A New Insight to Control Technology Spillover
– a Case Study of Adidas in China

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Abstract

Purpose- Previous literatures focus on the technology spillover from multinational companies to local companies. However, the great threats generated from spillover to subsidiaries were omitted. The purpose of this paper is to explore the variables which can help subsidiaries control the technology spillover.

Methodology- First a conceptual model is developed, which will then be used to map out how subsidiaries can control their technology spillover. An Adidas' local representative in China is used during the case study.

Findings- Findings indicate that there is a possibility to control the technology spillover by adopting certain variables. There are however, no omnipotent variables to stop the technology spillover. Thus the selection of variables employed needs to consider that products have different attributes.

Value- This paper stresses the importance and the very necessity of controlling technology spillovers. Furthermore, it maps influencing variables and tests, whether these variables work in real case.

Key words: Technology spillover, local companies, subsidiaries

Introduction

When talking about the sports shoes manufacturing industry, a lot of brands come to mind. Even though competing on a global market arena with fierce competition, Adidas has been able to distinguish themselves as a global brand in the eyes of their customers. Consumers hold their different views on Adidas; however, Adidas with its valuable brands has been recognized globally. Despite the gloomy of global economics in 2009 that foreign brands (stand on the Chinese market view) suffered including Adidas, over the past years, Adidas grew quickly. For instance, the sales in the footwear category increase from 2978 million euro in 2006 to 4919 million euro in 2008 (Adidas Group annual report, 2009). The brand values that Adidas has created help to expand the Chinese market. Besides, advanced technologies such as “FORMORION” technology and “adiTUFF” technology (the explanations of these two technologies can be found in the empirical data) have strengthened the competitive advantage. They also drive Adidas to position itself in China and capture market share. However, nowadays, an increasing number of imitation behaviors is fostering among the local companies. Nevertheless, it is in this context that some of the Adidas products still in the leading position in Chinese market. Data shows that Adidas got 10 percent breakdown by revenue in the sports shoes market in 2007. This number was increased to 14 percent in 2008 (Industry review, 2008). Moreover, only a small number of companies using the similar technologies as Adidas uses (see table one). Therefore, most of the Adidas technologies are still maintaining in the Chinese market.

Over the past decades, many MNCs (Multinational companies) have been keen on investing in foreign countries, especially have made substantial investments in developing countries bringing with them advanced technologies and so on. A problem with this is that technology spillover is generated during this technology transfer process. It is important to introduce the meaning of technology before discussing the technology spillover. In this paper technology is defined as a form of knowledge, which not only includes
tangible terms such as material and equipment, but also includes intangible terms such as practice, experience, thinking, management, and specific working skills (Tang, Zhang and Zhou, 2007). Technology incorporates an abundance of knowledge and can be considered as the carriers of knowledge. When talking about technologies on a firm level. No matter tangible or intangible the technologies are, they must be combined in order to transform the technology into product design technologies, product manufacture technologies, management technologies, etc. Therefore, it is quite difficult to separate the knowledge spillover when talking about the technology spillover. In this article, technology spillover includes both tangible and intangible terms and knowledge spillover is also considered as one aspect of technology spillover.

Over years, arguments around the effect from technology spillover on its existence divert greatly. However, one has been reached concerning technology spillover, that is, the importance of technology spillover effect generated from Foreign Direct Investment (FDI) – a direct financial flow from home company to host company (Froot, 1993). Zhang and Ouyang (2003) state that the spillover effect is the benefit that FDI generates and unconsciously diffuses to the local companies, and in turn it increases the host country productivity. However, subsidiaries from Multinational firms cannot absorb the whole benefit. This indicates that technology spillover effect will improve the technologies in local companies and enhance their productivities. Moreover, local companies will be much competitive in the local market. It is necessary to point that there are some of literatures mix the conception of technology spillover and spillover effect. In this paper, technology spillover effect is a topic to explain how the spillover technologies help to enhance the national economics. Technology spillover draws the picture that technologies are taken from companies to companies. It is a part of spillover effect but discussed in a national level. Cavers (1974) points out that technology spillover effect will increase the host countries’ economics after his empirical research in Canada and Australia. This indicates a positive relation between FDI and technology spillover effect. Sjöholm (1998) uses Indonesia’s case study and confirmed that FDI spillover effect exists at a national level because domestic establishments with a large foreign presence showed high growth of productivity. Blomström, Globerman and Kokko (1999) list hundred empirical analyses with the purpose of emphasizing the positive relations. Does this mean that FDI has the general positive effect to every country? Blömström (1986) concludes that FDI spillover effect will not speed up transferring of any specific technology after conducting empirical research in Mexico. Moreover, Aitken and Harrison (1999) point that an increase in foreign enterprise has negative effect on the productivity in the relative industry.

Most of the literatures prove the existence of the technology spillover effect, even though it has a positive or negative effect. Nevertheless, whatever the effects generated, all of them imply that the technology spillover, as a part of spillover effect, deriving from MNCs influences the local competitors. Looking further into the researches, it is not difficult to notice that the majority of the previous literatures are made in view of local companies and measured how well they obtained through spillover. However, the growth from local companies is also a threat to the MNCs. In most cases, these threats will lead MNCs lose competitive advantages while local companies increase the advantages (Bischi, Dawid and Kopelc, 2003).

This paper begins with reviewing previous literatures and identifying the most important variables in technology spillover. However, seldom of the research is based on the subsidiaries view to see how the subsidiaries maintain their advantages. An interesting question raised here that is how subsidiaries can control technology spillover effects? The purpose of this article is to explore whether the suggested influencing factors can help subsidiaries to control the spillover effect. For this reason, a conceptual model will be established to show the factors from subsidiary perspective to controlling spillover.
Definition

Conceptual source of technology: in this paper, conceptual source of technology is defined as two companies who design different technologies in the same field. [For instance: a layer 3 switch inspired from router technology, a router can act as a switch but switch cannot act as a router (Hassan, 2010).]

Methodology

This article focuses on the understanding of most important factors with conducted conceptual model that helps subsidiaries to control the lost of benefit. This indicates that the research needs to dig deeper into the subsidiaries to collect the data. By weighting the pros and cons, qualitative research is selected, as it provides a good way of collecting more information within a small group (Bryman and Bell, 2007). Specifically, a qualitative research adopted in this paper is helping to have a deep insight into the company and see how a company controls the spillover to local companies.

