, safe to say that China has the right laws and regulations in place. It seems to be application of those laws and enforcement (Bruun and Bennett 2002) that allow for further improvement (e.g. AmCham 2011).

Regardless of these challenges, it is without doubt that Chinese-Western partnerships are still, and increasingly so, en vogue. However, Western companies have progressively come to the realization that sustainable business with Chinese partners is contingent on complex environmental dynamics. (Child and Yan 1999; Luo 1995; Tjosvold, Hui, and Law 2001) There are knowledge spill-over effects which are detrimental to the sustainability of their core business (McGaughey, Liesch, and Poulson 2000) and many Western companies face increasing potentials of intellectual property violations (Bosworth and Yang 2000). IP protection has, therefore, become increasingly important for Western companies in their Chinese operations (McGaughey, Liesch, and Poulson 2000; Yang, Sonmez, and Bosworth 2004).
Researchers have also found in empirical research that while Chinese managers are often discontent with foreign managers’ reluctance in transferring the latest state-of-the-art technology to China, Western managers express their concerns about inadequate security measures for preventing the illegal dissemination and proliferation of transferred technology (Ding 1997) and the difficulties of protecting intellectual property in China (Weldon and Vanhonacker 1999), thereby lending further support to the importance of these issues in the context of this research setting.

However, it is not only managerial indicators that point to the importance of intellectual property protection in China. Risks associated with the dissipation of intellectual property of foreign firms transferring technology to China, commonly identified as a country with a history of infringements in intellectual property rights (Ding 1997), have also received considerable attention in the academic literature (McGaughey, Liesch, and Poulson 2000; Vanhonacker and Pan 1995).

Although China was accepted as a member of the World Intellectual Property Organization in 1980 and introduced a patent law in 1984 that came into effect in 1985 (1984), China has been identified as having weak IP rights legislation, a very weak level of enforcement (Bruun and Bennett 2002) and a very weak overall level of protection when compared with other developing Asian economies (McGaughey, Liesch, and Poulson 2000). The perception of IP-related risks in China can also be considered as a result of China’s approach to technology transfers, the regulations for which have been written to favour the Chinese recipient firm. For example, codified technology that is transferred to a Chinese venture must be certified by a government research and design institute whose charter is also the diffusion of technologies to domestic enterprises (Tackaberry 1998). Therefore, the unauthorized use of technology that has been transferred, outright counterfeiting of products and the unauthorized sale of products made under license can be seen as a consequence of these policies and procedures (McGaughey, Liesch, and Poulson 2000).

Taken together, it can safely be assumed that in order to create a sustainable, competitive advantage from product innovation, a strong focus needs to be put on the
protection and retention of knowledge in the automotive and automotive supply industries in China. This study will be guided by the questions of how do automotive OEMs and first-tier suppliers manage risks associated with the potential dissipation of know-how related to their businesses and partnerships and what retention measures can and should they take to maintain the competitive advantage of their product innovations. In addressing these questions, concepts from the knowledge-based view will be drawn upon.

6.5.6 Product Innovation

How to develop adaptive product innovation to create a competitive advantage in the automotive supply industry in China is at the heart of this analysis. Product innovation, in this context, is understood to be a process and path by which firms adapt and sometimes even transform themselves in changing environments as defined by Eisenhardt and Tabrizi (Eisenhardt and Tabrizi 1995). This definition is in line with the dynamic capabilities perspective which argues that the product innovation process is a cross-functional process of designing, developing, and launching new products to satisfy customer needs and preferences (Fang and Zou 2009). For the sake of this analysis the primary focus will be on incremental product innovation in terms of adaption and improvement of the current product and components in response to changing environments. This is because MNCs’ research, design and development activities in China still tend to be mostly at the end stage of the R&D cycle, with tasks such as adapting the general design to the local environment, as has been found by researchers to be quite common in emerging markets (Jane Zhao and Anand 2009).

While consumer preferences require automakers to alter the design of their vehicles to fit the characteristics of the Chinese market environment, heavy engineering work of vehicle development, where conceptual designs are translated into the parts and sub-systems that can be assembled into a drivable vehicle, remain centralized in or near the design clusters that have arisen near the headquarters of lead firms (Sturgeon, Van, and Gereffi 2008). The principal automotive design centres in the world are in Paris, France (Renault); Köln (Ford Europe), München (BMW), Rüsselsheim (Opel, GM Europe), Wolfsburg (Volkswagen) and Stuttgart (Daimler), Germany; Tokyo
(Nissan and Honda) and Nagoya (Toyota), Japan; and Detroit, USA (GM, Ford, Chrysler, Toyota and Nissan). However, the two biggest international players in the Chinese auto industry, Volkswagen and General Motors, have both established design centres in China lending support to the argument that they have at least to some extent moved away from a centre-periphery approach of concentrating all core competences at headquarters towards the integration of activities on a regional base. In this context it has to be acknowledged that with the Lavida model, Volkswagen for the first time developed a car “in China for China”.

However, the release process, design freeze, etc. for the Lavida were done at the Volkswagen lead design centre in Wolfsburg, Germany, and the core components used for the vehicle are all part of the Volkswagen groups’ “Baukasten” system of modularly built components and modules that was referred to in chapter 2. Therefore, the role of regional design centres in China tends to still be at the end stage of the design cycle, adapting vehicles to local customer tastes, and putting together vehicles from the “basket” of modular systems that fit with Chinese market and legal requirements and promise success in the local environment.
With regards to the brands Audi, Mercedes Benz or BMW the models brought to market are adapted so as to reflect the Chinese consumers’ tastes for increased spaciousness – witness the “L” versions such as the Audi A4L, Audi A6L, BMW 5-series iL or the MB E-class with extended wheelbase as prominent examples – or Chinese consumers’ expectation of luxurious configuration, clearly local adaptations to otherwise identical vehicles. These design adaptations and localization processes require varying degrees of local knowledge, ranging from extending the length of the car to re-designing the exterior and interior and fitting a new engine. For example, S-GM made approximately 600 engineering changes to tailor the Buick Century to Chinese driving conditions and regulations (Zhao, An, and Mitchell 2005). Therefore, the focus on product innovation in terms of adaptation and improvement following researchers such as Zhao et al. (Jane Zhao and Anand 2009) appears to be consistent with what we see happening in the market.

Previous studies have examined a number of factors affecting firm-level innovation. Firm characteristics such as structure, size, and culture have been identified (e.g. Damanpour 1991; Frambach and Schillewaert 2002; Stock and Zacharias 2010).
Environmental uncertainty and competition intensity are also important drivers of a firm’s innovativeness (Frambach and Schillewaert 2002). However, most prior studies focus on intra-organizational innovativeness and only selected few studies examine firm innovation in the inter-organizational context. As a result, very little is known about the facilitating conditions for innovation generation in inter-firm relationships, a void this study will try to address.

6.5.7 Trust

Academic research has confirmed what managers have been finding when operating in the Chinese market environment: contracts and contractual agreements, while necessary for doing business and setting up the framework of cooperation both within IJVs and between suppliers and customers are no substitute for informal understandings (Parkhe 1998b). A growing body of research has, thus, begun dealing with issues surrounding informal agreements and understandings, and have found trust to play an important, indeed often a leading, role in the success of partnerships, alliances, customer-supplier relationships and the like (Katsikeas, Skarmeas, and Bello 2009; Morgan and Hunt 1994; Zaheer and Zaheer 2006). In the context of inter-firm cooperative relationships, such as the complex collaboration between automotive first-tier suppliers and their OEM customers in China, daily business involves both explicit and implicit promises about the behaviour of both parties, during a co-development or co-design project as well as in less complex cooperation on the delivery of a certain component manufactured to customer’s expectation, and about future behaviours of both parties. Trust transforms such promises into credible propositions (Parkhe 1998a).

The literature has come up with numerous definitions of trust, mostly focusing on particular aspects of a relationship; one of the earliest and most frequently cited such definitions being Sabel’s (Sabel 1993, p. 1133) who defines trust as “the mutual confidence that no party to an exchange will exploit another's vulnerabilities” and postulates that trust is widely regarded as a precondition for competitive success. This study will follow this definition of trust.
In the context of this research setting, first-tier auto suppliers operate in a market environment of considerable uncertainty with regard to political decisions, regulatory requirements, changes to taxation and localization policies or the extension or adaptation of certification requirements (Baird, Lyles, and Wharton 1990; Pei, Kamel, and Eric 2010). Drawing on the literature, trust is required and gains importance in the supplier-customer relationship when uncertainty surrounds future events and the customer’s or partner’s responses to those future events. In such a situation, trust reassures partners of “mutually adaptive behaviours in response to unknown future circumstances” (Parkhe 1998a, p. 222). This is particularly salient when trust leads a one partner in the relationship to assume and, more importantly, expect that opportunities representing significant vulnerability will not be exploited by the other partner, consequently permitting better sharing and greater specialization of resources (Parkhe 1998a). In the context of the relationship between a first-tier auto supplier and an OEM customer, the control the supplier can exercise over the customer is very limited. Therefore, trust is required from the customer (Parkhe 1998a). Such trust has been found to be tied to a reassuring past cooperation history as well as to develop from expectations of a consistent, continuing, mutually beneficial relationship (Parkhe 1998b). This is particularly important when looking at the supplier-customer relationship in the auto industry in China from the Western MNC supplier’s perspective. With the OEM customer either being a Chinese company or an IJV between a global lead OEM and a local partner (as detailed in chapter 3.3) trust between the supplier and the customer cannot rest on societal or corporate similarity and the familiarity with the customer’s modes of thinking and behaving (Parkhe 1998b). Building trust has been found by researchers to be harder when cultural differences are involved, because expectations may differ and shared assumptions about the roles of the partners in the supplier-customer relationship may not exist (Parkhe 1998b). Researchers have found trust to vary across different national contexts with collaboration partners from different countries likely to bring differing conceptions of trust to the business relationship (Zaheer and Zaheer 2006).

In terms of the influence on trust on performance, researchers have found that an OEM’s trustworthiness as a buyer considerably reduces transaction costs and leads to greater information sharing between suppliers and buyers, thus enhancing product
innovation (Dyer and Chu 2003). Researchers found that in the absence of trust automakers spent significantly more of its face-to-face interaction time with suppliers on contracting and haggling, compared automakers who had established trusted relationships with their suppliers, translating into transaction costs found to be up to five times higher compared with the costs of supplier-customer interaction in trusted relationships (Dyer and Chu 2003). Also, in examining inter-firm trust in international import–export relationships researchers have found that trust reduces transaction costs (Katsikeas, Skarmeas, and Bello 2009).

In the context of this study trust at the organizational level is an important factor. While it is people, not organizations, who can trust, organizations have been found to have the capability of developing a reputation for trustworthiness, thereby fostering inter-organizational trust (Dyer and Chu 2011). Trust in this context shows a signal of good faith that the other party will not behave opportunistically and provides the foundation of cooperative activities in pursuit of mutual benefits in inter-firm relationships (Sinkovics et al. 2011). In particular, in trustworthy business relationships, suppliers will be more willing to perform the necessary co-design and co-development tasks to support product innovation in the supplier-customer relationship.

This study will be drawing on literature concluding that there is a positive correlation between trust and market performance (Dyer and Chu 2011) and define trust as the confidence that exchange parties have for each other’s reliability and integrity (Aulakh, Kotabe, and Sahay 1996; Cavusgil, Deligonul, and Zhang 2004; Luo 1997; Madhok 2006).

### 6.6 Hypotheses and Conceptual Framework

#### 6.6.1 The influence of supplier involvement on product innovation

Supplier involvement refers to the extent to which a supplier involves in co-design and new product development processes with their customers in the exchange relationships (Petersen, Handfield, and Ragatz 2003). Supplier involvement in new
product development has been documented as an important factor for successful inter-firm cooperation for innovation. This is particularly salient in the auto industry where auto assemblers involve their first-tier suppliers early for co-design and co-development in the product development processes (Liker et al. 1996; Takeishi 2001).

Prior literature has identified some potential benefits for supplier involvement in new product for both manufactures and their suppliers. For example, some research suggested that supplier involvement can reduce lead times and risks of product development (e.g. Chung and Kim 2003; Liker et al. 1996; Petersen, Handfield, and Ragatz 2003; Takeishi 2001; Wagner and Hoegl 2006). It can also enhance flexibility product quality for manufacturers (Lau, Tang, and Yam 2010; Liker et al. 1996). Research also suggests that the extent to which the suppliers react to their OEM customers’ schedule change, process orders in a timely fashion, deliver quickly, and meet schedule due dates help improve supplier-customer relationships (Handfield and Bechtel 2002). Supplier relationship performance in this context, is defined by Kim et al. (2006) as the extent to which the relationship that the supplier had built with a lead customer had led to improvements in terms of cost reduction, sales growth and profitability, a concept taken over by academic researchers in other contexts, e.g. adapted by Lee and Cavusgil (2006) in their study on alliance governance.

Research also shows that supplier involvement is beneficial for suppliers’ innovation, product quality and financial performance (Chung and Kim 2003). From the KBV and organizational learning perspectives supplier involvement in the form of co-design can facilitate knowledge sharing and learning between suppliers and their customers in the exchange relationships (Lakshman and Parente 2008) with different types of inter-firm collaboration arrangements all shown to facilitate knowledge sharing and innovation (Carayannopoulos and Auster 2010; Tsai 2009). For MNE auto suppliers, involving in co-design with Chinese vehicle assemblers can help them enhance their depth of local knowledge, adapt their products, access promotion channels, select market segments and upgrade their technology for local markets more successfully (Tsang 2002; Zhang, Henke Jr, and Griffith 2009).
In spite of these advantages, increased supplier involvement in co-design may incur some costs and risks which can be detrimental to product innovation. The task of co-designing in new product development requires close and frequent coordination and open communication between exchange parties. However, inter-firm relationships with certain extents of relationship stress and conflicts can hinder coordination efforts and thus impede information sharing and learning between exchange parties. This is particularly noticeable in the context of international exchange relationships in which cultural differences are found to impede efficient knowledge sharing (e.g. Johanson and Vahlne 2009; Parkhe 1998b; Zoubir and Volkema 2002). In addition, in the specific context of China, institutional voids such as lack of legal protection for product innovation (Peng 2003) as outlined in chapter 3.4.3 may drive more opportunistic behaviours including imitation and unfair competition (Andersson and Forsgren 2000; Parkhe 1998a; Wu et al. 2007) which make inter-firm learning more difficult.

Supplier involvement in new product development has also been documented as having a negative impact on product performance (Lakshman and Parente 2008). An explanation used for this result is the possible influence of time lags in performance outcome. Lakshman and Parente (2008) suggest that while they find early supplier involvement in product design to have a negative impact on product performance, it is likely to positively impact performance in later stages of the supplier-customer relationship by providing a high level of preparedness for speed to market and product quality in future projects, thereby resembling a form of alignment process during which suppliers at first encounter difficulties in their relationship with their OEM customers that can later translate into both partners in this supply chain having improved efficacy of their cooperation.

In the context of MNC suppliers and Chinese OEMs, the foreign firms usually possess better technological knowledge and play a role as source of knowledge transfer in the collaborative processes with Chinese OEMs (e.g. McGaughey, Liesch, and Poulson 2000; Wang and Nicholas 2005). However, foreign firms also hope to gain local market knowledge from Chinese OEMs to adapt their products and components to
local customers’ tastes. The nature of asymmetry in the knowledge base and absorptive capacity between exchange relationships may demotivate local partners’ willingness to transfer knowledge to foreign partners. As MNEs transfer more technical knowledge to their Chinese partners, local partners may become more protective and thus limit effective flow and integration of partners’ knowledge. Accordingly, in this study it is argued that the cost and risks of supplier co-design in product innovation may outweigh its benefits at later stages of the cooperation. The literature on learning alliance has shown that the learning race due to asymmetric knowledge resources between exchange partners may hamper firm innovation (Kale, Singh, and Perlmutter 2000). Thus, considered in tandem with its positive effects, these potential negative effects suggest that

\[ H1: \text{In supplier-customer relationships in China, there is an inverted U shape relationship between a supplier’s involvement in co-design and supplier product innovation.} \]

Figure 26: Hypothesis 1

6.6.2 The influence of knowledge protection on supplier product innovation

This study defines knowledge protection as the extent to which firms use certain processes to govern and protect a firm’s proprietary knowledge (Nielsen and Nielsen 2009; Norman 2002). From the TCE perspective, knowledge protection can be seen as a governance mechanism against opportunistic behaviour in the exchange relationships. According to this view, firms may use certain knowledge protection processes such as patents, trademarks and trade secrets to protect their intellectual property (e.g. Anderson and Gatignon 1986). In addition, firms may routinely ask both employees and customers to sign nondisclosure contracts that have IP defence clauses clearly mentioned (Roy and Sivakumar 2011). According to the KBV, knowledge and intellectual property are at the core of the competence of the firms.
Integrating the view from the TCE and the KBV, knowledge protection can serve as a safeguard mechanism to facilitate firms’ willingness of sharing more sensitive and implicit knowledge in the new product development process, which in turn, can drive better product innovation in the exchange relationships. In addition, knowledge protection can codify each party’s rights, duties, obligations, and responsibilities and specify goals; they create formal operating procedures that require communication for knowledge sharing. Thus, firms employing appropriate knowledge protection may gain competitive advantage in inter-firm innovation (Zhang, Henke Jr, and Griffith 2009).