Case study is an approach which helps in exploring a phenomenon in its context (Baxter and Jack, 2008). Stake (1995) stresses that case study provides a good way of solving the complexity. Many literatures point that multiple case studies can provide a general view; whereas, a single case study lacks essential key points. However, Yin (1993) and Hamel, Dufour, and Fortin (1993) argue that the relative size of sample does not transform the multiple case studies into a macro scope level. Meanwhile, multiple case studies are often facing a problem of dealing with the large sum of the data. More than one case makes it easy to lose the focus and decrease the possibility of having a deeper insight to the company. Tellis (1997) argues that single case study can still be acceptable if it meets the objective of paper. Since the purpose of this design is to look inside the companies deeply while most of the data needs to be collected based on a closed contact with the company. Thus a simply case study is adopted. Moreover, data from a single case study does not only show the specific information but also some general information. Therefore, though there are a large number of subsidiaries, a common way that subsidiaries maintain their competitive advantage can be traced. Many literatures select the case from High Technology Company so that traditional company with advanced technology is omitted. Obviously, technology spillover does not only exist in the high technology level. The case in this paper is selected according to three points below. Finally, “Adidas” case in China has been selected.

- It must be MNCs with a famous brand so that it is representative;
- The subsidiary of MNCs in China should not be small scale so that it will have the possibility to affect local companies;
- The company may not be a technological company, but it must have the relative high technology in its industry;

Data is collected from two sources: primary and secondary data. The semi-structured interview is considered (see the interview guide) to collect primary data. Tellis (1997) mentions that interviews provide the important source to case study and make it easy to look deeper inside the event. The interviewees in this paper are selected as the managers from Adidas Shanghai Company. Four different interviewees are selected from two different departments: marketing department and human resource department. Three team leaders from the marketing department are selected: the sales/marketing team and advertisement team (two from sales/marketing and one from advertisement). Since Adidas divides the task in the sales/marketing team according to different performances of the product. Therefore, two interviewees in sales and marketing are respectively from football category and outdoor shoes category. Four interviews in Adidas are made via Skype with the recorder. In order to avoid gathering simplest data, the interviewer organizes the questions step by step and motivates interviewees by giving examples. Four interviews are formed respectively in a fixed time and in an open atmosphere. Though interviewees are in
different positions, they got the same interview guide. The purpose of sending the same guide lies in collecting different views from different interviewees makes the data be valid and be feasible to compare the differences and similarities from the interviews. The author has sent the interview guide (see it in the appendix) one week before the interview. In order to make the data valid and reliable, the report after the interview is sent back to the interviewees and enquiry for further suggestions. Interviewees also admitted to keep in touch in case of updating news. Secondary data in this paper is collected from three ways: journals, websites and annual reports. In order to make the data valid, the author refers to different websites including Adidas official website, Adidas competitors’ websites and industry websites. The purpose of selecting different websites is to compare the data and ensure authenticity of material. The delimitation here is that the manager from Research and Development (R&D) department is not able to access for the interview because the main R&D center is not located in China.

Two types of products: football and sports shoes from Adidas are compared in the case study. The idea of comparison comes from the first interview with the Adidas football category team leader. He mentioned that sales in different products differ, especially football (see the definition of football in the empirical data) and outdoor shoes. Besides, choice of football and outdoor shoes lies in that in the Chinese market, Adidas is facing more competitors in producing sports shoes. More differences upon these two products are explained in the empirical data.

Stake (1995) suggests using categorical aggregation as well as establishing protocols to improve the quality of research while Eisner and Peshkin (1990) recommends a direct interpretation on the event and low interpretation on measuring the data. In this paper, a categorical aggregation together with direct interpretation is adopted to process the data analysis step by step. Data will be analyzed starting from a company level to specific products. Different points from data will be extracted to make each subtitle explicitly.

**Theoretical framework**

In the following section, theories from two aspects: subsidiaries’ performance and technology spillover and the channel of spillover are going to be intensively discussed. As mentioned before, this paper is aiming at finding the influencing factors. The theories start with the discussion of subsidiaries’ performance and technology spillover. Considering that technology spillover is formed between two sides (subsidiaries and local companies), the channel that bridges two sides also needed to be remarked.

- **Subsidiaries’ performance and technology spillover**

Li (2008) points that when MNCs are transferring their technologies to subsidiaries, local companies are prone to get the benefits from this process. This presents a result of technology spillover (to local companies). The issue is that how subsidiaries fail to control their technologies. Reasons behind this view are extracted as the factors presented below.

**Communication**

Communication here refers to the conversation between local companies and subsidiaries. Wu (2002) stresses that if the communications are weak between subsidiaries and local companies, technology spillover is low. Even though local companies can get new products, weak communications lead to the difficulties in getting the source of innovation and other information of marketing strategy (Li, 2008), which are defined in the introduction in terms of intangible technology. Therefore, basing on subsidiaries view, weaken the communication to the local companies provides the way of controlling the intangible technology spillover.

Sometimes subsidiaries are willing to communicate with local companies. However, another situation is that subsidiaries are trying to stop communicating with local companies but fail to avoid. Since communication with local companies does not good in controlling spillover, therefore, this paper takes communication from the second situation. Mess media are the way of communicating with the public,
including local companies in marketing. Rogers (2003) indicates that mass media is an effective way for transmitting messages that involve a mass medium such as radio, TV, newspaper. Subsidiaries can stop employees to communicate with local companies. However, it is quite difficult to stop the communication via marketing between two parties. A poor marketing is equal to a strong communication with local companies, because a poor marketing will lead to intangible technologies revealed to the local companies. Therefore, marketing department in the subsidiaries should pay more attentions to stop being as a carrier of technology spillover.

**Innovators**

Consumers are the receivers of technology. Innovators are one type of consumers in the market. According to the time that consumers make the decision of adopting the products, Rogers (2003) divides the consumers into five groups: innovators, early adopters, early majority, later majority and laggards. Innovators are the earliest group of consumers who gives the response to the newly released products, which means that innovators are the first “consumers” who consider the products (in the very early phase when the products launch the market). The purpose of introducing the conception of “innovator” in this paper is to pinpoint the potential threats from local companies to subsidiaries on the technology spillover perspective in the very beginning, when the products launch the market. Therefore, controlling technology spillover in the innovator perspective means to control the spillover when seldom of the consumers are in the market.

Innovators only share 2.5 percent among all adopters in the adopter category. Therefore, innovators are a very small group of consumers. Most of the innovators are of venturesome (Rogers, 2003). It is said that venturesome is the natural character of innovators. They are interested in new ideas, which push them over their local social cycle (ibid). Most of the innovators are technicians, scientists. Therefore, their comments are professional and powerful in influencing other consumers’ decision (ibid). The communication between different innovators is common even though it is not convenient for them to contact with each other due to the geographical inconvenience. There is another reason that the innovators are considered to be venturesome. Being an innovator, he or she must be at a certain condition (finance and technical knowledge) to face the risk of losing and high uncertainty from the innovation (ibid).

It is not difficult to find that local companies have the possibility to be the subsidiaries’ innovators. This can be regarded as the potential threats. Subsidiaries always run on the risk of showing product in the front of local companies. Local companies fulfill all the innovators’ characteristics mentioned above. Especially, local companies embrace strong financial background and professional knowledge. Technology spillover starts when the local companies adopt the new products. Most of the time, the spillover comes from tangible technology. Therefore, distinguish the real innovators and find the way of keeping distance with the “fake innovators” as local companies behave are crucial to subsidiaries. Since Rogers (2003) lists that group of innovators are usually formed from professional consumers, including scientist, technicians, etc. Hence, it indicates that subsidiaries could target trustful group as the innovators to control the technology spillover.

In summary, weaken the communication draws the possibility of preventing technology spillover from subsidiaries to local companies. Trying to distinguish the “fake innovators” in the market provides another way of controlling technology spillover.

**Gap of technology**

MNCs will transfer the technologies to subsidiaries when MNCs consider that it is the high time that technologies could launch to the market (Tang, Zhang and Zhou, 2007). The technology gap between subsidiaries and local companies are always large (ibid). Findlay (1978) points that the greater the gap is between subsidiaries and local companies, the quicker the technology spillover will be. This great gap will form a space encouraging local companies to learn and pursue. Therefore, the productivity in the local company will be improved immediately (Sjöholm, 1998). However, Kokko (1994) mentions that
local companies will have the possibility to learn only when the gap is small. What if the new technology from subsidiaries is quite new to local companies, it is quite difficult for them to learn; or the greater the gap is, the possibility of learning ability will decrease (ibid). The argument comes as it is too general to use large or small to describe the relation between technology gap and spillover. Li (2008) points that it is a dynamic relation between gap and spillover (see figure 1).

![Figure 1 the relation between technology spillover and gap of technology](image)

Source: Li (2008) pp. 112

This figure shows that the increasing large gap of technology between local companies and subsidiaries leads to reduce the technology spillover to local companies. This is shown in period Q of the figure from “d” to “g”. In turn, reducing the gap between local companies and subsidiaries causes the same result of decreasing technology spillover (see period P in the figure from “d” to “a”). Once, the gap of technology reaches to the peak, technology spillover gets to the maximum at the same time. The difference between period P and Q lies in whether subsidiaries plan to control the technology spillover by increasing or decreasing the gap. However, reducing the gap indicates that subsidiaries will run into the risk of losing the competitive advantage in technologies. Thus, in order to minimize the technology spillover, focus on expanding the gap does well to the subsidiaries (period Q). Continuous R&D ensures subsidiaries to increase the gap of technology.

**R&D property**

The speed of technology innovation is fast nowadays. R&D in MNCs is getting increasingly stronger. To local companies, absorbing the new technologies from subsidiaries becomes difficult. This is explained by Li (2008) that subsidiaries are making use of “time-lag” to local companies. Time-lag is a term to reduce the benefit that local companies get from subsidiaries by prolonging the time of releasing the products to the market. It works as decreasing the benefit of the new products in the market so that the benefit got by local companies at the same time decreases. This is because new technologies catch consumers’ eyes owing to the superiority in the market. “time-lag” leads to the less attractiveness of the products in the market. Some of MNCs started to move some R&D teams to local market in 1980’s for the sake of capturing the latest information and allocating elites (Tang, Zhang and Zhou, 2007). Therefore, the locations of R&D are closer to the competitors than before in the local market. By doing so, subsidiaries are running the risk of decreasing the “time-lag” and provide the high chances of letting local companies carry out technology spillover.

In summary, both of the gap of technology and R&D property are related to R&D department. Arguments around technology spillover and gap of technology differ. This paper is in favor of Li (2008) views that expand the gap of technology, which indicates a better way of reducing technology spillover at the same time generates the competitive advantage to subsidiaries. On the other hand, R&D in subsidiaries should make good use of “time-lag”. It provides a good way to decrease the benefit of product when local companies snatch the technologies.
Technology spillover channel

Blomström and Kokko (1998) define that there are three types of spillover channel: intra-industrial, inter-industrial and spillover with employee movement.

Intra-industry

Intra-industry channel of technology spillover is formed between subsidiaries and local companies in the same market. Local companies face strong competitions from competition in the market (Blomström and Kokko, 1998). Local companies are prone to use similar technologies if competitions between subsidiaries and local companies are in the same market and producing similar products (Tang, Zhang and Zhou, 2007). This indicates that subsidiaries have the chances to lose their technologies if the competitions are in the similar products.

Inter-industry

Inter-industrial channel appears from the connection between the subsidiaries and local suppliers and customers. Tang, Zhang and Zhou (2007) refers to Lall (1980) that there are five ways that technology spillover comes from MNCs which can help local companies to enhance productivity:

- Help suppliers to establish production facilities
- Provide technical assistance and relative information to improve the quality of products and innovation capability
- Provide suppliers with raw material and intermediate
- Provide training and assistant on management to suppliers
- Help suppliers to find more customers

Technology spillover through intra industry indicates that technology spillover does not only exist in the same market. Blomström and Lipsey (1991) point that if the technologies are complex for local companies (for example, manufactories), technicians from subsidiaries can help them to disgust the technology.

Spillover with employee movement

The third channel of spillover is employee movement. In order to enhance the working efficiency, subsidiaries usually hold training to their employees. Technicians receive the training on working skills. Management and operation training is given to managers. In these cases, once these trained employees quit the job and work in other companies or be entrepreneurs themselves, whatever, they have learned from subsidiaries will benefit local companies (Tang, Zhang and Zhou, 2007). Therefore, human resources lost will cause the technology transfer from local companies to subsidiaries (ibid). Even though subsidiaries have advanced technologies, their technologies probably are not suitable to local market. Capturing brains from local companies helps subsidiaries make the modification on the technologies.

Spillover with employee movement is far important in the developing countries owing to the weak educational system (Chen, 2003). Thus, subsidiaries are facing more severe cases in the developing countries. On the other hand, “Little opportunity for advance” and “wanted training” are two reasons for employees to leave the job (Middlebrook, 1999). Subsidiaries always provide better salary inducing employees from local companies to work for them (Tang, Zhang and Zhou, 2007). Middlebrook (1999) points that salaries and financial rewards are important to avoid brain drain.
Model for controlling the technology spillover

Based on the theories discussed above, a conceptual model of controlling technology spillover is generated here. This model is created to illustrate what factors are important in controlling technology spillover.

![Diagram of influencing factors in controlling technology spillover]

Five factors are listed in the model: Gap of technology, R&D property, innovator, and communication and employee movement. Four factors are the hot topics (except innovators) that previous literatures focus. They suggest local companies in deriving the technologies from the subsidiaries. These are in turn, providing good approaches for subsidiaries to control the spillover. Innovator is a new factor which this paper proposes. This brings a new idea of controlling spillover from early customer perspective. However, in this model, inter relationships among these five factors will not take into consideration. Spillover in intra industry is merged with the gap of technology. Spillover in intra industry will foster local companies to use similar technology if the product and market are similar with subsidiaries. This provides the premise in narrowing down the gap. Therefore, this paper considers it as a part of the gap of technology.