In contrast, an overemphasis on knowledge protection may be detrimental to trust and teamwork in inter-firm relationships. In addition, the development of innovation and creativity requires open and frequent communication and interactions between exchange partners (Roy, Sivakumar, and Wilkinson 2004). Knowledge protection may stifle firms’ intention for knowledge sharing with their partners and hamper product innovation efforts in the product innovation partnerships.

Taking into consideration that recent analysis has challenged the notion that knowledge obtained by a firm is, per se, beneficial for the recipient of that knowledge (Ambos, Ambos, and Schlegelmilch 2006), knowledge protection may be detrimental to the supplier-customer relationship while the knowledge-receiving firm would only benefit from the inflow of knowledge under certain pre-conditions, suggesting that an overemphasis of knowledge protection might be unnecessary and, thus, the negative aspects of knowledge protection might outweigh the positives.

However, the argument by Norman (Norman 2002) that a higher level of knowledge protection decreases learning and product innovation, did not receive empirical support. This is reflected in more recent findings by researchers who confirm that a strong protection orientation does not necessarily inhibit learning opportunities (Rivera-Santos, Dussauge, and Mitchell 2011) and that approaches to learning, innovation and protection may be structurally asymmetric in that innovation and learning require openness whereas protection centres on key proprietary knowledge.
that has been identified as valuable and for which it seeks to avoid any leakage or spill-over to OEM customers or third parties (Hamel 1991; Rivera-Santos, Dussauge, and Mitchell 2011). In this context, knowledge protection and clearly stated protection intent can focus on specific pieces of key proprietary knowledge and may not be detrimental to product innovation in the complex supplier-OEM relationship.

Furthermore, in the context of China where legal and formal governance mechanisms do not work well, first-tier suppliers may employ better knowledge protection and IP defence strategies to serve as a response strategy in overcoming institutional voids, unsatisfactory enforcement and legal hostility (Peng 2003). Thus, this study argues that the benefits of knowledge protection on product innovation may outweigh its deficiencies. Based on these arguments, this study proposes:

\[ H2: \text{ In supplier-customer relationships in China, knowledge protection is positively related to supplier product innovation.} \]

Figure 27: Hypothesis 2

6.6.3 The influence of trust on supplier product innovation

Investigation of the relationship between bargaining power, management control and performance in IJVs has led researchers to attribute the superior performance of some JVs to moderating variables such as mutual trust and highly institutionalized common goals (Ding 1997).

Some researchers have identified trust on an inter-organizational level to be of considerable importance (Mayer, Davis, and Schoorman 1995; Sabel 1993). Taking limitations for automotive OEMs who are legally bound to enter and remain in joint ventures when operating in the Chinese market environment into consideration, this
research will include the examination of the issue of trust on an organizational level, as this facet best applies to Western automotive OEMs’ attempts to build trust with their Chinese partners.

Furthermore, research has shown that trust also matters on a personal, intra- and inter-organizational level within joint ventures (Mayer, Davis, and Schoorman 1995). In China MNC first-tier suppliers have to deal with co-vice presidents, co-directors and co-managers at global lead OEMs’ Chinese IJV subsidiaries and are, therefore, dependent on successfully establishing trusting personal relationships with their counterparts at the customer and on the functioning intra-organizational trust between Western and Chinese co-managers at the IJV OEMs.

In this context trust will be included as a relational aspect along the line of a mutual understanding and confidence that none of the parties involved in lead OEM IJVs will exploit the other party’s or the first-tier supplier’s vulnerabilities (Sabel 1993). Trust will be seen as the willingness of both parties in the collaborative supplier-customer partnership to be vulnerable to the actions of the other party. This willingness is based on the expectation that the other party will perform a particular action important to the first party, regardless of the ability to monitor or control the other party (Mayer, Davis, and Schoorman 1995).

Following these definitions, trust in this study is defined as the confidence that exchange parties have for each other’s reliability and integrity (Doney and Cannon 1997; Zhang, Cavusgil, and Roath 2003). Literature highlights that trust provides better capability in governing cross-border relationships because physical and cultural distance undermine the ability of a formal contract to identify and cover each contingency (Cavusgil, Deligonul, and Zhang 2004).

Because trust eases communication between exchange parties, it is perceived a critical driver of knowledge transfer and acquisition. When trust exists, the exchange parties are more likely to be open and receptive to the knowledge offered by each other
Thomas Hiebaum

(Nielsen and Nielsen 2009). This intimacy is also associated with frequent communication and coordination flexibility, because parties are more willing to respond quickly to inter-firm requests. This can lead to better knowledge exchange and more innovative ideas generation (Zaheer and Zaheer 2006).

A major barrier to inter-firm knowledge transfer and supplier involvement for innovation is potential leakage of valuable knowledge or the spill-over of knowledge to third parties (Álvarez and Molero 2005; Feldmann and Kelley 2006). This is particularly salient when the knowledge base between source and recipient in the exchange relationship is asymmetric. Trust helps overcome this obstacle by establishing a level of predictability and reliability through the accumulation of exchange experiences. That is, a belief that the OEM customer will not use knowledge at the supplier’s expense increases suppliers’ willingness to share valuable knowledge. In addition, trust can enable greater cooperation between the exchange parties and thus foster greater innovation generation. In a trustworthy relationship between MNC suppliers and their OEM customers, Chinese OEMs are more willing to share their local knowledge with their technologically advanced MNC suppliers and lead to their better adaptation and improvement of their products to respond to local market requirements and needs. Hence,

\[ H3: \text{ In supplier-customer relationships in China, trust is positively related to supplier product innovation.} \]

**Figure 28: Hypothesis 3**

6.6.4 The influence of technological uncertainty on supplier product innovation

Technological uncertainty in this study is defined as the extent to which volatility, change, and unpredictability of technology exist in a supplier’s cross-border supplier-
customer relationships with its international customers (Lee et al. 2008). The importance of the organization’s environmental context for innovation is generally well acknowledged in the literature (Kimberly and Evanisko 1981; Souder, Sherman, and Davies-Cooper 1998). Building on this, the current study further argues that suppliers adopt more innovative actions in order to adapt to, and take advantage of opportunities emerging out of supplier-customer relationships by technological uncertainty. According to the KBV, firms attempt to pursue emerging opportunities to establish competitive advantage in rapidly changing environments (Calantone, Harmancioglu, and Droge 2010). Such an environment will lead to the initiation of new product development and innovative behaviours (Calantone, Garcia, and Dröge 2003). Unpredictable changes in the technological environment quickly render existing technologies for a certain customer obsolete, resulting in a shorter product life cycles. Under greater technological uncertainty suppliers must constantly generate innovations to stay ahead of their competitors. The literature shows that a turbulent environment makes technological firms adopt more innovative strategies, implying that technological uncertainty leads to more innovations in supplier-customer relationships (Li and Atuahene-Gima 2001). Hence, this study predicts that:

\[ H4: \text{In supplier-customer relationships in China, technological uncertainty is positively related to supplier product innovation.} \]

Figure 29: Hypothesis 4

6.6.5 The impact of supplier product innovation on supplier performance

The extant literature very well documents the link between innovation and performance. However, empirical research on the innovation–performance relationship shows controversial results (Rubera and Kirca, 2012; Sood and Tellis, 2009). This study extends the innovation-performance relationships to the supplier-
customer context in the auto supply industry in China and treats relationship performance as the ultimate outcome variable. A first-tier supplier in the auto supply industry in China with more innovations should have the ability to create a relationship with its customer that contributes both to the customer’s and the supplier’s market and financial performance. The supplier can provide better product quality and/or deliver better products and services in a timely manner, which in turn enhances the effectiveness and efficiency of the exchange relationship and of the co-design and co-development partnership. The supplier will also be in a position to gain more business opportunities to work with international customers because the innovations will help build its reputation and brand; this in turn will enhance its sales or profits. For example, large global suppliers such as ZF Friedrichshafen, Bosch or Koito have collaborated with S-VW, the joint venture OEM between SAIC and VW in China, to develop localized and innovative vehicles (e.g the VW Lavida, Figure 25) and components to help the above-mentioned suppliers gain a better relationship performance with their major OEM customer. The KBV, on which this study draws, suggests that innovation generation is an outcome of knowledge integration, application and reconfiguration (Grant, 1996), and can lead to a sustainable competitive advantage and, eventually, better firm performance.

Accordingly, it can be suspected that MNE suppliers can overall benefit from innovation in working with OEM customers in China. However, this study argues that this effect is largely context dependent. Thus, this research hypothesizes a positive relationship between product innovation and relationship performance, before addressing moderating factors:

\[ H5: \text{In customer-supplier relationships in China, supplier product innovation is positively related to supplier relationship performance.} \]

Figure 30: Hypothesis 5
6.6.6 The moderating effect of the institutional environment on the link between innovation and supplier market performance

The impact of the institutional environment on innovation and performance has been documented in the literature (Bello, Lohtia, and Sangtani 2004; Peng, Wang, and Jiang 2008). Recent work suggests incorporating institutional environment as a contextual variable to discuss firms’ strategic behaviours in emerging markets. In response to this emerging view, this study examines the contingent effect of the hostility of the legal and institutional environment on the innovation-performance link.

The hostility of the legal and institutional environment is expected to have unique influence on firm innovative behaviour in China. This construct refers to the degree to which the supplier perceives that the environment poses a threat as characterized by precarious industry circumstances, competition and cycles, severe regulatory violations, and generally unfavourable conditions beyond the control of the firm (Zhang, Cavusgil, and Roath 2003). Institutional constraints such as relatively underdeveloped government, legal and financial institutions pose threats in terms of weak IP protection, unsatisfactory legal enforcement and dysfunctional competition for MNEs doing business in China. For example, it has been observed that patent and copyright violations, broker contracts and agreements and unfair competitive practices have become widespread in China (Peng and Luo 2000). As shown in great detail in chapters 3.3 and 3.4 unfair competitive practices, weak enforcement of otherwise good laws that are in line with international standards and the lack of an independent judicial system in China remain at the core of the concerns addressed by MNC suppliers through their respective chambers. The IPRs of MNC suppliers that result from product innovation may go unprotected in a hostile or dysfunctional legal environment, making product innovation a risky and less profitable strategy.

According to the institutional theory (Peng 2003; Scott 2001), firms’ strategic behaviours are likely to be influenced by institutional constraints, particularly in emerging markets, such as China. Thus,

\[ H6: \text{In supplier-customer relationships in China, the positive relationship between supplier product innovation and supplier relationship performance is weaker when high hostility of the legal and institutional environment is encountered.} \]
Figure 31: Hypothesis 6

The conceptual framework of this study is made up of the above six hypotheses and is depicted in its entirety below (see Figure 32: Conceptual Framework).

Figure 32: Conceptual Framework
7 Research Design

7.1 Development of questionnaire and measurement scales

All the constructs in the model are measured by a set of reflective indicators, and all reflective indicators of a particular theoretical variable measure the same thing. In developing measures, the current study adapted existing scales from the literature wherever possible. The initial scales were developed using the approach to measure development recommended by Churchill (1979b, 1979a). First, the domain of each construct was clearly defined; delineating what would be included in and excluded from the definition. Second, a focused review of the interdisciplinary literature was performed to locate any relevant scales available for the current study. After the scales were selected, they were adjusted to fit the context in this study. Multi-item scales and a seven-point Likert-scale response format were used to operationalize all constructs and variables in the study. The questionnaire was developed in English and translated into Chinese, then back-translated into English by a third party, to confirm that it was an equivalent translation. The measures were adapted from existing studies using existing tested scales from previous research which were adapted and refined for this study when determined as appropriate and necessary based on feedback from experienced researchers and practitioners in the area of inquiry.

A five-item scale was used to measure supplier involvement in co-design. The scale items were taken from Lakshman and Parente (2008) to measure whether suppliers were involved in co-design activities with their customers, how early in the design process suppliers were involved, what level of involvement was seen between suppliers and customer, who benefited from the involvement and whether entering into co-design activities with OEM customers were considered to be a priority for suppliers.

<table>
<thead>
<tr>
<th>Original version (Lakshman and Parente 2008)</th>
<th>Adapted version</th>
</tr>
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<tbody>
<tr>
<td>Suppliers get involved in new product development processes in early stages of design.</td>
<td><strong>My company usually</strong> gets involved in the new product development process in an early stage of product design.</td>
</tr>
<tr>
<td>Suppliers have an active role in product design specifications.</td>
<td><strong>We</strong> have an active role in product design specifications.</td>
</tr>
</tbody>
</table>
During product development, there is a high level of involvement between our development team and our suppliers. During the product development stage, there is a high level of involvement between our development team and our major OEM customer.

During product development, our suppliers often benefit from our expertise and experience. During the product development stage, our major OEM customer often benefits from our expertise and experience.

Co-design activities of our product are a major priority to us. Co-design activity on our product with our OEM customer is a major priority for us.

For knowledge protection, the extent to which the multi-national enterprise suppliers adopted procedures and processes to protect their proprietary knowledge assets (Kale, Singh, and Perlmutter 2000; Norman 2002) was measured. The literature review suggests that knowledge protection intent involves a firm’s top-management’s statement of intention (e.g. Hamel 1991) and the existence of incentives that a firm puts into place in order to prompt knowledge protection behaviours by employees on the operational level (e.g.Kale, Singh, and Perlmutter 2000). Research has shown that a statement of knowledge protection intent, in particular when reinforced by operational decisions, management systems and a clear set of guidelines for employees can diminish the risk of knowledge spill-overs (Rivera-Santos, Dussauge, and Mitchell 2011). Items for measurement of systemized processes and the effective use of patents, trademarks and registered designs were developed from extant literature to fit the current study accordingly. Following Norman (2002) it can be argued that certain resource-based and relational characteristics are associated with actions taken to protect knowledge from unwanted access and appropriation. Norman’s findings suggest that firms assess the intentions of partners and adapt in the sense that the perceived customer learning intent leads to the firm protecting knowledge to a greater extent (Norman 2002). Items were adapted from Gold (Gold, Malhotra, and Segars 2001) to measure processes that are in place for the protection of knowledge from inappropriate use and the existence of incentives that encourage knowledge protection.
Developed following Candelin-Palmqvist et al., Gold et al., Hanel, Kale et al. and Norman (Candelin-Palmqvist, Sandberg, and Mylly 2012; Gold, Malhotra, and Segars 2001; Hanel 2006; Kale, Singh, and Perlmutter 2000; Norman 2002)

My company relies on patents and trademarks to protect our critical knowledge from inappropriate use.

My organization has processes to protect knowledge from inappropriate use inside the organization (Gold, Malhotra, and Segars 2001).

My organization has processes to protect knowledge from inappropriate use outside the organization (Gold, Malhotra, and Segars 2001).

My organization has incentives that encourage the protection of knowledge (Gold, Malhotra, and Segars 2001).

My company has incentives that encourage the protection of knowledge.

My company has processes to protect knowledge from inappropriate use inside or outside the organization.

My organization has processes to protect knowledge from inappropriate use inside the organization.

My company has processes to protect knowledge from inappropriate use outside the organization.

My company has incentives that encourage the protection of knowledge.

Trust is defined as the confidence in the reliability and integrity of the other party, and the ability to predict the actions of the other party in the relationship, as well as the belief that the other party will not act opportunistically when the opportunity arises (Anderson and Narus 1990; Morgan and Hunt 1994). A five-item scale was used to measure trust; it was taken from Doney and Cannon (1997) and adapted to the context of this study. Trust measures the supplier’s perception of the credibility and benevolence of their international customers in its cross-border customer-supplier partnerships.