On the other hand, spillover in inter industry is merged with communication. This is owing to that spillover in inter industry is mainly about the connection in between local companies and subsidiaries, which includes help, guidance and discussion, etc. Thus, it can be regarded as the communication between two companies.

Empirical data

In the early 1990s, Adidas started its business in the Chinese market. Its wholly-owned subsidiary "Adidas (China) Ltd" was founded in 1997 in Shanghai of China (Adidas shareholdings, 2009) and two facilities are respectively in Beijing and Guangzhou. In China, Adidas deals in three categories of products: footwear (shoes), hardware (accessories and balls) and apparel (clothing). In 2009, Adidas (China) donated 9 percent of wholesale net sales to the Adidas Group (Adidas Business Performance Wholesale, 2009). The data from Adidas Group shows that in the past 2009, sales were down, which covered all regions, including China (ibid). Sales in China declined by 16 percent on a currency-neutral basis.
basis in 2009 (Adidas Group Income by Statement, 2009). Chairman of supervisory Board provided the clue that owing to the ongoing global economic and financial crisis, sales decreased over the world (Adidas Group Supervisory Board Report, 2010). However, the recession of the finance in Adidas is better off due to the great business opportunity from 2010 FIFA World Cup. Especially, in the first quarter of 2010, the sales of football from all regions were already up 26 to percent (Adidas Group FIFA World Cup, 2010). As mentioned before, this paper adopts Adidas football and Adidas sports shoes for making comparison. Therefore, below, details of two categories are presented and compared.

- Adidas football (soccer)

Football in this paper is defined as a game that 11 players by two teams. This is equal to “soccer” where American calls. The first time that Adidas started to support FIFA World Cup was in 1970 held in Mexico. Adidas designed the ball with 32 hand-stitched panels (12 black pentagons and 20 white hexagonsl), which created the roundest sphere of its time (FIFA World Cup Adidas Ball History, 2010). Later, Adidas provided football with FIFA World Cup every four years. In each time of the World Cup, Adidas designed the football embedded with specific technology. New Technologies such as the of black polyurethane foam in 1990 and ultra-high-energy- return layer of white polyethylene in 1994 were implied in the rest of the World Cups. The latest design for FIFA World Cup is the eleventh time that Adidas showed its new technology as well as the second time that Adidas designed the special ball “Jabulani” for the final match. All the joints in the ball are completely sealed, which makes the ball water-repellent so that the ball’s characteristics are less affected during the rainy game (Den Officiella VM-bollen [Dagens Nyheter (DN) Sport.], 2010). The ball is perfectly spherical and provides better accuracy than previously balls (ibid). PU and PVC are the material that Adidas uses which is similar to local companies. Ultra-light fiber is a superior technology that Adidas differs from other. (PU, PVC and Ultra-light fiber are the material that used in the football surface. Ultra-light fiber is best among three.)

Competitors in Chinese market -In the Chinese market, some companies provide football such as Li-ning, Doublestar and Huochetou. Li-ning is famous for its brand and deals in basketball and Doublestar deals in Rubber and volleyball (Doublestar History, 2009). Huochetou brand is nearly at the end of its life in the market. Comparing with Adidas, the only advantage of selling football is low price. Figure five draws that in the famous Chinese online shopping website Taobao (www.taobao.com ), the number of Adidas football is far more than the rest three brands: Li-ning, Doublestar and Huochetou. Moreover, the price of Adidas football is in a relative high range (from RMB 81 to 199, RMB is the unit of Chinese currency. The exchange rate of Chinese currency is equal to 0.1115797 EURO on August 4th, 2010 02:21 Stockholm time, http://www.xe.com/ucc/convert.cgi?Amount=1&From=CNY&To=EUR the rest three brands. Therefore, all the native brands are weak in the technology of football. Local brands do not threat Adidas. Adidas still keeps its technology in football while none of the native brands sell the football with the similar technology. Football category team leader said that thanks to the World Cup, we are confident with our sales on football because our footballs are mostly known everywhere in the world. “sales of football are quite sound” manager followed,” I have just come back from Germany. Actually, sales in South America and Europe are better than China but the amount of sales is still increasing in China”.

Gap of technology and R&D property - The R&D department of football is in Germany. Comparing with other products such as outdoor shoes or apparels, the demand of football is less. However, the football category sales manager emphasized that Adidas has a strong R&D team. Though Adidas does not meet the threats from Chinese market, there are still some strong competitors in other regions such as Nike. This was also confirmed by the outdoor category sales shoes leader who pointed that Adidas is increasingly focusing on R&D because the sales of outdoor shoes were decreased last year, Adidas needs attractive products to catch consumers. On the other hand, there are more competitions in the sports shoes field, Adidas needs to strengthen the R&D to win the battle in China as well as the world. “Adidas football is superior in the Chinese market because our technology is unique! Our products are displayed
by the professional team, and this inspires the consumer to enjoy professional work” the football category team leader said. Adidas has formed a special department to take care of the intellectual property.

**Communication and customer (innovator)** – there are several ways to introduce Adidas football to the market. Traditional ways are exhibitions, retails and TV. However, the most effective way of showing footballs is through professional teams and magazines, the advertisement team leader pointed. Professional football players as the symbol of testing the quality of the ball provide the effective channels to diffuse the products. Therefore, Adidas always seeks for famous football clubs and cooperates with them. Moreover, Adidas has its special rule to introduce the new products including football. Nine months before new products were launched in the market, the product departments from different subsidiaries are required to visit the headquarters to check the samples. The outdoor shoes team leader stressed that six months before new products launched in the market; a retailer’s meeting will be held. During that time, the retailers are available to see the samples. “The way of introducing football is a little different from other products. For some special confidential products such as the football for World Cup, all the information will be hidden until the new products launch the market” the football category team leader added. The entire new product launches the market spontaneously and globally. Moreover, Adidas never communicates with its competitors in China mentioned by both of the team leaders. Most of the information is confidential to the market.

- Adidas sports shoes

Adidas sports shoes which share 46 percent of net sales are one of the most important sources of Adidas sales. Its technology embodied in the shoes is the charming factors to catch the consumers. For instance: “FORMORION” technology is designed to “adapt to the ground to ensure the smoothest, most comfortable run possible” (Adidas supernova sequence, 2010) and “adiTUFF” technology is designed for best abrasion resistance in the toe area (ibid). The mentioned two categories of technologies are usually learned by Adidas competitors in Chinese market (please see the underline in the table one from Appendix II). Besides, technologies such as adiWEAR® which is invented to provide “the ultimate in high-wear durability” (ibid) and TORSION® SYSTEM “offers adaptive midfoot support” (ibid). These two technologies are widely used in Adidas outdoor shoes but present few cases of being taken from competitors.

**Competitors in Chinese market** - Below are two figures respectively draw different brands of sports shoes’ revenues in the same Chinese market from 2007 to 2008. In 2007, Adidas together with its biggest competitor Nike as two foreign brands were still in a leading position in the Chinese market, which leads to another foreign brand Kappa less competitive. Such native brands as Anta and Xtep still kept a distance (3 percent to 6 percent) with Adidas by the revenue of the sports shoes market. Among all the native brands, Li-ning was the strongest competitor that Adidas was facing in 2007. Li-ning was only one percent after Adidas. In 2008, the situation in the Chinese sports shoes market altered significantly. Two business giants Adidas and Nike shared more revenues in the market. The native brand did not show any growth in 2008. Eight percent of the revenue that Adidas and Nike owned was taken from other brands comparing with 2007.
Figure 3 Breakdown by revenue of the sports shoes market in the PRC in 2007

Figure 4 Breakdown by revenue of the sports shoes market in the PRC in 2008

Source: Data of figure 3 is taken from “Industry Review” (2008), pp.5

Date of figure 4 is taken from “China Sporting Good Industry Report” (2009), pp.81

Data in 2009 is not accessible. However, Adidas 2009 annual report pointed that sales in all regions were down owing to the gloomy of world economic and finance. Foreign brands are suffered in the local Chinese market. This is confirmed by the income of Nike in 2009, its net income decreased from 1883.5 to 1486.7 million dollar (Nike Historical Financials, 2009). One of the influencing factors was the currency turbulence. However, Chinese currency in 2009 was stable, which helped local brands grow quickly. Therefore, adding data in 2009 is not appropriate to make the comparison on revenue. This was also confirmed from Adidas “Outlook 2010” that the gross margin increase to a level around 46.4 percent to 47.5 percent in 2010. This indicates that the increase of revenue is coming back.

Adidas, a famous brand in the local Chinese market holds more technologies than native Chinese brands in shoes. Table one from appendix shows that Adidas owns 17 categories of technologies. Within each
category, there are more sub-items. Among all Chinese native brands, only Li-ning holds a big number of technologies (32 technologies). However, the number of technology that Li-ning owns is far less than Adidas. After comparing with all the technologies that different companies keep, there are three groups of technologies that Adidas and native Chinese brands focus: Tuff, Formotion and Climalite. Even though the real technologies from these three groups are not same, the original ideas of these technologies are similar. Different designs of the technology presented the similar functions in the shoes. Therefore, Adidas is advanced in the technology, but Chinese native brands are trying to find the source of conceptual technologies. The great difference between Adidas and other native brands in shoes lies in the number of technology and speed of introducing the new technologies.

On the other hand, both of the football category team leader and outdoor shoes team leader pointed that Adidas never think of helping local companies to provide material and equipments. Since Li-ning is the most powerful competitors, Adidas pays more attention to the products that Li-ning designed. There are some of the shoes which are similar in technology (see the technologies in the appendix with the underlines.)

**Gap of technology and R&D property** - The location of Adidas shoes R&D department is same as Adidas football in Germany. Even though Adidas is famous for the football, sales of shoes are still optimistic owing to the attractive technologies, the outdoor shoes manager emphasized. R&D activities focus not only on the development of balls but also on the innovative footwear. “To solidify Adidas’ position as a leader in technology and innovation, the Adidas Innovation Team (AIT) is responsible for the ongoing development of new technologies and concepts in all key product categories” is reported by “Adidas Research and Development” in 2009. The center of dedicated innovation development is in Asia that concentrates on design of products. The design specially is to target the Asian market “as well as the production of prototypes to support the product creation process” (Adidas Research and Development, 2009). There are two production creation centers in Asia. One of the locations in Shanghai of China and the other is in Tokyo of Japan (Adidas Major R&D locations, 2009). The outdoor shoes team leader mentioned that it is a good advantage for the shoes sale because the R&D center is at hand. It is also a good advantage that Adidas can capture the new elements from the Chinese market and design the specific shoes aiming at Chinese consumers. Besides, one of the Adidas manufactories in Guangdong Baocheng of China is considered as an indirect R&D centre. This manufacture is responsible for developing the model of outdoor shoes (Adidas Supply Chain, 2008).

**Communication and customer (innovator)** – “an Adidas shoe adopts the best way to be closer to the customers” the outdoor shoes team leader pointed. Even though the paths of introducing the new products are quite normal as most of the companies do, it still catches the people. Advertisements in the TV are crucial, because this can make the consumer remember the products continuously. “We need to advertise the products via these channels because we need to reach a large population to diffuse our new products. Collaborations with the professional team are a good way, but the demerit is that it covers less population” the advertisement team leader said, and football category team leader confirmed. On the other hand, Adidas is facing a severe case of the pirated brand, especially the cases of clothing and shoes. The outdoor shoes team leader said “despite apply for the copy right, it is quite difficult for us to stop the growth of piracy. The distribution of products provides the good way for local companies to steal the technologies. What we can do right now to offer best quality of products and quicken the speed of R&D”

**Employee movement** – Nowadays, managers are signed with a two-year contract while technicians and salesmen are employed with a one year contract. “Managers are encouraged to continue the job after the former contract is expired. The movement from Managerial level is low”- said by the human resource manager. The football category leader pointed that he has been in Adidas for 4 years and he loves his job. The movement from managers is less but more from the salesman. Adidas is willing to hire the employees from competitors. Adidas offers the promotion especially to managers and employee training aiming at different positioning employees.
The management of the human resource changed last year. After the transition in 2009, Adidas, as a typical brand Retailers Company is facing a great challenge from Human resource issue. The number of retailer increases as well as the number of employees, so that there will be a great pressure on managing the human resource. On the other hand, even though Adidas has the subsidiary in China, retailers are located in different areas within China. Different ways of organizing the employee and managing employees' welfare trouble a lot. Therefore, it is quite difficult for subsidiaries (headquarter in China) to manage the retailers in a standard way. Considering the increasing problem generating from Human resource management (HRM), Adidas introduced a Chinese HRM system called Kayang HRM system (Kayang [http://www.kayang.com.cn/chinese/aindex.asp](http://www.kayang.com.cn/chinese/aindex.asp) which has a fertile knowledge on HRM over years. Many famous companies (foreign company and local company) such as Johnson & Johnson China, Michelin, Inventec, Hua Hong, NEC and Toshiba have select Kayang HRM system. Company Kayang deals in providing HRM system, which provides the users with a platform of simulating and evaluating the employees of their performance. It is through Kayang HRM system that Adidas can make the management on employment and salaries effectively and efficiently. Kayang is also a company that firstly brings the conception of e-HR in China. The human resource manager pointed that this system does work properly in Adidas and make Adidas easy to supervise its employees in each department as well as retails.