<table>
<thead>
<tr>
<th>Original version (Doney and Cannon 1997)</th>
<th>Adapted version</th>
</tr>
</thead>
<tbody>
<tr>
<td>This supplier keeps promises it makes to our firm.</td>
<td>We trust our international customer is able to fulfil contractual agreements.</td>
</tr>
<tr>
<td>This supplier is not always honest with us.</td>
<td>Our international customer is not always honest with us.</td>
</tr>
<tr>
<td>We believe the information that this vendor provides us.</td>
<td>We believe the information that this international customer provides us.</td>
</tr>
<tr>
<td>This supplier is genuinely concerned that our business succeeds.</td>
<td>Our international customer is genuinely concerned that our business succeeds.</td>
</tr>
<tr>
<td>When making important decisions, this supplier considers our welfare as well as its own.</td>
<td>When making important decisions, our international customer considers our welfare as well as its own.</td>
</tr>
<tr>
<td>We trust this vendor keeps our best interests in mind.</td>
<td>We trust our international customer keeps our best interests in mind.</td>
</tr>
<tr>
<td>This supplier is trustworthy.</td>
<td>Our international customer is trustworthy.</td>
</tr>
</tbody>
</table>
Technological uncertainty was conceptualized to capture product complexity, technological innovation, and the rate of technological change in the industry (Kirti Sawhney, Robert, and John 1999). Items for measurement of technological uncertainty were taken from Celly et al.’s (1999), Kirti et al.’s (Kirti Sawhney, Robert, and John 1999) and Jaworski and Kohli’s (1993) technological turbulence scales without any adaptations.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>The technology in our industry is changing rapidly.</td>
<td>No changes.</td>
</tr>
<tr>
<td>Technology changes provide big opportunities in our industry.</td>
<td>No changes.</td>
</tr>
<tr>
<td>There are high technological innovations in our industry.</td>
<td>No changes.</td>
</tr>
<tr>
<td>More complex products are provided in our industry.</td>
<td>No changes.</td>
</tr>
</tbody>
</table>

Product innovation in customer-supplier relationships is frequently understood as the supplier’s application or utilization of knowledge in the creation of new developments, modifications or innovative improvements to products or processes (Koufteros, Edwin Cheng, and Lai 2007; Nielsen and Nielsen 2009). As this study focuses on the overall product innovation performance in an automotive first-tier supplier – OEM customer relationship, the specifics of the automotive industry context, namely the set of complex relationships between the auto manufacturers and their first-tier suppliers which leads to increasingly close cooperation and collaboration between customers and suppliers and to a very high degree of first-tier supplier involvement into the development and design of vehicles and their main components, the importance of the supplier-customer relationship for product innovation performance needs to be addressed (Neubauer and Rudow 2012). In this context, the relationship value defined from a managerial perspective as the received benefits perceived by suppliers in terms of their expectations from a business exchange relationship (Ulaga 2003), is of considerable importance. First-tier suppliers tend to establish co-design and co-development relationships with lead OEM customers who are at the forefront of
technology or whose product expertise is high (Cheung, Myers, and Mentzer 2010),
discounting short-term financial gains for the long-term benefits of an innovation
development network that serves both sides and helps the supplier build expertise in
his specific business segment. Thus, product innovation was conceptualized adapting
items from Cheung et al. (Cheung, Myers, and Mentzer 2010) to capture the effect
that the relationship established between a first-tier supplier and the major OEM
customer – who respondents were asked to think about when answering the questions
– has on improvements and adaptive innovations to existing products, on product
return rates and the ability to develop new products. In addition, one item was
combined from Cheung et al. (Cheung, Myers, and Mentzer 2010) and Wolfgang
Ulaga (Ulaga 2003) and adapted to measure the effect of the supplier-customer
relationship on product improvements and adaptations over the most recent three-year
period.

<table>
<thead>
<tr>
<th>Original version</th>
<th>Adapted version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relationship with this customer has a positive effect on our ability to make improvements to our existing products (Cheung, Myers, and Mentzer 2010).</td>
<td>Our relationship with the customer has a positive effect on our ability to make improvements / adaptations to our existing products.</td>
</tr>
<tr>
<td>Our relationship with this customer has helped lower product return rates on their orders with us (Cheung, Myers, and Mentzer 2010).</td>
<td>Our relationship with the customer has helped lower product return rates on their orders with us.</td>
</tr>
<tr>
<td>Our relationship with this customer has a positive effect on our ability to develop successful new products for our markets (Cheung, Myers, and Mentzer 2010).</td>
<td>Our relationship with the customer has a positive effect on our ability to develop successful new products for our markets.</td>
</tr>
<tr>
<td>Combined and adapted from Cheung et al. and Ulaga (Cheung, Myers, and Mentzer 2010; Ulaga 2003)</td>
<td>Our relationship with the customer has helped us to achieve a great number of product adaptations / improvements in the last three years.</td>
</tr>
</tbody>
</table>

The importance of the hostility of the legal and institutional environment has been
identified by researchers in the context of foreign distributor relationships (e.g.Zhang,
Cavusgil, and Roath 2003) in the context of global outsourcing (e.g.Roy and
Sivakumar 2011) and in the specific context of the legal and institutional environment
that is found in China (e.g.Sheng, Zhou, and Li 2011). Measures were adapted from
Cavusgil et al. (Cavusgil, Deligonul, and Zhang 2004). Two items included in this
section measure the extent to which the manufacturer perceives the institutional or
legal environment in China to pose a threat, as characterized by precarious industry
circumstances, such as competition and cycles, severe regulatory violations, or generally unfavourable conditions beyond the control of the firm.

<table>
<thead>
<tr>
<th>Original version (Doney and Cannon 1997)</th>
<th>Adapted version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local companies, including distributors, frequently interpret local laws in their favor.</td>
<td>Local companies in China frequently interpret local laws in their favor.</td>
</tr>
<tr>
<td>Local companies, including distributors, frequently violate distribution laws in this market.</td>
<td>Our OEM customers frequently violate local laws in their favor.</td>
</tr>
</tbody>
</table>

Firm age and organizational arrangements were integrated into the study as control variables. Firm age is a well-recognized factor in a firm’s strategic choices and performance. Firm age is measured by the number of years since entering China. Extant literature on the analysis of entry modes and legal conversion of IJVs into WFOEs in China has highlighted the importance of firm age in China, i.e. the length of an established, successful operation in the Chinese market environment, on firm performance (Puck, Holtbrügge, and Mohr 2009).

Following the discussion in chapter 2.4. on the legal framework of the auto industry in China, firms’ organizational arrangements are divided into two categories, namely WFOE and IJV. Organizational arrangement was measured by dichotomous variable, assigning 1 as IJV and 2 as WFOE.

The questionnaire was translated into Mandarin Chinese, checked with two ethnic Chinese managers regarding the accuracy of technical terms and abbreviations, as well as understandability and comprehensibility, and was subsequently translated back into English following Brislin’s guidelines for translation quality equivalence between source and target versions (Brislin 1970). The survey instrument was then pre-tested with a small group of managers from different companies before sending out the final version. Pretesting helped verify the language suitability and reject items that were difficult to understand, or involved unnecessary repetition. Reverse translation and pre-tests ensured that both versions were equivalent.
Subsequently, the English and Chinese versions were both uploaded online with an option for language selection and hard-copy English versions were used for non-Chinese interviewees, whereas Chinese interviewees were questioned using the Mandarin Chinese version of the questionnaire.

7.2 Unit of analysis

Relationships between MNC first-tier suppliers and their OEM customers in the automotive industry in China were chosen as the empirical setting for this study for the following reasons.

First, unique knowledge asymmetries exist in this specific inter-firm relationship. Before the influx of multinational firms in the mid-1980s, the Chinese automotive industry was far behind the world standard in terms of technological and managerial capabilities. Hence, most of the technical knowledge transfer is moving from MNCs as the source of that knowledge to OEMs in China, both local Chinese OEMs and IJV OEMs with global lead automotive manufacturers, as receiving organizations. The relationships between MNC suppliers and Chinese OEMs are subject to a high degree of relational stress, due to this significant asymmetry in the exchange relationship.

In addition, China is the world’s fastest-growing automobile market. Thus, examining product innovation for MNE suppliers in the Chinese automotive industry could provide managerial and theoretical implications for MNEs’ innovation and international strategies in emerging markets.

Furthermore, in order to achieve success in the Chinese market environment in the automotive industry, the most prevalent engineering task that multinational corporations’ subsidiaries and joint ventures perform is to adapt existing product designs to the local conditions, regulations, and consumer tastes. Consequently, large variations in the mechanisms and outcomes of product innovation for MNE suppliers can be observed in this setting.
7.3 Sampling frame and data collection

This research study focuses on the relationship dyad between foreign suppliers and their major Chinese OEM customers in the automotive industry in China. Senior product and project managers from MNEs directly involved in international OEM relationships with Chinese customers were chosen as the key informants for this study. A survey methodology was used to collect the data. The sampling frame consisted of MNEs supplying automobile parts, taken from the lists in the directory of China Automobile and Parts (850 companies), which are produced by different nations’ chambers of commerce in China. The sample was focussed on MNC suppliers that meet the following criteria: (1) for-profit MNEs that are potentially in need of both the technical and managerial know-how of local firms and engage in product innovation in China, (2) MNC first-tier suppliers, i.e. suppliers in a direct business relationship with auto manufacturers, (3) MNEs with only one foreign parent and (4) wholly foreign-owned or international joint ventures. All firms in the database were contacted to assess their eligibility and to determine appropriate informants for the study. Respondents were asked to specify their most important OEM customer in China in terms of largest sales volume and think of that particular customer when answering questions in the questionnaire.

Data collection was conducted in two stages. In-depth interviews were first conducted with seven senior managers, directors, vice presidents or general managers of MNC first-tier suppliers. This initial qualitative and exploratory approach provided valuable inputs for the development of the questionnaire and the adaptation of the key constructs to the industry context. The interviews served as an a priori test of the key constructs with respect to their usefulness and appropriateness. The detailed discussion of the qualitative pre-study interviews can be found in chapter 4 of this research, the interview guideline for the semi-structured interviews is attached in the appendix.
In the second stage, the relevant survey data was collected through different approaches, including mail, telephone and face-to-face interviews using hard-copy versions of the questionnaire. The questionnaire was also made available online and distributed to managers in the auto supply industry through cooperation with the European Union Chamber of Commerce’s Auto Components Working Group and the German Chamber of Industry and Trade. The senior managers involved in the survey answered the questionnaire by choosing their firm’s major OEM customer in China and responding to all questions with respect to their firm’s relationship with that customer.

Of the 850 firms contacted, a total of 170 usable questionnaires were returned, resulting in an effective response rate of 20.0% (170/850). A detailed analysis of respondent demographics is provided in chapter 7.5. Among the 170 firms, 64.7% were joint ventures of all forms, and the rest were MNC supplier subsidiaries. With regards to nationality, the MNE suppliers in our sample came from various countries or regions, including the most important auto nations with large investments in China, namely Germany, the United States, Japan, South Korea and France.

The sample also includes suppliers of a variety of key automobile parts, components and modules, including brakes and brake systems (27.6%), chassis (26%), motor (25.8%), general electrics (23.5%), clutches (23%), petrol sensors (20%), filtration (18.2%), body (17.6%), exhaust (15.9%), lighting (15.3%), cooling (13.5%), oil and chemicals (8%), batteries (8.2%) and others.

Non-response bias was assessed by classifying the responses into two groups, early respondents and late respondents (Armstrong and Overton 1977). The possibility of non-response bias was checked by comparing the respondents with the non-respondents in terms of number of employees, sales volume, and age of company. The results of the ANOVA show that there are no statistically significant differences between the respondents and the non-respondents in any of these aspects (F=0.63, P>0.10; F=0.92, P>0.10; F=0.77, P>0.10).
A reliable assessment of non-response bias can only be achieved via feedback from the non-respondents themselves. Therefore, a selection of non-respondents was identified and contacted by phone or mail with the goal of obtaining explanations for their lack of response. In all cases, reasons provided were related to time pressures in filling out the questionnaire, non-availability of senior management due to business trips, the general notion that the questionnaire was too demanding and that other requests for feedback had to be prioritized. These findings imply that non-response bias does not pose a significant threat to the study.

### 7.4 Common method bias assessment

When a survey method is used to collect data using a single source, common method bias is always a potential threat. Thus, Podsakoff and associates’ (2003) steps were stringently followed with the goal of limiting and assessing the effects of common method variance. First, scale items were carefully constructed drawing on existing research and using a systematic questionnaire and measure development and refinement process as outlined in chapter 7.1 of this study. Second, anonymity was guaranteed to all respondents orally and in writing where required. Respondents were urged to respond to questions as honestly as possible considering that there were no right or wrong answers and results would only be presented to third parties in anonymized and aggregated form. Third, within the questionnaire, items were grouped together within general topic areas and not within conceptual dimensions so that respondents were not able to readily detect which underlying constructs were being measured or to guess or anticipate relationships between predictor and criterion variables. Fourth, post-hoc methods, namely Harman’s one-factor rule and partial correlation, were employed to assess the potential effect of common method bias (Podsakoff and Organ 1986). The analysis produced seven factors with eigenvalues greater than 1, accounting for 69% of the variance. Neither a single factor nor a general factor emerged that could account for the majority of the covariance in the measures. Fifth, objective performance data was collected on sales growth, profitability and turnover from firms in the sample. The objective data collection proved to be quite a challenge in light of disclosure requirements in China which
makes such data not always readily available and accessible. Objective data could, however, be collected for 31 firms of the sample.

Correlations between the objective sales growth and turnover indicators and the product innovation measure are 0.406 (p<0.01) and 0.35 (p<0.01), respectively, and thus provides good evidence for external validity of the psychometric measures used in the questionnaire.

Therefore, following the literature (Podsakoff and Organ 1986) it can be concluded that common method bias does not pose a major threat to the study.

7.5 **Respondent demographics**

As outlined in the sampling frame section 850 firms in the auto supply industry in China were contacted. In order to obtain contact data of senior managers within those companies, the cooperation of the European Chamber of Commerce’s (EUCCC) Automotive Components Working Group (ACWG) was sought and granted. In addition, member companies of both, the German Chamber of Commerce in China’s (GCCC) German Industry and Commerce China’s automotive supply industry subgroup, and the American Chamber of Commerce in China’s (AmCham China) auto council, supported the collection of data through their participation and referencing of contacts of their respective working groups and councils. A total of 170 useable questionnaires were returned, resulting in an effective response rate of 20% (170/850).

Unfortunately demographic information on respondents and respondent companies is not always complete. Some respondents chose not to answer this set of questions even when willing to respond to the questions in the questionnaire and even though anonymity was guaranteed. Other respondents were either not knowledgeable enough about specifics of company demographics or pretended not to be. Secondary analysis on information provided, such as operating margins, turnover, headcount, company profitability, etc. could not always be obtained to confirm or contradict responses provided during the interviews. Secondary, objective data could, however, be
collected for 31 firms of the sample, supporting external validity of psychometric measures from the questionnaire.

Among the 170 firms the vast majority were joint ventures (64.7%) of all forms including the largest group of JVs, namely IJVs with Chinese partners (60.6%). Amongst IJVs with Chinese partners the foreign investor was mostly of German (29.4%), South Korean (14.7%), and Japanese (6.5%) origin.

46.5% of respondent companies were foreign-owned enterprises either as JVs between international investors with no Chinese partner (2.4%) or as WFOEs with Germany (15.3%), the USA (9.4%) and Japan (3.5%) as largest source countries of investment.

5.9% of respondent companies were Chinese companies, i.e. had no foreign partner or investor. Despite our focus on taking the Western company perspective and the subsequent attempt to limit the sampling frame to MNC first-tier suppliers, ideally only one foreign parent and the legal setting of wholly foreign-owned or international joint ventures, 10 Chinese companies (5.9%) were amongst the respondents.

JVs with some form of investment from Hong Kong or Taiwan though frequently found by researchers to make up a large majority of FDI into China (e.g. Buckley 2004) were of no significance in our sample with 2.4% and 2.9% of respondent companies respectively, corresponding with the position of Hong Kong and Taiwan in the global auto industry.

MNC suppliers in the sample came from various countries or regions, including Germany (25.9%), Korea (12.9%), the United States (12.3%), Japan (10%), France (3.6%), and others. This reflects to a good deal the heavy investment into the auto industry by German lead OEMs Volkswagen, Daimler and BMW, Korean lead OEMs
Hyundai and Kia, the large set-up by General Motors, in particular in Shanghai, Ford in Central China, as well as Japanese investments by Honda, Toyota, etc. in Southern China and the investment by their main suppliers from their home markets that the OEM’s Chinese set-up triggered (e.g. Gao 2004; Posth 2006; Roberts et al. 2005).

Unfortunately, more than half of all respondents were not able to give meaningful description of the legal set-up of their group China operations (holdings, regional headquarters, etc.), but were only knowledgeable with regard to the legal entity at which they themselves worked. It might, therefore, be that an IJV in our sample is invested by a WFOE holding company from country x and a local Chinese partner. It might just as well be invested by an IJV and a local Chinese partner, thereby being majority Chinese-owned.

Also, 29.4% of respondents couldn’t give useful information on the number of years that their companies were active in China with secondary analysis showing that in some cases information on “the legal entity you work for” and “your company’s China operations” might have been mixed up. Future research should take this into consideration and formulate the questions more clearly and more easily understandable.

In terms of the type of product that suppliers in the sample manufacture, a large variety of parts, components, modules and systems can be found. Most common are the following:

1. Brakes and brake systems (27.6%)
2. Chassis (26%)
3. Motor (25.8%)
4. General electrics (23.5%)
5. Clutches (23%)
6. Petrol sensors (20%)
7. Filtration (18.2%)
8. Body (17.6%)
9. Exhaust (15.9%)
10. Lighting (15.3%)
11. Cooling (13.5%)
12. Batteries (8.2%)
13. Oil and chemicals (8%)

51.8% of respondents hail from companies that not only manufacture parts, components and modules in China for their OEM customers, but have local design and development capabilities and implement some degree of local design and development in the products sold in the Chinese market environment, whereas the rest only manufacture locally, based on designs from parent companies or according to detailed customer specifications and drawings. 38.8% of respondents report implementation of local design and development adaptations to between 20% and 80% of their products sold in China to create a fit with local market and homologation requirements, whereas 97.6% of respondents confirm product duplications from MNC company headquarters or other locations.

More than seventy per cent of respondents were at senior manager, director, vice president or managing director / CEO level of their company’s management hierarchy with responsibility for product development, sales and marketing, business development, strategy or overall company management, consistent with other studies that use senior management respondents to report on product innovation, learning, opportunism, knowledge management, etc. in the context of MNC’s foreign subsidiaries, alliances and so forth (e.g. Puck, Holtbrügge, and Mohr 2009; Takeishi 2001; Tse, Pan, and Au 1997; Van Echtelt et al. 2008; Zhao and Anand 2009; Zhao et al. 2008).

For the sake of this thesis all data will be analysed in an aggregated manner.
While there is an appreciation that the data could be further sub-divided, this will be left for future research, whereby potential benefits can be seen by extracting sub-questions for further analysis or dividing the sampling frame along different lines for in-depth analysis.

For example the nationality of foreign investors provides an opportunity to analyse if companies from a Japanese or Korean background put more or stronger emphasis on the protection of their knowledge based on their own experiences and the cultural background of their managers than companies from, say, Germany or the United States, as suggested by some researchers (e.g. Li, Lam, and Qian 2001; Luo 1997; Selmer 1999a).

Also, analysing the set of data according to different groups of products could be of interest for future research. For instance, suppliers who identify themselves as manufacturers of value-added modules or who provide auto manufacturers with complete systems might be more cautious in terms of willingness to share their knowledge with their customers (e.g. McGaughey, Liesch, and Poulson 2000; Wang and Nicholas 2005) than such suppliers who identify themselves as suppliers of commodities.

Future research could look at the data set in terms of the customer in question. It might be that suppliers take different approaches with different customers based on past experience and the level of trust that their relationship with different customers show, leading to a very open co-design, co-development approach with one customer and a very protective approach with another. Possibly, even a dyadic study to look at such possible differences from both sides might be of interest.

Furthermore, 48.2% of respondents stated that their companies had no local design and development capabilities. Future research might take a closer look at specifying where design and development is conducted, which forms of design and development are available in the local market environment and which consequences this might
have on product innovation or a focus on protecting knowledge from spill-over to third parties.

While there is an appreciation that the sub-division of data could yield interesting results in many aspects, this will be left for future research. First, knowledge, intellectual property and the active protection of both are increasingly becoming a source of wealth for firms, in particular in the context of China. However, literature on this topic has been found to be relatively scarce and much of it is descriptive focusing on specific industries or country contexts (Candelin-Palmqvist, Sandberg, and Mylly 2012). Thus, the aggregate analysis of the data points in this study yields quite interesting results even without further sub-division of data and provides for empirical analysis of a topic dominated by descriptive analysis, thereby closing a gap in the literature.

Secondly, the set of usable data is limited to 170 data points, thus not providing sufficiently large sets of data for parametric statistical calculations and analysis of many potentially interesting sub-divisions of data. Such sub-division has, therefore, not been undertaken.

8 Analysis and Results

8.1 Measurement model assessment and construct validity

First, the loadings of individual items with their respective constructs were examined as depicted in Table 3. All items with loadings above 0.5 were retained and most of the factor loadings for the measures exceed the threshold level of 0.7, recommended by Fornell and Larcker’s (1981). The items removed due to low reliability are depicted in Table 2.
Table 2: Items removed due to low reliability

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Loadings</th>
<th>Result</th>
<th>Items removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier Involvement</td>
<td>all items above 0.5</td>
<td>all items retained</td>
<td>We avoid disclosing the key components of product when dealing with OEM customers.</td>
</tr>
<tr>
<td>Knowledge Protection</td>
<td>3 items below 0.5</td>
<td>3 items removed</td>
<td>My company values and protects knowledge embedded in individuals.</td>
</tr>
<tr>
<td>Trust</td>
<td>1 item below 0.5</td>
<td>1 item removed</td>
<td>Our automotive OEM customer is trustworthy.</td>
</tr>
<tr>
<td>Technological Uncertainty</td>
<td>1 item below 0.5</td>
<td>1 item removed</td>
<td>Production (or service) techniques / processes change very frequently in our industry.</td>
</tr>
<tr>
<td>Product Innovation in Customer-Supplier Relationships</td>
<td>3 items below 0.5</td>
<td>3 items removed</td>
<td>Our relationship with this customer has helped increase sales from incremental product introduced by your firms in the last three years.</td>
</tr>
<tr>
<td>Relationship performance</td>
<td>all items above 0.5</td>
<td>all items retained</td>
<td>Our relationship with the customer has helped us to achieve drastic changes in technology platforms or production processes in the last three years.</td>
</tr>
<tr>
<td>Hostility of Legal and Institutional Environment</td>
<td>2 items below 0.5</td>
<td>2 items removed</td>
<td>Our relationship with this customer has helped our company frequently introduce radical new products into new markets in the last three years.</td>
</tr>
</tbody>
</table>

Second, Cronbach’s alpha and the composite reliability values for each of the latent constructs were examined. Both measures suggest reasonable reliability, with all values exceeding the 0.7 threshold (Nunnally and Bernstein 1994). Table 4 reports the measures that were used, their respective item loadings, and the construct reliabilities.

Convergent validity was assessed using average variance extracted (AVE) (see Table 4), as suggested by Fornell and Larcker (1981). Convergent validity was found to be satisfactory as all the values are greater than 0.5 (Henseler, Ringle, and Sinkovics 2009). The discriminant validity was further checked using two methods, the Fornell-Larcker criterion (1981) and the cross-loadings of items. For each variable, the AVE turned out to be higher than its highest squared correlation with any other measure,
thus an adequate level of discriminant validity can be safely assumed. This is supported by the cross-loadings. The loading of each indicator is greater than all of its cross-loadings (Henseler, Ringle, and Sinkovics 2009). Thus, all of these analyses indicate that the data are robust, and well within acceptable ranges.
### Table 3: Measures and Composite Reliabilities

<table>
<thead>
<tr>
<th>Construct (Composite Reliability: $\text{CR}_\eta$)</th>
<th>Item (Loading)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supplier Involvement in Co-design</strong> ($\text{CR}_\eta = 0.842$)</td>
<td>(1=strongly disagree; 7=strongly agree)</td>
</tr>
<tr>
<td>My company usually gets involved in the new product development process in an early stage of product design. (0.666)</td>
<td></td>
</tr>
<tr>
<td>We have an active role in product design specifications. (0.698)</td>
<td></td>
</tr>
<tr>
<td>During the product development stage, there is a high level of involvement between our development team and our major OEM customer. (0.735)</td>
<td></td>
</tr>
<tr>
<td>During the product development stage, our major OEM customer often benefits from our expertise and experience. (0.825)</td>
<td></td>
</tr>
<tr>
<td>Co-design activity on our product with our OEM customer is a major priority for us. (0.624)</td>
<td></td>
</tr>
<tr>
<td><strong>Knowledge Protection</strong> ($\text{CR}_\eta = 0.814$)</td>
<td></td>
</tr>
<tr>
<td>My company has formal and systemized processes for protecting knowledge, e.g. contracts, regulations and procedures. (0.682)</td>
<td></td>
</tr>
<tr>
<td>My company relies on patents and trademarks to protect our critical knowledge from inappropriate use. (0.788)</td>
<td></td>
</tr>
<tr>
<td>My company has processes to protect knowledge from inappropriate use inside or outside the organization. (0.793)</td>
<td></td>
</tr>
<tr>
<td>My company has incentives that encourage the protection of knowledge. (0.623)</td>
<td></td>
</tr>
<tr>
<td><strong>Trust</strong> ($\text{CR}_\eta = 0.866$)</td>
<td>(1=strongly disagree; 7=strongly agree)</td>
</tr>
<tr>
<td>My company trusts that our automotive OEM customer is able to fulfil contractual agreements. (0.728)</td>
<td></td>
</tr>
<tr>
<td>As far as key issues are concerned, our OEM customer is always honest with us. (0.795)</td>
<td></td>
</tr>
<tr>
<td>My company believes the information that our OEM customer provides to us. (0.761)</td>
<td></td>
</tr>
<tr>
<td>Our OEM customer is genuinely concerned about whether our business succeeds. (0.759)</td>
<td></td>
</tr>
<tr>
<td>When making important decisions, our OEM customer considers our welfare as well as its own. (0.708)</td>
<td></td>
</tr>
<tr>
<td><strong>Technological Uncertainty</strong> ($\text{CR}_\eta = 0.816$)</td>
<td>(1=strongly disagree; 7=strongly agree)</td>
</tr>
<tr>
<td>Technological changes provide big opportunities in our industry. (0.768)</td>
<td></td>
</tr>
<tr>
<td>There is a high level of technological innovation in our industry. (0.787)</td>
<td></td>
</tr>
<tr>
<td>More complex products are provided in our industry. (0.761)</td>
<td></td>
</tr>
<tr>
<td><strong>Product Innovation in Customer-Supplier Relationships</strong> ($\text{CR}_\eta = 0.858$)</td>
<td>(1=strongly disagree; 7=strongly agree)</td>
</tr>
<tr>
<td>Our relationship with the customer has a positive effect on our ability to make improvements /adaptations to our existing products. (0.819)</td>
<td></td>
</tr>
</tbody>
</table>
Our relationship with the customer has helped lower product return rates on their orders with us. (0.764)
Our relationship with the customer has a positive effect on our ability to develop successful new products for our markets. (0.761)
Our relationship with the customer has helped us to achieve a great number of product adaptations/improvements in the last three years. (0.759)

**Relationship performance** (CR η = 0.863) (1=strongly disagree; 7=strongly agree)
Our relationship with our customer helps to increase sales (0.776)
Our relationship with our customer helps to increase our market share. (0.852)
Our relationship with our customer helps to increase our profitability. (0.839)

**Hostility of Legal and Institutional Environment** (CR η = 0.920) (1= strongly disagree; 7= strongly agree)
Local companies in China frequently interpret local laws in their favour. (0.898)
Our OEM customers frequently violate local laws in their favour. (0.948)

**Table 4: Inter-correlations and Shared Variances of Measures (n=170)**

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
<th>F7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier Involvement in Co-design (F1)</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Protection (F2)</td>
<td>.52</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust (F3)</td>
<td>.25</td>
<td>.49</td>
<td>.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technological Uncertainty (F4)</td>
<td>.27</td>
<td>.37</td>
<td>.44</td>
<td>.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Innovation (F5)</td>
<td>.50</td>
<td>.38</td>
<td>.48</td>
<td>.46</td>
<td>.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship performance (F6)</td>
<td>.47</td>
<td>.38</td>
<td>.44</td>
<td>.40</td>
<td>.62</td>
<td>.82</td>
<td></td>
</tr>
<tr>
<td>Hostility of Legal and Institutional Environment (F7)</td>
<td>.43</td>
<td>.29</td>
<td>.40</td>
<td>.30</td>
<td>.25</td>
<td>.27</td>
<td>.92</td>
</tr>
</tbody>
</table>

Correlations are shown in the lower triangle of the matrix. Numbers on the diagonal shown in bold denote the square root of the average variance extracted.
8.2 Structural model assessment

After ensuring that the outer model is both reliable and valid, the inner path model was examined in detail using SmartPLS (Ringle, Wende, and Will 2005). The explanatory power of a partial least squares (PLS) model is determined by the amount of variance explained ($R^2$) by the endogenous latent variables (Henseler, Ringle, and Sinkovics 2009). The $R^2$ value for relationship performance is 0.385. While Chin (1998) sets thresholds of 0.67, 0.33, and 0.19 for substantial, moderate, and weak inner path models respectively, Henseler et al. (2009) suggest that a “moderate” $R^2$ value is acceptable if an endogenous latent variable is explained by only one or two exogenous latent variables. To this end, results from this study can be seen as relevant and indicative for future research as the prediction capability of the model is sufficiently high. The prediction capability of the model was also checked using Stone-Geisser’s $Q^2$, as suggested in Henseler et al. (2009), applying the blindfolding technique (Tenenhaus et al. 2005).

9 Discussion

With the increase in global innovation outsourcing and a significant shift towards supplier-driven innovation networks and open innovation, suppliers are now playing key roles in innovation generation in global supply chains in particular in the automotive industry in which suppliers have increasingly become system suppliers accounting for an increasing proportion not only of the cost price but of the innovation built into a new vehicle model, thereby defining the systematic of the automotive supply chain. Suppliers have moved into increasingly close cooperation and collaboration with automotive OEMs and are highly involved in the development and design of vehicles and their main components with growing responsibility of functionality, quality and value of the vehicle (Azadegan and Dooley 2010; Liker et al. 1996).

In the global automotive industry, multinational suppliers have shifted their global production to emerging markets such as China, in order to take advantage of high growth opportunities. However, the institutional constraints in China pose a threat to
the multi-national enterprises conducting business there. In order to cope with drastic changes in market conditions and regulatory treatments in China, MNCs have to develop successful product innovation strategies. This study investigates how multi-national automotive component suppliers can enhance product innovation in customer-supplier relationships with Chinese OEM customers and improve their relationship performance. In addition, this study explores how the institutional environment shapes the outcomes of product innovation. Drawing on transaction costs economics and the knowledge-based view, this study develops and empirically tests an integrative model that delineates the antecedents and performance outcomes of supplier product innovation in customer-supplier relationships in the context of automotive OEMs and their first-tier suppliers in China. Furthermore, this study applies institutional theory to examine the moderating effect of supplier dependence on the links between drivers and innovation and between innovation and performance.

This study identifies different drivers of product innovation for MNC suppliers in their relationships with Chinese OEMs by integrating the knowledge-based view, transaction cost economics, behavioural governance and the institution-based view and examines the outcomes in the specific context of the automotive industry’s complex supplier-customer relationship from the Western MNC first-tier suppliers’ perspective in the Chinese industry setting.

This study broadens and deepens our understanding of how innovation by suppliers can be generated in customer-supplier relationships in China and how it increases the competitiveness of these suppliers. Moreover, by connecting knowledge and knowledge protection to product innovation and performance and providing empirical analysis in a field of research in which most of the academic literature is rather descriptive, this study provides feasible implications for innovation-management practitioners working on the organisational level in the auto industry in China.
Below, the results of this study are discussed.

### 9.1 Drivers of innovation generation

Prior researchers have investigated the impact of supplier involvement in product development on firm innovation. However, the extant literature provides contradictory results. While some work shows that suppliers’ involvement in design and product development contributes to higher product quality and product innovation, others do not find a significant effect. Again others find a negative impact, suggesting that there might be a time lag with early supplier involvement in product design likely to have a negative impact first and enhance performance only at a later stage in the process, by providing a level of preparedness for speed to market, product quality, and other components of the performance measures only later in the supplier involvement process.

Using unique data from MNE automobile component suppliers in China, the results of this study demonstrate that supplier involvement in the co-design process has an inverted U-shaped relationship with product innovation in China. The findings imply that supplier involvement in co-design with their customers can be beneficial for suppliers, mainly through knowledge sharing and creation. However, the co-design process incurs a risk of knowledge leakage and knowledge spill-over effects,

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### Table 5: Summary table of empirical findings (*p<.1 **p<.05 ***p<.01)

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Result value</th>
<th>Result</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>In supplier-customer relationships in China, there is an inverted U shape relationship between a supplier’s involvement in co-design and supplier product innovation.</td>
<td>-.385**</td>
<td>Hypothesis supported</td>
<td>(-) Lakshman and Parente (2008)</td>
</tr>
<tr>
<td>H2</td>
<td>In supplier-customer relationships in China, knowledge protection is positively related to supplier product innovation.</td>
<td>.137*</td>
<td>Hypothesis supported</td>
<td>(+) Lau, Tang, and Yam (2010)</td>
</tr>
<tr>
<td>H3</td>
<td>In supplier-customer relationships in China, trust is positively related to supplier product innovation.</td>
<td>.253***</td>
<td>Hypothesis supported</td>
<td>(-) Nielsen and Nielsen (2009)</td>
</tr>
<tr>
<td>H4</td>
<td>In supplier-customer relationships in China, technological uncertainty is positively related to supplier product innovation.</td>
<td>.267***</td>
<td>Hypothesis supported</td>
<td>(+) Rivera-Santos et al. (2011)</td>
</tr>
<tr>
<td>H5</td>
<td>In supplier-customer relationships in China, supplier product innovation is positively related to supplier relationship performance.</td>
<td>R²=.384</td>
<td>Hypothesis supported</td>
<td>(+) Parkhe (1998a)</td>
</tr>
<tr>
<td>H6</td>
<td>In supplier-customer relationships in China, the positive relationship between supplier product innovation and supplier relationship performance is weaker when high hostility of the legal and institutional environment is encountered.</td>
<td>*p&lt;.1</td>
<td>Hypothesis supported</td>
<td>(+) Wu et al. (2007)</td>
</tr>
</tbody>
</table>

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*(+) Positive relationship, (–) Negative relationship, (*p<.1 **p<.05 ***p<.01)*
exacerbated by insufficient legal protection in China, with local partners and customers, both Chinese OEMs and global lead OEM’s Chinese IJV subsidiaries, often leaking MNC suppliers’ knowledge to local firms and potential future competitors. Accordingly, this study argues that the risks of knowledge leakage and the costs of overcoming the protective mind-set of local partners may limit the effective flow and integration of foreign partners’ knowledge.