Analysis

In this section, the analysis is carried out from two different products: football and sports shoes in Adidas China and seeing how the influencing factors work differently in controlling technology spillover between these two products.

1. Communication

This research finds that there is no great difference of controlling spillover between these two products in the communication. Both team leaders point that Adidas China never communicates with local companies actively. Adidas China is trying to keep distance with local companies. Wu (2002) stresses that if the communications are weak between subsidiaries and local companies, technology spillover is low. Both two products teams are reluctant to talk with the local firms which provide a good way of stopping the technologies being revealed.

With the research goes further, the author finds that both products are even weak in communication aspect. Communication itself is an intangible technology as it includes a large sum of messages. Technologies are easy to be taken away via words, messages, etc. Stopping communication indicates stopping the intangible technology spillover. However, the problem is that intangible technologies are not easy to keep as the way of keeping tangible technologies because it runs away unconsciously. Rogers (2003) indicates that mass media is an effective way for transmitting messages that involve a mass medium such as radio, TV, and newspaper. From this point of view, even though two teams behind the two products have no purpose to communicate with local companies, the way of diffusing the products carries too many messages and provides a channel of intangible technology spillover. As the advertisement team leader mentioned that there are several ways to introduce Adidas football to the market. Traditional ways are exhibitions, retails and TV. However, the most effective way of showing footballs is through professional teams and magazines, which is the only difference from sports shoes. Though it is effective in introducing products to the market, it brings an invisible trap in controlling technology spillover. This is because that professional way (especially professional magazine) of showing the products to the market concentrates the attentions from local companies on point easily. This means that local companies are easily to get the information from magazines, and steal the tangible and intangible technologies, by which spillover occurs.
2. **Innovators**

Innovators are the earliest consumers who purchase the products. Since most of the innovators are of professional insight (Rogers, 2003), their comments on the newly designed products especially, the newly innovated products are convincing to the consumers (ibid). Negative comments from innovators are disasters to the companies. Therefore, innovators play important roles in the diffusion of products. Moreover, innovators are of professional, which indicates that innovators know better in the technology from the products. From this perspective, it is feasible to receive the powerful comments from innovators. Spontaneously, it also shows a direct way that technologies are learned by innovators, which in this paper is named “fake innovators”. Hence, in order to control the technology spillover from subsidiaries, trying to stop “fake innovators” when doing the marketing on new products is crucial. Since new technologies are always attractive to the market, thereby, it is inevitable to avoid local companies snatch the technologies from the market. To prevent this, it is equal to stop the “fake innovators” purchasing the products when the technologies are still new, and seldom of the consumers are in the market.

Adidas sports shoes are weak in preventing the “fake innovators” the professional magazines. Since this paper has already points that advertisement in the magazine will concentrate the insight from innovators. Does this conflict with each other? The answer is “NO”. The difference is that professional magazines are open to the public including local companies, whereas, products are only open to the football players if selecting the professional team. No matter the tangible or intangible technologies they are inside the football will only be shared within teams. The image that football team adopts Adidas football is enough to catch the consumers. Fake innovators from local companies are not feasible to access to the products in the early phase when the football launch to the market.

In a word, there is no possibility to stop local companies purchasing the technologies. However, it is still important to stop local companies snatching the new technologies when the products just launch to the market. Adidas football chose a small amount of the target group to reach the whole population. This helps Adidas football to avoid meeting the “fake innovators” from local companies. Adidas sports shoes choose the less satisfactory way and expose the technologies to the “fake innovators”.

3. **Gap of technology**

Li (2008) recommends a dynamic relation between technology gap and technologies spillover, which demonstrates that too narrow or large gap of technology between subsidiaries and local companies leads to decrease technology spillover. However, an appropriate gap enlarges spillover (ibid). At the same time, narrowing down the gap leads companies loses their great advantage in technology. Thus, the larger the gaps of technology that subsidiaries are of, the chances of spillover are low. This research finds that Adidas sports shoes and football differ in the tendency of gap movement.

Table one from appendix II illustrates that Adidas sports shoes have 17 categories of technology aiming at different part of sports shoes. This amount is far more than its native competitors in Chinese market. The strongest competitor is Li-ning, which holds 6 categories of technology. Li-ning as a native Chinese brand is quite better than the rest brands in the table one. However, Li-ning is powerful though, the distance in technology between Li-ning and Adidas is still large. After comparing all the technologies in the table, this paper finds that there are four technologies, which are similar in the market: “Tuff”, “Formotion”, “ClimateLite”and “ClimateCool”. Local brands have not snatched the pure tangible technologies from shoes instead they absorb the intangible technologies such as the conceptual source of technology. This means that local companies are not keening on designing the same technologies. Taking the instance of “Adidas-ClimateCool” “Li-ning-Breathe category”, “Anta-A cool I & II” and “Erke-Bamboo Charcoal Fiber”, the conceptual source of technology is to lose the bad smell after usage. The gap is large where in the figure one is positioning in between “f and g”, but the tendency of the gap is moving in Q period with a reversing arrow (from g to d) comparing with figure one. Most of the Chinese native brands are still
young. However, these young brands are of high technology design. This is because more and more local companies are starting to design their own technologies but use the conceptual source of technologies from famous brands, including Adidas. Moreover, intangible technology spillover is increasing in Adidas sports shoes. Since Adidas sports shoes is still keeping its advantage in the market. Therefore, the speed of movement is slow.

Adidas football is in a different situation in controlling spillover. In the football industry, footballs are usually designed according to several specifications: material, size and the way of sew the football. These specifications are recognized widely as consensuses, which cannot be considered as the technology spillover in the industry. Material such as PU and PVC are widely used by many local companies as well as Adidas. The special technology that Adidas has is “Ultra-light fiber” and high technology in “sew by hand”. This research finds that Adidas football owns the special technologies and none of the local companies have tried yet. Thus, Adidas football in figure one positions in between “f and g”, and not evidence shows that the tendency of the arrow in the gap of technology is moving from either direction in the figure one. This indicates that the gap of technology between Adidas and local companies are stable. Adidas football is still in a low level of spillover.

In a word, stopping the movement of gap of technology help Adidas football to prevent its technology spillover, whereas, the tendency of movement in sports shoes are not optimistic. Many young established firms are directly using the conceptual source of technology.

4. R&D property

R&D property is described as subsidiaries use “time-lag” to fasten the speed of introducing new technology from R&D to market. Li (2008) points that time-lag is a term to reduce the benefit that local companies derive from subsidiaries. The usual way is to prolong the time of releasing the products to the market. It works as decreasing the benefit of the new products in the market so that the benefit got by local companies at the same time decreases. This paper finds that the difference is not significance between two products. However, in one aspect, they differ.