The risk of knowledge leakage is particularly relevant in light of the complex relationships between the auto manufacturers and their suppliers that lies at the heart of the auto industry. Globally, OEMs have passed on more and more responsibility to their suppliers who have become module and system suppliers accounting for between 50 and 70 per cent of the cost price of an average car. This structure and systematic of the automotive supply chain entails high supplier knowledge and creates a strong asymmetry in particular in the Chinese market environment where local Chinese OEMs do not possess the same knowledge as their global peers and global lead OEMs are forced by law to operate their Chinese subsidiaries in international joint ventures with government-selected, carefully chosen partners whose declared goal it is to develop the competence to design and manufacture vehicles and who the government strongly supports in building credentials as national champions.

Research has shown that the increasing responsibility of suppliers in the design and development of components are essential to the functionality, quality and value of the vehicle (Azadegan and Dooley 2010; Liker et al. 1996) and account for an increasing proportion of the innovation built into a new vehicle model (Liker et al. 1996; Petersen, Handfield, and Ragatz 2003). Therefore, the knowledge that suppliers bring into the business relationship with their customers in China, is of potentially great value.

Drawing on TCE, the findings of this study demonstrate that firms need to craft certain governance mechanisms, including knowledge protection and trust building, in the product innovation process. While prior work has suggested that knowledge protection may be detrimental to product innovation because it hinders knowledge
sharing (Nielsen and Nielsen 2009), this study argues, and the results of empirical analysis confirm, that knowledge protection can help innovation generation in China, by providing an effective platform for knowledge sharing within the process of inter-firm innovation and establishing a barrier for local competition. This enhances important research work by Rivera-Santos et al. (2011) who find that a strong protection orientation does not necessarily inhibit learning opportunities and offers empirical support for their findings.

In emerging markets whose legal systems do not play a sufficient role in protecting IP (Bruun and Bennett 2002), as is the case in China, in particular in terms of unsatisfactory enforcement of laws (see chapter 3.4.3) firms need to be more proactive in developing knowledge protection processes that enable efficient and safe knowledge transfer and creation and, in turn, product innovation. The findings of this study contribute to this stream of research by demonstrating the role of knowledge protection in facilitating product innovation in China while limiting the negative effects of knowledge spill-over to local competitor companies who often operate within the network of large automotive conglomerates, of which the Chinese IJV OEM customers, with whom suppliers enter into knowledge creation processes, are an integral part.

The results of this study also show that the top-management’s explicitly stated intention to protect knowledge which takes the form of formal and systemized processes for protecting knowledge, as well as incentives that encourage operational level employees to take knowledge protection seriously, can lead directly to enhanced protection and diminish the risk of leakage and spill-overs while enabling efficient and safe knowledge transfer and creation in the supplier-customer relationship. Given that intellectual property is increasingly recognized as a source of sustained competitive advantage and, consequently, as a risk for firms, the findings of this study support the notion that companies fare better when deciding to actively protect their key proprietary knowledge in their China operations.
However, three items had to be removed from the knowledge protection dimension because of poor reliability. While results show that having formal and systemized processes for protecting knowledge, such as contracts, regulations and procedures, in place can lead to enhanced protection and enable efficient and safe knowledge transfer and creation in the supplier-customer relationship, the results do not support that having “policies and procedures” in place that clearly identify the technology knowledge that is restricted and protected would diminish the risk of leakage and spill-overs. Therefore, the question arises whether the wording of questions possibly need some further consideration in the future to differentiate more clearly between systemized processes and policies and procedures. In addition, it might be that respondents, even though granted anonymity in the data collection process, were reluctant to respond to questions surrounding limited disclosure of key components to customers, leading to poor reliability of this item. Future research should consider rephrasing and pre-testing this item accordingly. Finally, whether suppliers questioned valued knowledge embedded in individuals yielded no reliable results. It might be that the differentiation between general human resources policies and the intent to protect knowledge was not clear enough in this context.

Trust also plays a crucial role in building governance mechanisms for knowledge sharing and product innovation in exchange relationships. The results show that trust has a stronger impact on product innovation than knowledge protection does. The only item that had to be removed due to poor loadings was possibly phrased not specific enough by asking the respondents about their customers’ general trustworthiness. The results on all other items clearly show a strong impact of trust on product innovation. Trust results in greater transparency regarding local market intelligence, such as local customer tastes and local government regulations. Trust will also foster a cooperation environment in which first-tier suppliers work with their OEM customers to adapt their products to local market requirements, access promotion channels, develop a better market understanding and select market segments for future growth. Thus, it provides the MNE suppliers with the opportunity to gain access to local market knowledge, which ultimately enhances creativity and the development of innovative products. In a study of exporters dealing with foreign distributors, Wu et al. (2007) found that trust plays the most important role in
governing international channel relationships and developing local market competence. The findings of this study lend some support to this view.

In the context of the cooperative inter-firm relationship between automotive first-tier suppliers and their OEM customers, daily business involves both explicit and implicit promises about the behaviour of both parties, in particular during a co-development or co-design project, and about the future behaviour of the other party. This study empirically reinforces findings that suggest that trust transforms such promises into credible propositions (Parkhe 1998a).

Furthermore, technological uncertainty may actually enhance supplier innovation, in that an unpredictable and changing technological environment provides an ideal learning platform through which firms can identify emerging market opportunities and discover niche market segments. This finding is in line with the results of earlier organizational innovation research, which suggested that environmental uncertainties shape innovation (Damanpour 1991; Frambach and Schillewaert 2002). These results confirm the importance and value of supplier-driven innovation in the auto industry in China in the presence of frequent technological changes and updates, as well as government regulations forcing such changes on market actors, e.g. the strong focus on electric vehicles as s growth industry set out in the current 5-year plan (see chapter 1.4). The results of this study lend support to that view. One item with poor loadings that had to be removed concerned frequent changes of production techniques, whereas all other items measuring e.g. technological innovation and product complexity received strong support.

### 9.2 Outcomes of innovation generation

The results of this study show that supplier product innovation can enhance relationship performance. This finding sheds light on the link between innovation and performance in exchange relationships. Supplier innovation, following the logic of the KBV, is regarded as a critical organizational resource and capability which can drive firm value in inter-firm relationships. In the context of the auto industry in China,
first-tier suppliers serve as a source for coordinating local market operations and provide product innovation knowledge in the inter-firm relationship with their lead OEM customers, both implementation- and operation-based as well as component- and module- and, most importantly, system-related (as outlined in chapter 3.1.2).

Inter- and intra-firm relationships in the auto industry are defined by the circuit of interconnected functions, operations and transactions. In China these networks encompass globally active players on the supplier and OEM side, as well as Chinese OEMs and suppliers. In this context, the web of connections in the auto industry in China is made up of complex structures with horizontal, vertical and diagonal links that form multidimensional matrixes of cooperation and collaboration, in which the link between innovation and performance becomes particularly noticeable.

The finding of this study provides empirical evidence of the link between innovation and performance in the context of inter-firm relationships between first-tier suppliers who are highly integrated into co-development and co-design processes with their customers. In China, auto manufacturers’ and first-tier suppliers’ design centres tend to be at the end stage of the design cycle, adapting vehicles to Chinese customer tastes and ensuring that vehicles fit Chinese legal requirements. The innovation done at those design centres is, therefore, mostly at the end stage of the R&D cycle, with tasks such as adapting the general design to the local environment and consists largely of incremental product innovation in terms of adaption and improvement of existing vehicle platforms, components and models in response Chinese market requirements, which has been found by researchers to be quite common in emerging markets (Jane Zhao and Anand 2009). Items removed due to poor loadings (see Table 2) concerned “radically new products” and “drastic changes in technology platforms” as well as introduction of “incremental product”, lending further support to this view.

The results of the empirical investigation suggest that a creative and innovative supplier is more likely to meet the changing needs of OEM customers in China by generating highly innovative and superior products and processes, which, in turn, enhance its relationship performance.
Research has found that firms are economically rewarded for product innovation and the transformation of knowledge into products and services (Kogut and Zander 1993). The empirical results of this study suggest some support for this view.

### 9.3 The role of the institutional environment in China

In response to the emerging theme of integrating institutional theory as a contextual variable into the study of firms’ strategic behaviour, this research discusses the contingent effect of the hostility of the legal and institutional environment on MNEs’ product innovation strategies. The results show that the degree of hostility in the legal and institutional environment shapes the effect product innovation has on relationship performance. When MNEs face high hostility in an emerging market setting, such as in China, product innovation strategies become more risky and challenging. This is due to a lack of sufficient protection for innovative outputs, which, in turn, hinders product innovation. The results highlight the importance of the institutional environment in shaping the development of product innovation strategies in global supply chains (Bello, Lohtia, and Sangtani 2004). In a study of new Chinese ventures, Li and Atuahene-Gima (2001) suggest that dysfunctional competition may curb product innovation.

Scholars agree that well-established connections with powerful political actors and institutions in China constitute a critical element of business success (Pei, Kamel, and Eric 2010). However, when markets are increasingly liberalized, a deep level of embeddedness in the Chinese institutional framework may lead to a higher the degree of cost-inefficiency through structural lock-in and ill-developed market-based capabilities (Pei, Kamel, and Eric 2010).

Furthermore, the central, provincial and municipal governments’ influence is utilized not only to forbid the creation of wholly owned foreign auto firms and limits foreign equity stakes in OEM IJVs, but also to approve or decline the creation of new assembly JVs, the partners involved in such a JV, the terms of the deal, and even for
the models produced (Pei, Kamel, and Eric 2010), for which government agencies become large customers or ensure market success, for example by specifying taxi fleets to allow only certain makes. By using government influence in such a manner, competition is distorted.

While Li and Atuahene-Gima’s (2001) empirical work does not support their claims, the findings of this study do indeed lend empirical support to the view that dysfunctional competition may restrain product innovation. The two items removed due to poor reliability concerned the Chinese legal system in a more general manner; future research should consider rephrasing to make the questions more relevant to the senior manager targeted as respondents.

9.4 Managerial implications

This research offers further insights to managers. It demonstrates how MNC suppliers can develop product innovation as an adaptive strategy, in response to environmental and technological uncertainties in China. The volatile and growing environment in an emerging market setting, such as China, offers great opportunities for MNCs but also poses threats, due to underdeveloped infrastructure and an unpredictable institutional environment. The results of this study show that MNC first-tier automotive component suppliers can achieve better relationship performance by developing better and more sophisticated product innovation strategies. This process requires the involvement of suppliers in co-development and co-design processes with their customers, the application of knowledge protection measures and the pro-active grasping of opportunities presented by technological uncertainties.

However, managers need to be cautious concerning the risk of knowledge leakage, knowledge spill-over to local competition with the tolerance or support by customers, and the potentially protective mind-sets of their partners. Institutional constraints, such as dysfunctional competition and IPR-related issues such as unsatisfactory enforcement of laws and regulations in China may exacerbate these risks. Accordingly, MNCs need to deploy appropriate governance mechanisms to minimize
transaction costs while maximizing value creation. Instead of patents and contracts, knowledge protection measures focused on human resources and an established knowledge sharing system based on clearly defined guidelines might be deployed as a winning strategy in this context. Most importantly, trust building may serve as the best-placed strategy for MNCs to govern their relationships with partners in China. Trust can serve as one form of bilateral governance, by creating shared beliefs and mutual concern for long-term benefits. Trust helps to create an environment in which MNCs can share local knowledge and thus can drive product innovation in China, as well as removing barriers for MNC first-tier suppliers’ headquarters’ transfer of knowledge into their subsidiaries in China which fosters product innovation on the local level.

Table 6: Summary of hypothesis test results

10 Limitations and further research

The results of this study should be interpreted in the light of several inherent limitations. First, supplier innovation was measured using subjective measurement and focused on product and process innovation only. Future studies should also include objective measures of supplier innovation, such as patents or R&D expenditure. In addition, prior studies show that different conceptualizations may
have different antecedents and outcomes. Hence, future research may examine other innovation types, such as radical innovation, or technological versus administrative innovation, and identify their antecedents and effects on performance in the supply chain.

Second, knowledge protection was measured using objective measures with no differentiation of tacit or explicit, hard or soft knowledge or differentiation in terms of the source of knowledge undertaken. Future research may examine, if firm performance can be improved by working very openly with a Chinese IJV customer without any knowledge protection wherever market and marketing knowledge or knowledge on operational improvement is concerned and contrast this with the protection of knowledge that is the heart of the firm’s competitive advantage. Future research may also consider using the knowledge types as a moderator when measuring the effect of knowledge and its protection on product innovation.

In terms of methodology, this study relies on data collected from MNC suppliers in the automotive industry. Due to the limited scope of this sample, it is difficult to generalize our findings to other international customer-supplier relationships, especially in other industrial contexts, or to generalize findings from China to emerging markets. Future research should thus consider obtaining data from other industries, and both customers and their suppliers, as well as from other emerging economies to cross-check the validity of the proposed model. Furthermore, this study adopts only a single respondent strategy, which may potentially produce common method bias. While such possible bias has been very carefully assessed, future research should collect data using multiple respondents for each organization in question.

It is also due to the limited scope of the sample and methodical limitations that this study fails to fully explore the relevance of global production networks (GPN) that are defined as a circuit of interconnected functions, operations and transactions through which commodities, products, goods and services are produced, distributed and consumed, in the context of the auto supply industry in China. Future research may consider taking a dyadic perspective in collecting data in order to make significant
and meaningful contributions to GPN research and theory. In addition, future research might consider extending the current downstream perspective to the upstream market perspective.

In terms of analysis of data collected, this study analysed data in an aggregate manner. Future research should consider sub-dividing data sets for in-depth analysis. For example, the nationality of MNC suppliers’ headquarters provides an opportunity to analyse if companies from different cultural backgrounds differ in their approach towards product innovation or knowledge protection. Similarly, different groups of products and a split along value-added products versus commodities might yield interesting results. Also, an analysis of differing supplier behaviour and cooperation willingness via different OEM customers might shed light on product innovation in the Chinese auto industry context. Possibly, even a dyadic study to look at such possible differences from both sides might be of interest. Most certainly, companies that have and actively utilize local design and development capabilities in China will show differing results from companies that only manufacture locally and have design work done abroad or follow detailed customer specifications and drawings in their manufacturing of parts for OEM customers in China.

Yet another limitation of this study is its cross-sectional design. Although the results reveal the drivers and performance outcomes of supplier product innovation, their causality is only implied. Future studies could overcome this limitation using longitudinal data collection, even over relatively short periods.

11 Conclusion

Global competition is increasingly defining business. Understanding how to acquire local knowledge and develop adaptive products in China represents a critical challenge for MNCs in the auto industry. This research informs this intriguing topic by showing how supplier involvement, knowledge protection, trust and technological uncertainty influence the product innovation by MNC automobile component suppliers in China in their relationship with their OEM customers.
This study adopts an integrated theoretical approach by integrating the knowledge-based view (KBV), the transaction cost economics (TCE), behavioural governance and the institution-based view in looking at drivers and outcomes of product innovation for MNC suppliers in their relationships with Chinese OEMs. Furthermore, this study links different governance mechanisms to firm performance, and, thereby, moves away from the transaction cost approach of focusing on safeguarding opportunism towards the capability creation perspective of the knowledge-based view.

As highlighted in Table 5, the hypotheses put forward in this study have been given support by the results of the empirical data analysis. While some academic work shows that suppliers’ involvement in design and product development contributes to higher product quality and product innovation, others do not find a significant effect. The results of this study point towards an inverted U-shape between supplier involvement in the co-design process and product innovation in the context of the auto supply industry in China. The findings, thus, support research that implies benefits of supplier involvement in co-design with customers through, amongst others, knowledge sharing and creation. Findings also support academic research that has found co-design processes to incur a risk of knowledge leakage and knowledge spillover effects, particularly so in the context of China and its insufficient legal protection. Accordingly, the results of this study support previous academic work that identifies risks of knowledge leakage in the process of co-design and finds that the effective flow and integration of foreign partners’ knowledge may be limited by the costs of overcoming the protective mind-set of local partners.

Interestingly, Lakshman and Parente (2008) find a negative impact of supplier involvement in co-design and explain it by a possible time lag. They suggest early supplier involvement in product design is likely to have a negative impact first and enhance performance only at a later stage in the involvement process, by providing a level of preparedness for speed to market, product quality, and other components of the performance measures. The results of this research suggest otherwise, supporting hypothesis 1 which postulates that there is an inverted U-shape relationship. Future research could build on these findings and extend the scope of the study to other markets outside China.
Due to methodical limitations and the limited scope of this sample the relevance of global production networks in the context of supplier-customer relationships in the auto industry in China and in supplier involvement in co-design in China could not fully be explored. Future research may consider taking a dyadic perspective in collecting data in order to make significant and meaningful contributions to GPN research and theory. The GPNs in the context of the supplier-OEM relationship in China are not merely mechanisms for the production and distribution of components, modules and vehicle systems. They have been found to be economic agents with considerable political importance. Future research could take a full dyadic perspective to help understand increasing collaboration between suppliers and OEMs in the Chinese market environment and establish a link with what occurs in this context in the auto industry on a global scale. In this context, the findings of my research could be further built upon to highlight mutual dependencies and co-investment by suppliers and customers. A dyadic study following up upon my findings could shed light on in how far global cooperation between suppliers and customers in the form of GPNs shape the relationship that suppliers and customers have in China. In addition, taking an upstream perspective could shed light on the relevance of GPNs in the context of the auto industry in China.

The empirical findings of the study also allow for further extension of the international business literature. The concept of “guanxi” that has been at the center of interest for some researchers of China (Alon 2003, 2009; Chi, Nystrom, and Kircher 2004; Davies et al. 2003; Luo 1997; Sheng, Zhou, and Li 2011; Standifird and Marshall 2000) could be introduced to the context of the auto industry in China. In particular, a longitudinal study could analyse, how the interaction between suppliers and customers is being shaped in the very dynamic Chinese automotive market environment and compare my findings with quantitative data collected two or three years from now.

Furthermore, the findings of this study could be extended to other markets, in particular emerging markets with strong automotive clusters and development. While it is acknowledged that some research has been conducted, for instance, on the
Brazilian and other South American auto industries (e.g. Kotabe, Parente, and Murray 2007; Lakshman and Parente 2008; Parente, Baack, and Hahn 2011), much of that research tends to be qualitative and could be extended to create a basis for comparison of my findings with findings from other emerging market settings and, subsequently, generalization of the findings.

The results of this research highlight the importance of the institutional environment in shaping the development of product innovation strategies in the auto supply chain in China. In this context, it would be interesting to analyse whether the dynamics of the industry and the laws and regulations governing it would lead to considerable improvement of the legal and institutional environment, better protection of knowledge and IP and trustworthy and effective enforcement, thus resulting in decreasing importance of knowledge protection by suppliers and relational governance mechanisms. As 12-5 stipulates that Chinese companies work aggressively to build a knowledge base in preferred industries, including amongst others electrical vehicles, the opposite result is also thinkable and the increasing importance of building trusted relationships with selected partners and customers and pivotal significance of knowledge protection measures a possible outcome of future research into the development of the institutional and legal environment in China.

In this context, prior academic work has suggested that knowledge protection may be detrimental to product innovation because it hinders knowledge sharing (Nielsen and Nielsen 2009). The results of this study’s empirical analysis confirm, however, that knowledge protection can help innovation generation in China, by providing an effective platform for knowledge sharing within the process of inter-firm innovation and establishing a barrier for local competition. In taking this research forward, future analysis could look not only on how the institutional and legal environment evolves in China, but build upon work by Rivera-Santos et al. (2011) who find that a strong protection orientation does not necessarily inhibit learning opportunities. Their argument that a firm’s approach to innovation and protection may be structurally asymmetric in that innovation requires openness and collaboration whereas protection centres on key proprietary knowledge for which the firm seeks to avoid any leakage or spill-over could be built upon in the context of the auto and auto supply industries in China.
Furthermore, this research finds that a highly dynamic market environment with technological uncertainty makes suppliers adopt more innovative strategies, which in turn lead to more innovations in supplier-customer relationships. This study, therefore, lends support to previous studies suggesting likewise (Li and Atuahene-Gima 2001). According to the KBV, firms attempt to pursue emerging opportunities to establish competitive advantages in rapidly changing environments (Calantone, Harmancioglu, and Droge 2010), a notion that this research supports. This research supports previous work (e.g. Damanpour 1991; Frambach and Schillewaert 2002; Mooi and Frambach 2012) in suggesting that under technological uncertainty auto supply industry first-tier-suppliers must constantly generate innovations to stay ahead of their competitors.

Summarizing, this study empirically advances our understanding how Western MNC auto suppliers in China can address the challenge of acquiring local knowledge and developing adaptive products in China. This research shows how supplier involvement, knowledge protection, trust and technological uncertainty influence the product innovation by MNC automobile component suppliers in China in their relationship with their OEM customers. This study assumes a cohesive theoretical approach by integrating the knowledge-based view (KBV), the transaction cost economics (TCE), behavioural governance and the institution-based view in looking at drivers and outcomes of product innovation for MNC suppliers in their relationships with Chinese OEMs. In doing so, this study identifies drivers of product innovation in inter-firm supplier-customer relationships between Western MNC suppliers and their OEM customers in China, both organizational and environmental, thereby providing an answer to the central research question (see chapter 5).

Furthermore, this study links different governance mechanisms to firm performance, and, thereby, moves away from the transaction cost approach of focusing on mere safeguarding against opportunism towards the capability creation perspective of the knowledge-based view. This study also provides empirical confirmation of the effect that product innovation in supplier-customer relationships in China has on the relationship performance in the supplier-customer interaction and provides interesting insight into the moderating effect of the institutional environment, thereby providing answers to the questions of what effect innovation would have on supplier performance and what role of the institutional environment is.
I sincerely hope that future research will contribute additionally to this important topic by continuing to explore the issues surrounding it.
## 12 Appendix

### 12.1 Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AG</td>
<td>Aktiengesellschaft</td>
</tr>
<tr>
<td>AmCham China</td>
<td>American Chamber of Commerce in China</td>
</tr>
<tr>
<td>AVE</td>
<td>Average Variance Extracted</td>
</tr>
<tr>
<td>BAIC</td>
<td>Beijing Automotive Industry Holding Co Ltd.</td>
</tr>
<tr>
<td>BMW</td>
<td>Bayerische Motorenwerke</td>
</tr>
<tr>
<td>BRICs</td>
<td>Brazil, Russia, India and China</td>
</tr>
<tr>
<td>CAAM</td>
<td>China Association of Automobile Manufacturers</td>
</tr>
<tr>
<td>CAGR</td>
<td>Compound Average Growth Rate</td>
</tr>
<tr>
<td>CCC</td>
<td>China Compulsory Certificate</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CJV</td>
<td>Cooperative Joint Venture</td>
</tr>
<tr>
<td>CKD</td>
<td>Completely Knocked-down</td>
</tr>
<tr>
<td>CO2</td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td>ECC</td>
<td>European Chinese Center</td>
</tr>
<tr>
<td>ECE</td>
<td>United Nations Economic Commission for Europe, abbreviation of a global vehicle homologation standard</td>
</tr>
<tr>
<td>EJV</td>
<td>Equity Joint Venture</td>
</tr>
<tr>
<td>EUCCC</td>
<td>European Union Chamber of Commerce in China</td>
</tr>
<tr>
<td>FAW</td>
<td>First Auto Works</td>
</tr>
<tr>
<td>FAW-VW</td>
<td>A joint venture between FAW and VW</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>GAIG</td>
<td>Guangzhou Automobile Industry Group Co Ltd.</td>
</tr>
<tr>
<td>GCCC</td>
<td>German Chamber of Commerce in China</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<td>---------</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GM</td>
<td>General Motors</td>
</tr>
<tr>
<td>GPN</td>
<td>Global Production Networks</td>
</tr>
<tr>
<td>GS</td>
<td>Group Standard (by BMW)</td>
</tr>
<tr>
<td>GVC</td>
<td>Global Value Chains</td>
</tr>
<tr>
<td>IJV</td>
<td>International Joint Venture</td>
</tr>
<tr>
<td>IP</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>IPR</td>
<td>Intellectual Property Rights</td>
</tr>
<tr>
<td>JDV</td>
<td>Joint Development Venture</td>
</tr>
<tr>
<td>JV</td>
<td>Joint Venture</td>
</tr>
<tr>
<td>MNC</td>
<td>Multi-national corporation</td>
</tr>
<tr>
<td>MNE</td>
<td>Multi-national enterprise</td>
</tr>
<tr>
<td>MOFCOM</td>
<td>Ministry of Commerce of the People's Republic of China</td>
</tr>
<tr>
<td>MP3</td>
<td>Moving Picture Experts Group-2 Audio Layer III, a patented encoding format for digital audio</td>
</tr>
<tr>
<td>NDRC</td>
<td>The People's Republic of China National Development and Reform Commission</td>
</tr>
<tr>
<td>OEM</td>
<td>Original Equipment Manufacturer</td>
</tr>
<tr>
<td>OFDI</td>
<td>Outward Foreign Direct Investment</td>
</tr>
<tr>
<td>PBOC</td>
<td>The People's Bank of China, China's Central Bank</td>
</tr>
<tr>
<td>RFQ</td>
<td>Request for quotation</td>
</tr>
<tr>
<td>RMB</td>
<td>Renminbi, the Chinese currency</td>
</tr>
<tr>
<td>SAE</td>
<td>Society of Automobile Engineers</td>
</tr>
<tr>
<td>SAIC</td>
<td>Shanghai Automotive Industry Corporation</td>
</tr>
<tr>
<td>SAR</td>
<td>Special Autonomous Region</td>
</tr>
<tr>
<td>SKD</td>
<td>Semi knocked-down</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td>SMMT</td>
<td>Society of Motor Manufacturers and Traders</td>
</tr>
<tr>
<td>TNC</td>
<td>Trans-national corporation</td>
</tr>
<tr>
<td>TPS</td>
<td>Toyota Production System</td>
</tr>
<tr>
<td>TRIPS</td>
<td>Agreement on trade-related aspects of intellectual property rights</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>USA</td>
<td>The United States of America</td>
</tr>
<tr>
<td>USD</td>
<td>Dollar, the US currency</td>
</tr>
<tr>
<td>USDOC</td>
<td>The United States Department of Commerce</td>
</tr>
<tr>
<td>VW</td>
<td>Volkswagen</td>
</tr>
<tr>
<td>WCT</td>
<td>World Intellectual Property Organization Copyright Treaty</td>
</tr>
<tr>
<td>WFOE</td>
<td>Wholly foreign-owned enterprise</td>
</tr>
<tr>
<td>WIPO</td>
<td>World Intellectual Property Organization</td>
</tr>
<tr>
<td>WPPT</td>
<td>World Intellectual Property Organization Performances and Phonograms Treaty</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
</tr>
</tbody>
</table>
12.2 Semi-structured interview guideline

1. Critical incident
   a. Describe most significant challenges you face in Chinese activities
   b. Which are the critical success factors for your operations in China
2. Assess critical success factors for operation in China
   a. Know-how
      i. If, yes, which?
   b. Design
   c. Quality control
   d. How treat people
   e. Tangible organizational background
   f. Production technologies
      i. Can production technologies be retained / guarded at all?
      ii. Are they worth being guarded?
         1. If yes which?
3. Knowledge management- retention
   a. Does knowledge retention make sense at all?
      i. If yes, for which type of knowledge
      ii. If yes, for the company towards who?
      iii. If no, why not
      iv. If no, towards who not (“Toyota network”)
4. Organizational strategies to retain knowledge
   a. Legal set-up
   b. JVs
      i. how choice of partner
      ii. How ensure goal compatibility between partners
      iii. ratio of JV board members appointed by each partner
      iv. amount of strategic and operational control that each partner enjoys
      v. nationality of managers holding key executive positions in JV
   c. Set-up of central services / regional HQ / holding
   d. Contracts
      i. Contract language
      ii. Goal compatibility
   e. Build government relationships
5. Managerial strategies to retain knowledge
   a. No localization of certain functions
      i. If yes, which
   b. HR
      i. Policies
      ii. Expatriates for certain functions
         1. If yes, which
      iii. Selection of staff, candidate screening
      iv. Screening of personnel
   c. IT
   d. Reaction to CCC-certification necessities
6. Intellectual property abuses
   a. If yes, how respond
b. What measures to ensure singularity

7. Suppliers, partners
   a. Percentage of import / CKD / SKD as opposed to local content
   b. How do you chose, qualify, evaluate your local suppliers
   c. Mechanisms to ensure ethical, reputable partners
   d. Has your enterprise created a strategic centre to manage a web of partners / suppliers?

8. General information on respondent
   a. Function / Position
   b. Age
   c. Nationality / Ethnic origin
   d. Gender
   e. Years with organization
   f. Years in China
   g. Travel schedule
   h. Educational level
   i. Foreign Languages (Mandarin or other Chinese for Expats; English or other for Chinese managers)

12.3 European passenger car classification

As stipulated by the European Union:
http://ec.europa.eu/competition/mergers/cases/decisions/m1406_en.pdf

<table>
<thead>
<tr>
<th>A:</th>
<th>mini cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>B:</td>
<td>small cars</td>
</tr>
<tr>
<td>C:</td>
<td>medium cars</td>
</tr>
<tr>
<td>D:</td>
<td>large cars</td>
</tr>
<tr>
<td>E:</td>
<td>executive cars</td>
</tr>
<tr>
<td>F:</td>
<td>luxury cars</td>
</tr>
<tr>
<td>S:</td>
<td>sport coupés</td>
</tr>
<tr>
<td>M:</td>
<td>multi-purpose cars</td>
</tr>
<tr>
<td>J:</td>
<td>sport utility cars including off-road vehicles</td>
</tr>
</tbody>
</table>
中西方汽车行业合作夥伴关系之知識管理實踐

此調查由
CIBER（國際商業教育研究中心）
與其會員公司合作
中國歐盟商會汽車與汽車配件分會
德國駐外商會汽車工業工廠

如對這份研究調查有問題，請隨時聯繫
Rudolf R. Sinkovics, (Rudolf.Sinkovics@manchester.ac.uk)
曼徹斯特商學院教授
國際商業教育研究中心院長

Bryan Jean (bryan@nccu.edu.tw)
國際商業教育研究中心教授

調查的目的

在與北京、上海及瀋陽的中國歐盟商會汽車與汽車配件分會的會員，以及上海的德國駐外商會汽車工業工廠的會員配合過後，國際商業教育研究中心想探討會員們與中國主要代工客戶的互動。尤其，我們在研究會員們在競爭激烈的中國汽車工業市場，如何將本身的知識帶入客戶關係，並保持其安全性。

當使用“知識”此字時，我們指的是關於產品、流程（包括設計及開發、製造）、服務及成本/價格的“專屬知識”。這些專屬知識可以使您在和競爭對手相比時佔有競爭優勢。

保密性

您的回覆將會自動完全保密，任何的發佈將會以整體形式公開。

我們了解完成此問卷大約需要20分鐘。然而，我們希望您同意參加本次重要的問卷調查。由於樣本有限量，因此您的回覆是非常重要的。

研究結果將會根據您的要求提供給您。研究結果也會顯示出在中國市場環境的競爭對手中，您公司的相對位置，以利於您公司的業務發展。

我們希望在暑假期間完成此分析，以便在九月上旬提供您研究結果。因此，請儘早完成此問卷調查。
第一部份 – 知識管理

在這部份，我們的目標是了解貴公司對內及對外，如何處理其專屬知識。我們想了解貴公司與主要代工客戶互動時，對於知識分享及保護所建立之機制。請在下列敘述中，最符合貴公司的選項的數字打勾。

<table>
<thead>
<tr>
<th>A. 請思考並評估貴公司已採用之保護知識的機制。</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 我們公司有正式的，制度化的流程來保護知識，如合約，法規及程序。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>2 我們公司使用專利權或商標以保護重要知識不會被不當使用。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>3 我們公司在組織內外均有一定流程以保護知識不會被不當使用。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>4 我們公司有獎勵措施來保護知識。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>5 我們公司與代工公司做生意時，避免透露產品的主要零部件。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>6 我們公司的每個人都重視與保護知識。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>7 我們公司的政策及程序都清楚地指出技術知識是被限制及保護的。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>8 我們公司在組織內會清楚的傳達保護知識的重要性。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>9 我們公司的產品/流程技術很複雜，因此競爭對手無法輕易仿製。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>10 我們公司擁有的專門技術及經驗的優勢，無法輕易被模仿。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>11 我們的競爭對手無法複製所有需要的零部件。他們可能會面對將所有零部件結合在一起的界面問題。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>12 我們公司與地方政府或地方社區共同發展良好關係以保護關鍵知識。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>13 我們公司的員工了解公司本身那些能力不希望被我們汽車代工客戶所了解</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>14 我們公司員工有接受關於如何保護公司本身能力之訓練</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>15 我們鼓勵員工與代工客戶合作時，了解如何保護自身的能力。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>16 保護及機密性是我們企業文化的重要特色。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
</tbody>
</table>
### I. B. 供應商在生產過程中的參與