The R&D department of Adidas sports shoes is located in China, and the manufactures are also located in China. Therefore, Adidas get the opportunity to fasten the speed of introducing new technologies from R&D to manufacture. Meanwhile, it is also providing a way of being closer to the Chinese market. Some of MNCs started to move some R&D teams to local market in 1980’s for the sake of capturing the latest information and allocating elites (Tang, Zhang and Zhou, 2007). For Adidas sports shoes, six months before new products launch the market; a retailer’s meeting will be held. During that time, the retailers are available to see the samples. However, it because of this six months, local companies get the opportunity to be access to the products. This is owing to that retailers are the carriers to spread the intangible technologies. Retailers are the special group that is directly involved in the new products. Six months before, retailers have already acquired the technologies from headquarter. Hence, it is possible for retailers to reveal the technologies to local companies on the premise that local companies offer attractive compensations. By doing this, local companies get the chance to design the similar or even better products to compete with subsidiaries. From this point of view, Adidas sports shoes are weak in controlling spillover.

The case in Adidas football does not present the same result. The R&D department of Adidas football is located in Germany, and the manufactures are also located in China. The speed of introducing the new technologies from R&D to manufacture is relative slower than sports shoes. But this is not working effectively. Retailers still can find ways to communicate with the R&D in Germany. Technology spillover still will happen. The only difference lies in the speed of spillover. However, for some special confidential products such as the football for World Cup, all the information will be hidden until the new products launch the market. This presents as Adidas football is trying to keep both tangible and intangible
technologies in hand before they release to the market. In this view, local companies get few chances to reach the new technologies.

In summary, Adidas football is using “time-lag” trying to hold the new technologies or even make the technologies confidential to every retailer. Nevertheless, it is not an effective way. Adidas sports shoes are running the high risk of losing technologies. From the point of controlling technology spillover, keeping the product confidential such as football for World Cup is an effective way to stop spillover. However, this paper does not find that it is feasible and reasonable for all the products to do so since it brings difficulty in operation and cost in keep the technology.

5. Employee movement

This paper does not find the difference between two products in controlling technology spillover in employee movement view. Managers are signed with a two-year contract while salesmen are employed with a one year contract. Even, Adidas is willing to hire the employees from competitors. The movement from Managerial level is low. Subsidiaries always provide better salary inducing employees from local companies to work for them (Tang, Zhang and Zhou, 2007). Middlebrook (1999) points that salaries and financial rewards are important to avoid brain drain. Managers are encouraged to continue the job after the former contract is expired. This is owing to that Adidas provides promotion to managers. “Little opportunity for advance” and “wanted training” are two reasons for employees to leave the job (Middlebrook, 1999). On this aspect, Adidas manages to keep its brain drain. On the other hand, the movement in managers is less but more in the salesman. Trained employees quit the job and work in other companies or are entrepreneurs themselves, whatever they have learned from subsidiaries will benefit local companies (Tang, Zhang and Zhou, 2007). However, it does influence Adidas a lot. Salesmen are less educated than managers, which indicate that they have less advanced knowledge in understanding the technologies. Therefore, they have the few chances to be the carrier of technology spillover.

This paper also finds that despite controlling the technology spillover, Adidas china also absorb the technology from the local market. Since Adidas focuses a lot on its subsidiaries, large number of employee makes the management on human resource difficultly. By considering the increasing problem generating from Human resource management (HRM), Adidas introduced a Chinese HRM system called Kayang HRM system from the company Kayang in 2009. This system provides the users with a platform of simulating and evaluating the employees of their performance. This shows that local technology also spillover to Adidas and shows a reverse on the technology spillover. This hints that besides considering on how to control the technology spillover, subsidiaries can also think about “stealing” information from local area. However, reversing the technology spillover should be carefully carried out. Before Adidas select Kayang HRM system, it has made the investigation that many famous companies (foreign company and local company) such as Johnson & Johnson China, Michelin, Inventec, Hua Hong NEC and Toshiba have selected Kayang HRM system. This survey provides a solid support on the adoption. Therefore, subsidiaries, as the companies which have a culture difference from local companies can consider outside resource with a carefully observation.
Conclusion

Previously, a large amount of literatures stand the point on enhancing technology spillover for local companies, but ignore the issue in controlling technology spillover from “subsidiaries” aspect. However, the growth of local companies becomes increasing “toxic” to subsidiaries. Therefore, this paper holds the discussion on controlling spillover by extracting the points to connect the previous theories and current research. Subsidiaries could control the technology spillover by adopting the following factors. As a result, three factors are concluded to have the significant influences in controlling technology spillover. The rest two factors do not show the great influences. One extra factor is found in this research.

Three factors, as results, present the great influence in controlling spillover. 1) Innovators- Innovators are difficult to identify, which leads to the difficulty in catching the “fake innovator”. However, finding a small number as a target group, especially seeking the cooperation with professional teams would lead to fewer possibilities in meeting the “fake innovator”. In turn, expanding the target group and selecting consumer from general group would increase the technology spillover. 2) Gap of technology- Trying to enlarge the gap of technology and make this status stable would decrease the technology spillover. Technology spillover reaches the peak, when the gap of technology is in a medium level, movement on technology gap toward a medium position cannot avoid losing benefit to local companies. Nevertheless, this paper notices that it is not easy to make one product’s gap of technology being stable for a long time, especially for few professional products. Therefore, a feasible way to control the spillover is to slow down the speed of the gap movement. 3) Employee movement - Since subsidiaries have the advantages in stopping the brain drain, factor such as employee movement does not occur often. Holding the training aiming at different employees and offering appreciable salary are effective ways to keep the employees. Thus, the chance of spillover is less. Moreover, using “employee movement” would also lead to stop spillover. This means that subsidiaries could consider employing a person from competitors’ companies, including local companies so that spillover will change it direction to subsidiaries.

However, among all factors, below there are two factors that do not have significant influence in controlling spillover. 1) R&D property- R&D property such as “time-lag” does not show a significant influence in controlling technology spillover. Either the change on location or on the time that new products reach to the market does not provide an effective way of avoiding spillover. Especially, retailers from subsidiaries could be the spies and reveal the technology to the local companies. Therefore, there is no evidence to support that increasing “time-lag” could control the technology spillover. 2) Communication- Another factor also indicates a weakness in controlling. It is found that there is a great difficulty for subsidiaries to use factor “communication” to control the spillover. Subsidiaries can stop talking with the local companies. Nevertheless, marketing is a way of doing communication with local companies with intangible technologies included. Moreover, professional products always run the higher risky than non-professional products. It is because the way of introducing products to the market is inappropriate. A typical example is making advertisement in the professional magazines. By doing so, it is quit risky in gathering the local companies and exposing the technology.