請思考與主要代工客戶之互動

<table>
<thead>
<tr>
<th>項目</th>
<th>非常不同意</th>
<th>非常同意</th>
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</thead>
<tbody>
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<tr>
<td>6</td>
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</tr>
</tbody>
</table>

### I. C. 供應商經由共同設計以在早期參與

#### 產品設計

請思考與主要代工客戶在早期參與共同設計之產品設計

<table>
<thead>
<tr>
<th>項目</th>
<th>非常不同意</th>
<th>非常同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 第二部份 - 關係方面

在這部份，我們主要想了解 貴公司與最重要的汽車代工客戶之間曾經歷之良好及糟糕的關係。請思考您和客戶之間的合約，合作與承諾。

### II. A. 貴公司支援主要代工客戶商業交易之投資

請思考您對於代工客戶的投資

<table>
<thead>
<tr>
<th>項目</th>
<th>非常不同意</th>
<th>非常同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
我們公司與代工客戶花了很多時間在學習其營運例行作業及建立與員工的關係。  

我們公司在產品及生產系統或內部運作流程，已作重大調整，以適應代工客戶的特殊需求和技術規格。  

我們公司花了很多時間和努力配合自己的供應商的運作流程，以適應此重要代工客戶的特殊需求和技術規格。  

### B. 詳述您的代工客戶支援貴公司商業交易之投資

<table>
<thead>
<tr>
<th>話題</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>我們的代工客戶對我們投入大量資金</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>如果我們的代工客戶要轉換到另一競爭供應商，他會損失一大筆因我們目前關係而投入的資金</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>我們的代工客戶與我們的特定的業務關係中有投資設備，員工及流程。</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

### 信任和合作夥伴關係

請思考您與主要代工客戶之間在工作及互動上的信任及合作夥伴關係

<table>
<thead>
<tr>
<th>話題</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>我們公司相信我們汽車代理客戶有能力履行合約協議</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>代工客戶對我們關心的重要問題，都誠實以待</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>我們公司相信代工客戶所提供的資料</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>我們公司的代工客戶真誠關心我們公司的商業成功</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>當作重要決定時，我們公司代工客戶會考慮彼此的福利</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>我們公司的汽車代工客戶是值得信任的。</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

### II. D. 您們有相互依賴對方嗎？

您對於主要代工客戶的依賴程度

<table>
<thead>
<tr>
<th>話題</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>我們公司很難取代因與主要代工客戶合作所產生的銷售及利潤</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>我們公司很依賴主要代工客戶</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>我們公司與主要代工客戶的關係對於達成長期目標成長是很重要的</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>您對於主要代工客戶對您的依賴程度的看法</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
</tbody>
</table>
1. 我們公司主要代工客戶很難取代因與我們公司合作所產生的銷售及利潤

2. 我們主要代工客戶很依賴我們公司

3. 我們公司與主要代工客戶的關係對於達成長期目標成長是很重要的

### II. E. 與代工客戶的合約關係

|  | 非常地不同意 | 非常地同意 |
|----------------------------|----------------|
| 1. 我們與代工客戶有簽訂明確，良好詳細的合約 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. 我們有定製協議，詳細說明雙方的義務。 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. 我們與代工客戶有明確地製訂詳細的合約協議。 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

### 第三部份—文化議題與商業環境

在這個部份，我們主要想了解貴公司在中國文化背景下運作時之文化敏感度。請在下列敘述中，最符合貴公司的選項的數字打勾

### III. A. 你覺得貴公司對於在以中國方式作生意的文化敏感度高嗎?

|  | 非常地不同意 | 非常地同意 |
|----------------------------|----------------|
| 1. 我們了解在中國作生意的困難 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. 我們有能力適應在中國作生意的方式 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. 我們願意遵守中國的商業行為和習俗。 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. 我們對於中國文化有相當程度的了解。 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

### 在中國，人人講求「關係」，您覺得這對您及貴公司來說有無相關？

|  | 非常地不同意 | 非常地同意 |
|----------------------------|----------------|
| 1. 在中國作生意須認識對的人 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. 要在中國增進生意最好的方法是保持良好的關係 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. 在中國作生意，作為圈內人可助於獲得優惠待遇 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. 發展正確的人際關係有助於在中國的業務順利進行。 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. 要在中國增進生意最好的方法是保持良好的關係 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
6. 要在中国成功发展，送礼是项非常重要的特色

7. 公司的高层管理者与各级政府官员都有保持良好个人关系。

8. 公司的高层管理者与监管及支援机构，如税务局，国营银行，工商行政管理局都有发展良好的关系。

9. 到目前为止，我们公司与地方政府官员一直处于良好的状态

10. 我们公司花了大量资源，与政府官员建立关系

11. 公司的高层管理者与买方公司的高层管理者已建立良好的个人关系，人际网络及联繫。

12. 公司的高层管理者与供应商公司的高层管理者已建立良好的个人关系，人际网络及联繫。

13. 公司的高层管理者与竞争对手公司的高层管理者已建立良好的个人关系，人际网络及联繫。

### 根据您公司在中国的营运，请告诉您对于汽车产业环境及技术看法。请在下列叙述中，最符合贵公司的选项的数字打勾

<table>
<thead>
<tr>
<th>中國商業環境的動態</th>
<th>非常不同意</th>
<th>非常不同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 我們產業的發展趨勢非常難以監控</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>2 我們這個產業的銷售量非常不穩定</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>3 我們產業的競爭對手的策略及行動變化非常頻繁</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>請思考您在中國營運時，對於汽車工業技術不確定性</th>
<th>非常不同意</th>
<th>非常不同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 生產(或服務)技術/流程在我們產業改變很頻繁</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>2 我們產業的技術改變會提供很大的機會</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>3 我們產業有高科技創新</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>4 我們產業提供越來越多複雜的產品</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
</tbody>
</table>
### 法律環境

請思考您的公司在中國法律制度實施下之運作。

<table>
<thead>
<tr>
<th></th>
<th>中國法律制度對我們的專有技術及智慧財產有提供充分保護。</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>中國法律制度對我們的商業機密有提供充分保護。</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
<tr>
<td>3</td>
<td>中國的法律對於我們公司在中國的投資，提供優惠措施。</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
<tr>
<td>4</td>
<td>中國當地公司時常會以對他們有利的方式來解釋當地的法律。</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
<tr>
<td>5</td>
<td>我們的代工客戶時常會以對他們有利的方式來解釋當地的法律。</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
<tr>
<td>6</td>
<td>中國當地公司在這個市場時常會侵犯保護智慧財產權的法律。</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
<tr>
<td>7</td>
<td>我們的產業曾歷經一些非法競爭行為，如非法複製新產品，其他公司仿冒我們公司的產品及商標</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
<tr>
<td>8</td>
<td>我們的產業歷經同產業中其他公司日益增加的不公平競爭行為。</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
</tbody>
</table>

### 第 4 部份－工作情況

在這個部份，我們主要想了解您們的合作關係所累積下來的優勢及改善的部份。

請在下列敘述中，最符合貴公司的選項的數字打勾

#### IV. A. 請告訴我們與主要代工客戶合作

<table>
<thead>
<tr>
<th></th>
<th>我們與客戶的關係幫助我們減少成本</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>我們與客戶的關係幫助我們業績成長</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
<tr>
<td>3</td>
<td>我們與客戶的關係增加我們的獲利</td>
<td>非常地不同意</td>
<td>非常地同意</td>
</tr>
</tbody>
</table>
### IV. B. 您認為和主要代工客戶合作，您的產品或零部件有改善嗎？

<table>
<thead>
<tr>
<th>您的意見</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>我們與客戶的關係對我們現有產品之改善有正面的作用</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>我們與客戶的關係幫助降低了客戶訂單的退貨率</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>我們與客戶的關係對於我們成功開發新產品市場有正面的作用</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>我們與客戶的關係在過去三年，對於產品的調適/改善有很大的幫助</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>我們與客戶的關係在過去三年，對於技術平台或生產過程的徹底改變有很大的幫助</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
</tbody>
</table>

### IV. C. 請思考在您們關係中的任何改善

<table>
<thead>
<tr>
<th>您的意見</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 我們與客戶的關係使著雙方之間能更有效率的溝通</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>2 我們與客戶的關係幫助我們更了解彼此的目標</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>3 當客戶給我們專案時，我們為其零件之獨家供應商</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>4 我們的主要代工客戶在專案協商的數量會與訂單一致。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>5 我們主要代工客戶允許我們進入獨立售後市場銷售</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>6 所有我們為主要代工客戶終身所實現的專案特別直接成本已賺回。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>7 我們為了主要代工客戶專案的投資回收大多在我們的預期之內。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>8 當我們從主要代工客戶贏得生意時，我們對於其他業務管道的使用就會受到限制</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>9 與主要代工客戶的業務關係對我們而言是有利的。</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
<tr>
<td>10 我們主要代工客戶明確要求獨家生產我們的產品</td>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
</tr>
</tbody>
</table>

第 5 部份－人口統計資訊

請提供關於 貴公司，產品及客戶的資料。如果資料不清楚，請提供您所了解的部分

貴公司基本資料
1. 請註明 貴公司的國籍及相關單位:

<table>
<thead>
<tr>
<th>國籍</th>
<th>公司名稱</th>
<th>商業組織</th>
<th>中國營運組織</th>
<th>法人單位</th>
</tr>
</thead>
</table>

2. 貴公司在中國的營運:

<table>
<thead>
<tr>
<th></th>
<th>集團</th>
<th>中國營運組織</th>
<th>法人單位</th>
</tr>
</thead>
<tbody>
<tr>
<td>貴公司在中國從事生意的年數</td>
<td>從 19__ / 20__</td>
<td>從 19__ / 20__</td>
<td>從 19__ / 20__</td>
</tr>
<tr>
<td>貴公司的年收入</td>
<td>歐元/美金/人民幣______</td>
<td>歐元/美金/人民幣______</td>
<td>歐元/美金/人民幣______</td>
</tr>
<tr>
<td>過去三年的業績成長</td>
<td>歐元/美金/人民幣______</td>
<td>歐元/美金/人民幣______</td>
<td>歐元/美金/人民幣______</td>
</tr>
<tr>
<td>員工人數</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. 貴公司在中國的子公司數量：
   外商獨資企業：
   多數股權合資企業：
   均等股權合資企業：
   少數股權合資企業：

4. 貴公司在中國的子公司有多少營運有獲利？

5. 貴公司在中國的子公司的投資有多少已回收？

6. 為什麼有些子公司的投資沒有回收？（請指出）。

   [ 1 ] 與營運計劃書一致
   [ 2 ] 我們公司目前仍處於擴張階段，並使用當地的子公司利潤增加註冊資本，支付投資等
   [ 3 ] 我們公司在中國的子公司有獲利，不過並沒有以最初的投資資本再融資。
   [ 4 ] 其他，請註明：

V. B. 關於貴公司產品資訊:
1. 您的主要產品是：

   [ ] 驅動機   [ ] 車身   [ ] 電氣系統   [ ] 空調設備，汽油＆感應器
1. [ ]濾清器  [ ]底盤  [ ] 燈光  [ ] 點火裝置，交流發電機，啟動裝置  
[ ]離合器  [ ]剎車  [ ] 潤滑油/化學製品  [ ] 其他，請註明：__________  
[ ] 冷卻器 [ ] 排氣管 [ ] 電池

2. 除了製造外，貴公司有為您的中國代工客戶設計過產品嗎？______  

3. 請註明您幫您的中國代工客戶設計產品的比例 ______ %

4. 請註明您們總公司或其他地區產品雷同的比例 ______ %

5. 請註明您們公司賣給中國代工客戶全散件組裝/半散件組裝零件的比例 ______ %

6. 全散件組裝/半散件組裝與深入本土化相比

<table>
<thead>
<tr>
<th>我的公司主要是賣全散件組裝/半散件組裝的零件給我們的中國代工客戶</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>為了要保持在中國的競爭優勢，我們公司對於賣給我們中國代工客戶的零件，努力實現本土化的目标</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. 全散件組裝/半散件組裝與深入本土化相比


7. 請註明 貴公司在中國自有品牌的比例 ______ %

8. 您們主要賣什麼類型的产品給代工客戶？

<table>
<thead>
<tr>
<th>我們賣給我們主要的代工客戶的主要產品為一般商品</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>我們在中國的業務，主要是銷售有附加價值的產品給我們的主要代工客戶</th>
<th>非常地不同意</th>
<th>非常地同意</th>
</tr>
</thead>
<tbody>
<tr>
<td>① ② ③ ④ ⑤ ⑥ ⑦</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. 請註明 貴公司產品價格點 ______。


10. 請註明 貴公司產品的新穎性


11. 請註明 貴公司產品的技術水平

12. 請註明 貴公司產品是否擁有專利權

13. 請註明 貴公司對於產品的依存程度。
    銷售的______________%為產品依存度

14. 請註明主要代工客戶所佔 貴公司銷售額之比例
    大約______________%的總銷售額是來自我們的主要代工客戶

15. 請註明 貴公司主要代工客戶向 貴公司採購零部件的比例
    大約______________%是向我們公司採購零部件

關於 貴公司在中國主要代工客戶的基本資料

貴公司在中國客戶的法律地位:
   [   ]中國代工  [  ]國際合資企業代工

1. 如果您的客戶是國際合資企業代工，請註明原產地的國際合作夥伴:
   [  ]德國  [  ]其他歐洲  [  ]日本
   [  ]韓國  [  ]美國  [  ]其他，請註明：____________

   貴公司與此代工客戶合作多久？____________年

請註明下列

<table>
<thead>
<tr>
<th>您對於自己公司在中國的營運程度有多了解？</th>
<th>非常了解</th>
<th>非常不了解</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>您對於自己公司與代工客戶的關係有多了解？</th>
<th>極少參與</th>
<th>高度參與</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>您對於自己公司與代工客戶關係的參與程度？</th>
<th>沒有信心</th>
<th>很有信心</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>您對於回答此問卷的信心度？</th>
<th>非常了解</th>
<th>非常不了解</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  2  3  4  5  6  7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

基本資料

如想收到研究結果的執行摘要，請填寫下列資訊或是附上名片。

<table>
<thead>
<tr>
<th>姓名</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>國籍</td>
<td></td>
</tr>
<tr>
<td>職稱</td>
<td></td>
</tr>
<tr>
<td>公司名稱</td>
<td></td>
</tr>
<tr>
<td>電子郵件地址</td>
<td></td>
</tr>
<tr>
<td>郵寄地址</td>
<td></td>
</tr>
</tbody>
</table>
非常感謝您的協助！
汽车产业链调研问卷

受访者姓名：
受访者联系电话：（公司）；（手机）
访问时间：__月__日__：～__：
访问地点：

访员承诺：
◇ 我清楚本人的访问态度对调查结果的影响：
◇ 我保证本份问卷的各项资料都是由我本人按照公司规定的访问程序进行访问和记录的，绝对真实无欺；
◇ 我知道若发现一份作假，本人访问的所有问卷将全部作废，并需对因此而给公司造成的损失作出赔偿。

访员签字：__________ 访员中心：__________
KNOWLEDGE MANAGEMENT PRACTICES IN SINO-WESTERN AUTOMOTIVE INDUSTRY PARTNERSHIPS

A SURVEY BY

CIBER (CENTER OF INTERNATIONAL BUSINESS RESEARCH)

IN COOPERATION WITH THE MEMBER COMPANIES OF AUTOMOTIVE AND AUTO COMPONENTS WORKING GROUPS, EUROPEAN UNION CHAMBER OF COMMERCE IN CHINA GERMAN CHAMBER OF INDUSTRY AND TRADE WORKSHOP AUTOMOTIVE

For questions about this study, please feel free to contact:

Rudolf R. Sinkovics, (Rudolf.Sinkovics@manchester.ac.uk)
Professor, Manchester Business School
Director, Center of International Business Research

Bryan Jean (bryan@nccu.edu.tw)
Professor, Center of International Business Research

PURPOSE OF THIS SURVEY

In coordination with member companies of the Automotive and Auto Components groups of the European Union Chamber of Commerce in Beijing, Shanghai and Shenyang and members of the German Chamber of Industry and Trade in Shanghai, CIBER would like to explore issues that arise in your interaction with your key OEM (original equipment manufacturing) customer in China. In particular, we are investigating how the knowledge that you are bringing into the relationship with your customer can be kept safe in the competitive market environment of the automotive industry in China.