This paper finds that absorbing the technology from outside is a good way to maintain subsidiaries’ technologies. It cannot only well control the technology from subsidiary side but also weaken the local companies. Therefore, a modified model is formed below:
Figure 5 influencing factors of controlling technology spillover (an modified model)

This paper only focuses on controlling spillover standing on subsidiaries view. This, however, more factors probably could be explored from both or the other parties (local companies or subsidiaries). Omitting or mistakenly using any factors will lead to technology spillover. In addition, different attribute of products may also induce to the different result of controlling spillover. This paper suggests five factors at the beginning, but only three factors are confirmed as useful in controlling spillover. However, this does not mean that the other factor: R&D property (time-lag) and communication are useless. Probably, theories from other perspectives such as industrial influence and government support could be considered to work for technology spillover.

Future research

Proposition one: The technology absorption also plays an important role in the technology spillover. A high level of technology absorption local company can decrease the speed of technology spillover. Even though subsidiaries have their ways to control the spillover, once highly technology absorption companies obtain the relative knowledge; it will be a tough job for subsidiaries to tackle with. Due to the inaccessibility to the local companies, this paper does not take this “technology absorption” into consideration. Future research is suggested to think about the control of technology spillover according to the different level of technology absorption.

Proposition two: Since most of the researchers focus on the positive effect of technology spillover, future research is recommended to focus more on the subsidiaries view, especially the subsidiaries in the developing countries. This paper only collects the data from China. Thereby, future research is suggested taking different cases from different countries.
Appendix I

Interview guide I (English Version)

General question
1. What do you think of the core advantage of Adidas?
2. What are the main competitors that the company is facing nowadays?
3. What do you think that the technology that Adidas own comparing with local company within the industry?
4. What do you think of technology spillover that Adidas is facing?
5. What has Adidas learned from competitors?

Specific question
1. Intra and inter- industry spillover channel
   From inter and intra industry view, what has Adidas lost or gained?
2. Spillover with people movement
   Once the person is employed, how Adidas sign the agreement with him?
   Normally, for how long does the contract sign? (For manager and for salesman)
   What do you think of the employee moment? (Quit the job and new employment)
3. R&D property
   Where is the R&D department located in?
   What the scale of R&D department?
   How does Adidas protect the new technology?
   For how long does the new product spread from MNCs to the subsidiary?
4. Communication
   How does Adidas communicate with suppliers? (eg: provide training )
5. Technology gap
   What do you think of the change of the technology gap between Adidas and local companies?
   What do you think such change on the technology gap will influence the advantage of Adidas or not?
6. innovator
   How does Adidas promote the new product and how does Adidas distinguish the fake buyer (such as the competitor disguises the buyer and steals the technology)
   Who does Adidas promote the product, such as shoes and football?
   What are the channels that Adidas introduce new technology in the exhibition?
7. Employee movement
   If the person who comes from local competitor companies applies Adidas position, what will Adidas do?
Interview Guide II (Chinese Version)

面试指南

您觉得贵公司在同行业内主要的优势是什么？
公司的主要竞争者有？
您觉得贵公司在同行业内技术处于何种层次？
您是如何看待阿迪达斯面临的技术溢出问题的？
阿迪达斯从竞争出学到了什么？
1. 行业内同行业间的技术溢出
从行业内和行业间的角度看，阿迪达斯获得和损失了什么？
2. 人员流动的技术溢出
公司对人员的录用采用何种制度？（合同制？）
通常对管理层，合同一般一次签订多久？
对技术人员的合同一般一次签订多久？
就您们部门而言，人员的流动性大吗？（离职及新录用数量）
3. 研发资产
阿迪达斯的研发部门在哪里？
研发部门的规模如何？
阿迪达斯是如何保护其新技术的？
新技术从总部传到中国的子公司需要多久？
4. 沟通交流
公司是如何处理同供应上的关系的（比如，提供培训）？
5. 技术差距
您觉得公司近五年同行业内其他公司的技术差距是否有所改变，改变状态呈显出？
您觉得这种技术上的改变对公司在国内市场的优势产生怎样的影响？
6. 采纳者和伪采纳者
公司在新产品投入市场之初，是如何推广产品的，公司是如何区分国内竞争者假冒采纳者（购买者）？
公司对新产品的宣传主要通过哪些渠道？鞋类，和足球宣传方式上的区别。
公司在展销会上是如何介绍产品的？（比如，介绍新技术）
7. 员工流动
如果竞争对手的离职员工申请贵公司，公司是如何考虑的？
Appendix II

Figure 6 the comparison of number of football in different range of price among four brands

Source: http://s.taobao.com/search?q=%BB%F0%B3%B5%CD%B7+%D7%E3%C7%F2&cat=50038569&style=grid&bcoffset=3&ppath=5562053:3323086;5561963:55423461;5562072:55424136;20000:20579&cps=yes&from=compass&navlog=compass-2-p-5562053:3323086;5561963:55423461;5562072:55424136;20000:20579 2010-07-15

Notice: Adidas China does not show any data of price on its official website. The collected data in this figure is from one of the famous native Chinese website TAOBAO (www.taobao.com). Since China is facing a severe case of piracy, it is quite difficult to avoid. The author considers taking the data of different brands in the same website so that the possibility of piracy among different the brands is close to equal. Considering that the numbers of football changes every day, in this paper, five days are randomly selected within two months. The average number from these five days is calculated as the source of data.

On the other hand, the author takes the specification of football as below:

- Football is made by machine - (football made by machine is more popular than made by hand and the price is lower. Since most of the Chinese native brands are using machines to make football, in order to make it easy to compare among different brands, “made by machine” is selected.)
- The material of football is PU - (PU is a material and widely used in balls, which provide a good quality in stretching)
- The football is used for 11 people which is equal to size 5 - (this is the formal size for football playing)
<table>
<thead>
<tr>
<th>Brand</th>
<th>technology</th>
<th>Number of total technology and reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adidas Germany Brand</td>
<td>PowerPulse™ Technology category, Pro-moderator™ Technology category, AdiTuff™ Technology category, Traxion™ Technology category, Adiwear® Technology category, Formation® Technology category, Z-Traxion™ Technology category, a³®Energy Management System category, ClimaLite® Technology category, Quickstrike™ Technology category, GeoFit® Technology category, ClimaCool™ Technology category, AdiPrene® Technology category, Torsion System® Technology category, Supernova™ Sequence 3 category, adiPRENE®+ category, respoEVA category</td>
<td>17 categories. There are more technologies under each category, the total amount of technology is high so that it is difficult to calculate. <a href="http://shoesobsessions.wordpress.com/2008/08/06/adidas-shoes-technology/">http://shoesobsessions.wordpress.com/2008/08/06/adidas-shoes-technology/</a>. Establish time (1949) Germany</td>
</tr>
</tbody>
</table>

*Source:* See the different links in each column.
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http://www.adidas.com/campaigns/performance/ru_ss10/content/products.aspx  2010-07-23


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