When using the word “knowledge” we are referring to the proprietary knowledge about products, processes (including design and development, manufacturing), and services and cost/pricing that would put you at a competitive advantage vis-à-vis your competitors.

IMPORTANT

When answering the questions in this study we would like you to think of your key OEM customer, which refers to the most important customer in terms of strategic dimensions like sales volume, market share or profitability.

CONFIDENTIALITY

Your response will automatically be kept completely confidential and any release will only be in an aggregate manner.
We are aware of the fact that this questionnaire will take about 20 minutes to complete. However, we hope you agree to participate in this important survey. The sample is limited and therefore your response is extremely important.

The results will be made available to you upon your request and will be beneficial to your business by showing your relative position in the Chinese market environment via your competitors.

**Part I – KNOWLEDGE MANAGEMENT**

In this section, we aim to understand how your company deals with proprietary knowledge internally and externally. We would like to know the mechanism established to share and protect this knowledge when your company interacts with your *key OEM customer*. Please tick the number that best reflects your response to the following statements.

<table>
<thead>
<tr>
<th>I. A. Please think of the mechanisms and measures your company has taken to protect knowledge</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My company has formal and systemized processes of protecting knowledge, e.g. contract, regulations and procedures.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>My company relies on patent and trademark to protect our critical knowledge from inappropriate use.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>My company has processes to protect knowledge from <em>inappropriate use inside or outside</em> the organization.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>4</td>
<td>My company has incentives that encourage the protection of knowledge.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>5</td>
<td>We avoid disclosing the key components of product when dealing with OEM customers.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>6</td>
<td>My company values and protects knowledge embedded in individuals.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>7</td>
<td>My company has policies and procedures clearly identifying the technology knowledge that is restricted and protected.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>8</td>
<td>My company clearly <em>communicates the importance</em> of protecting knowledge within the organization.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>9</td>
<td>Our product/process technology is very complicated which make imitation pretty difficult for our competitors.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>10</td>
<td>Our company has the advantage of a combination of technical expertise and experience that can not be easily copied.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>11</td>
<td>It is very difficult for our competitors to replicate all the components they need. They may face interface problems in combining</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
components together.

| 12 | My company develops good relationships with local government or local communities to protect our key knowledge. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 13 | My company lets our employees know what capabilities we do not want our automotive OEM customer to access. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 14 | Our employees receive training about how to protect our capabilities from our OEM customer. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 15 | We encourage our employees to protect our capabilities when they collaborate with our OEM customer. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 16 | Protection and confidentiality are major features of our corporate culture. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |

### I. B. Supplier’s involvement in the production processes

Please think of your interaction with your key OEM customer.

| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 1 | My company frequently monitors the speed and flow of our products at the customer’s assembly line. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 2 | My company is always ready to react to any problems at the customer’s assembly line. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 3 | My company keeps our own personnel inside or at close distance to the customer’s assembly line. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 4 | My company is responsible for sequenced delivery to our customer’s assembly line. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 5 | My company makes regular efforts to improve the quality of the product with the customer. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 6 | My company cooperates closely on quality control of products delivered to this customer | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |

### I. C. Supplier’s early involvement in product design through co-design

Please think of your early involvement in co-designing products with your key OEM customer.

| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 1 | My company usually gets involved in the new product development process in an early stage of product design. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 2 | We have an active role in product design specifications. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 3 | During product development stage, there is a high level of involvement between our development team and our major OEM customer. | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 4 | During product development stage, our major |
OEM customer often benefits from our expertise and experience.

Co-design activity of our product with our OEM customer is a major priority to us.

<table>
<thead>
<tr>
<th>II. A. Your company’s investments, undertaken specifically to support business transactions with your key OEM customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please think of the investment you have dedicated to your key OEM customer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My company has made significant investments dedicated to our automotive OEM customer (e.g. production and testing equipment, tooling and engineering design or information technology and logistic systems).</td>
</tr>
<tr>
<td>2</td>
<td>My company has spent a lot of time with our OEM customer in learning its operation routines and in building relationships with its staff.</td>
</tr>
<tr>
<td>3</td>
<td>My company has made significant adjustments in our product and production system or internal operation processes in order to adapt to our OEM customer’s unusual needs and technical specifications.</td>
</tr>
<tr>
<td>4</td>
<td>My company has spent a lot of time and effort in coordinating the operation processes of our own suppliers to adapt to this focal OEM customer’s unusual needs and technical specifications.</td>
</tr>
</tbody>
</table>

Part II – RELATIONSHIP ASPECTS

In this section, we aim to understand both good and bad relationships you have with your most important automotive OEM customer. Please think of the contractual issues, cooperation, commitment, and etc. between you and your customer.

<table>
<thead>
<tr>
<th>II. B. Specific investments which your OEM customer has undertaken to support business transactions with your company:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Our OEM customer has invested a great deal in this relationship with us.</td>
</tr>
<tr>
<td>2</td>
<td>If our OEM customer were to switch to a competitive supplier, he would lose a great portion of the investments made in the current relationship with us.</td>
</tr>
<tr>
<td>3</td>
<td>Our OEM customer has invested facilities,</td>
</tr>
</tbody>
</table>

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employees and processes specific to the business relationship with us.

<table>
<thead>
<tr>
<th>II. C. Trust and partnership issues</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please think of trust and partnership issues while working and interacting with your key OEM customer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 My company trusts our automotive OEM customer is able to fulfil contractual agreements.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>2 As much as key issues are concerned, our OEM customer is always honest with us.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>3 My company believes the information that our OEM customer provides us.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>4 Our OEM customer is genuinely concerned that our business succeeds.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>5 When making important decisions, our OEM customer considers our welfare as well as its own.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>6 Our automotive OEM customer is trustworthy.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. D. Are you equally dependent on each other?</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your dependence on your key OEM customer (supplier dependence)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 It would be difficult for us to replace sales and profits generated from the key OEM customer.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>2 We are quite dependent on the key OEM customer.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>3 Our relationship with the key OEM customer is very important to achieve our long-term growth.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Your perception of how dependent your key OEM customer is on you.</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 It would be difficult for our OEM customer to replace sales and profits generated from our business relationship.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>2 Our key OEM customer is quite dependent on us.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>3 Our key OEM customer’s relationship with us is very important to achieve its long term goals.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. E. Contractual relationships issues with your OEM customer:</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 We have specific, well-detailed agreements with this OEM customer.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
2. We have customized agreements that detail the obligations of both parties.

3. We have detailed contractual agreements specifically designed with this OEM customer.

**Part III – CULTURAL ISSUES & BUSINESS ENVIRONMENT**

In this section, we aim to understand your company’s culture sensitivity when operating under the Chinese cultural context. Please tick the number that best reflects your response to the following statements.

### III. A. Generally, do you think your company is culturally sensitive to the Chinese way of doing business?

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>We are sensitive to the difficulties of doing business in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>We have the ability to adapt to the way of conducting business in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>We are willing to abide by Chinese business practices and customs.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>4</td>
<td>We have good knowledge of Chinese culture.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

### III. B. Everybody talks about “Guanxi” in China, do you think this is really relevant for you and your company?

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doing business in China involves knowing the right people.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>Maintaining a good relationship is the best way to enhance business in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>Being in the &quot;inside&quot; circle helps in obtaining preferential treatments in doing business in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>4</td>
<td>Developing the right contacts helps in the smooth running of a business in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>5</td>
<td>Maintaining a good relationship is the best way to enhance business in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>6</td>
<td>Gift giving is an important feature when we want business to succeed in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>7</td>
<td>Top managers at our firm have maintained good personal relationship with officials in various levels of government.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>8</td>
<td>Top managers at our firm have developed good connections with officials in regulatory and supporting organizations such as tax bureaus, state banks, and commercial administration bureaus.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>9</td>
<td>So far, our firm’s relationship with regional government officials has been in a good shape.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
Our firm has spent substantial resources in building relationships with government officials.

Top managers at our firm have developed good personal ties, networks and connections with top managers at buyer firms.

Top managers at our firm have developed good personal ties, networks and connections with top managers at supplier firms.

Top managers at our firm have developed good personal ties, networks and connections with top managers at competitor firms.

---

**III. C. Dynamics of the Chinese business environment**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>It is very difficult to monitor the trends in our industry</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>Sales volume in our industry is very volatile</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>Competitor’s strategies and actions in our industry change very frequently.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

**III. D. Please think of the technological uncertainty of the automotive industry during your operation in China.**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Production (or service) techniques / processes change very frequently in our industry.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>Technology changes provide big opportunities in our industry.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>There are high technological innovations in our industry.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>4</td>
<td>More and more complex products are provided in our industry.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

**III. E. Legal environment**

Please think of your company’s operations under the legal system implemented in China.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Chinese legal system has provided adequate protection for our know-how and intellectual property.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>The Chinese legal system has provided adequate protection for our trade secrets.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>The law enforcement in China has provided incentives for our company to invest in China.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>4</td>
<td>Local companies in China frequently interpret local laws in their favor.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
5. Our OEM customers frequently *interpret local laws in their favor.*

6. Local companies in China frequently *violate intellectual property rights protection laws* in this market.

7. Our industry has experienced some unlawful competitive practices such as illegal copying of new products, counterfeiting of our firms’ own products and trademark by other firms.

8. Our industry has experienced increased unfair competitive practices by other firms in the industry.

### Part IV – PERFORMANCE

In this section, we aim to understand the benefits or improvements accumulated as a result of your relationship. Please tick the number that best reflects your response to the following statements.

#### IV. A. Please tell us how working with this key OEM customer has impacted on your operational performance.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relationship with the customer has helped us reduce our costs.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Our relationship with the customer has increased our sales growth.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Our relationship with the customer has increased our profitability.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

#### IV. B. Do you think that in working with this key OEM customer your products or components have improved?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relationship with the customer has a positive effect on our ability to make improvements to our existing products.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Our relationship with the customer has helped lower product return rates on their orders with us.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Our relationship with the customer has a positive effect on our ability to develop successful new products for our markets.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Our relationship with the customer has helped us to achieve a great numbers of product adaptations/improvements in the last three years.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>Our relationship with the customer has helped increase sales from incremental product introduced by your firms in the last three years.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
Compared with your major competitor, our relationship with this customer has helped introduce more incremental new products in the last three years.

Our relationship with the customer has helped us to achieve drastic changes in technology platforms or production processes in the last three years.

Our relationship with this customer has helped our company frequently introduce radical new products into new markets in the last three years.

Compared with your major competitor, our relationship with this customer has helped introduce more radical new products in the last three years.

**IV. C. Please think of any improvement regarding your relationship.**

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Our relationship with the customer has resulted in more efficient communication between the two parties.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>Our relationship with the customer has helped us better understand each other’s goals.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>Once we have been awarded a project by our customer, we are the sole exclusive supplier of that part.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>4</td>
<td>Our key OEM customer places orders with us in line with the volumes agreed during project negotiation.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>5</td>
<td>Our key OEM customer allows us to sell into the Independent Aftermarket (IAM).</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>6</td>
<td>We earn back all special direct costs for the projects that we realize for our key OEM customer over lifetime.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>7</td>
<td>Payback times for projects awarded to us by our key OEM customer have mostly been within our expectations.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>8</td>
<td>When winning business from our main OEM customers restrictions on our access to other sales channels apply.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>9</td>
<td>The business relationship with our key OEM customer is profitable for us.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>10</td>
<td>Our key OEM customer explicitly request exclusive access to our products.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

**Part V – DEMOGRAPHIC INFORMATION**

Please provide information concerning your company, your product and your customer. If exact information is not available, please provide your best estimate.

**V. A. Basic information about your company**

1. *Please indicate the nationality of your company and related entities:*

<table>
<thead>
<tr>
<th>Nationality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your company</td>
</tr>
</tbody>
</table>
Corporate
China operations
Legal entity that you work at

2. Your operations in/with China: (Please give indication).

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>China operations</th>
<th>Your legal entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of years that your business has been active in China</td>
<td>since 19__ / 20__</td>
<td>since 19__ / 20__</td>
<td>since 19__ / 20__</td>
</tr>
<tr>
<td>Number of employees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual sales of your company</td>
<td>below RMB 10 mio</td>
<td>below RMB 10 mio</td>
<td>below RMB 10 mio</td>
</tr>
<tr>
<td>(Please tick the number)</td>
<td>RMB 10 - 100 mio</td>
<td>RMB 10 - 100 mio</td>
<td>RMB 10 - 100 mio</td>
</tr>
<tr>
<td></td>
<td>RMB 100 - 500 mio</td>
<td>RMB 100 - 500 mio</td>
<td>RMB 100 - 500 mio</td>
</tr>
<tr>
<td></td>
<td>RMB 500 mio - 1 bio</td>
<td>RMB 500 mio - 1 bio</td>
<td>RMB 500 mio - 1 bio</td>
</tr>
<tr>
<td></td>
<td>more than RMB 1 bio.</td>
<td>more than RMB 1 bio.</td>
<td>more than RMB 1 bio.</td>
</tr>
</tbody>
</table>

3. Number of subsidiaries your company operates in China:
   - Of which WFOE: ____________________________
   - Majoriy JVs: ____________________________
   - 50:50 JVs: ____________________________
   - Minority JVs: ____________________________

4. How many of your company’s subsidiaries in China operate profitably? ___%

5. How many of your company’s subsidiaries in China have returned their investment? ____________________________ %

6. Why have some of your companies not yet returned their investment? (Please give indication).
   1. In line with business plan
   2. My company is still in a phase of expansion and uses profits from local subsidiaries to increase registered capital, pay for investment, etc.
   3. Those subsidiaries of my company in China that have turned profitable have not yet refinanced their initial investment.
   4. Other, please specify:

V. B. Basic information regarding your products:

1. Your primary product group is:
   [ ] Motor     [ ] Body     [ ] Electrics General     [ ] A/C, Petrol
   & Sensors
   [ ] Filtration [ ] Chassis [ ] Lighting [ ] Ignition,
Alternators, Starters

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2. In addition to manufacturing, does your company design the product for your OEM customer in China? ______
   1. Yes    2. No

3. Please indicate the percentage of products that have you designed for your OEM customer in China ______% 

4. Please indicate the percentage of product duplication from your company headquarters or other locations ______%

5. Please indicate the percentage of CKD/SKD parts that you sell to your OEM customers in China ______% 

8. CKD/SKD versus in-depth localization

<table>
<thead>
<tr>
<th>My company mainly sells CKD/SKD parts to our OEM customers in China.</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In order to maintain the competitive edge in China, my company strives to achieve in-depth localization for the parts we sell to our OEM customers in China.</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Does your company produce the product for sales under your own brand in China? ______
   1. Yes    2. No

7. Please indicate the percentage of your own brand business in China ______% 

8. What type of products do you mainly sell to your OEM customers?

<table>
<thead>
<tr>
<th>The products we sell to our main OEM customers are mostly commodities.</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In our business in China, we mostly sell value-added products to our main OEM customers.</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Please indicate your price point. ______
   1. Expensive    2. Cheap

10. Please indicate the relative newness of your product. ______
    1. Leading product    2. Established product

11. Please indicate the level of the technology of your product. ______
    1. Leading technology    2. Established technology

12. Please indicate if your product is patented or not.
13. Please indicate the degree of your company’s dependence on the product. Dependence on the product as _________ % of our sales

V. C. Basic information about your key OEM customer in China:

2. The legal status of your customer in China is:
   [ ] Chinese OEM   [ ] International IJV OEM

3. If your customer is in an IJV OEM, please indicate the origin of the international partner:
   [ ] Germany   [ ] other Europe   [ ] Japan
   [ ] Korea   [ ] USA   [ ] others, please specify: ______

4. How long have you been in relationships with this OEM customers? __________ yrs

V. D. Please Indicate the Following

<table>
<thead>
<tr>
<th>How knowledgeable are you about your firm’s China Operations?</th>
<th>Not Very Knowledgeable</th>
<th>Very Knowledgeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>How knowledgeable are you about your firm’s relationship with your OEM customers?</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>How involved are you in your firm’s relationship with your OEM customers?</td>
<td>Minimally involved</td>
<td>Highly involved</td>
</tr>
<tr>
<td>How confident do you feel in answering this questionnaire?</td>
<td>Not Very Confident</td>
<td>Very Confident</td>
</tr>
</tbody>
</table>

V. E. Basic information about yourself:
To receive a copy of the executive summary of the research findings, please complete the following or attach a business card.

<table>
<thead>
<tr>
<th>Your name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Your nationality</td>
<td></td>
</tr>
<tr>
<td>Your job title</td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td></td>
</tr>
<tr>
<td>E-Mail address</td>
<td></td>
</tr>
<tr>
<td>Mailing Address</td>
<td></td>
</tr>
</tbody>
</table>

THANK YOU FOR YOUR TIME AND ASSISTANCE!
BOTH ARE GREATLY APPRECIATED!
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