

# THE STATE-BUSINESS NEXUS IN THE CHINESE BIOTECHNOLOGY INDUSTRY

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## ABSTRACT

**Purpose:** To investigate the formation of a biopharmaceutical network in China, and its political embeddedness.

**Methodology:** The empirical data is presented as a single case study. The data collection started in 2004 and continued until 2008.

**Findings:** The paper finds that the interaction is based around state owned resources. Political actors are active participants in biopharmaceutical development, and play a role in the formation of new interfaces between actors. The state actors provide essential resources and legitimacy to projects and firms.

**Originality:** For the past three decades China has experienced dramatic changes to its political and economic landscape. While the political system is still authoritarian in nature, the forms of governance have become more flexible which have played an integral role in the rapid economic growth. The IMP literature has not focused on the role of the state as an important actor in driving industrial change and forming business networks. This paper describes the political embedding and formation of a business network within the Chinese biotechnology industry.

Keywords: China, political embeddedness, biotechnology, business networks, vaccine

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## INTRODUCTION

China's transformation from a poor agrarian society to an economic and industrial superpower in the last three decades has generated much interest among scholars. The development is interesting not only because of China's dominating position in the world economy, but also because the transformation is considered the result of active government guidance (Beeson, 2009; Cai & Treisman, 2006). China differs from other contemporary major economies through its authoritarian system. Rule through authoritarianism implies that the state and its associated agents have a monopolist position in coordinating industrial activities. While an authoritarian setting is often associated with governance through coercion and rigid central planning, recent economic developments in China, however, have shown that the set of instruments the state actor disposes over is broad (Göbel, 2011). Although, the control that permeates Chinese society and business life cannot be disregarded, the Chinese government has become increasingly responsive to the demands of society and business (cf. McGregor, 2012). This has for example as Liu and White (2001) note led to the central government relinquishing its role in micro planning and instead adopted industrial policies that resemble those of the Asian tigers, such as Taiwan and Korea. In such policies, the state is the main actor in identifying new industrial sectors, and allocates key resources for the development of the sector (Mathews & Cho, 2000). The political system in China is arguably suitable for the stability of such a model, as the state possesses considerable political and economic power to pursue long-term goals related to industrial development. The Industrial Marketing and Purchasing (IMP) approach rarely addresses the relationship between the state and the formation of business networks (cf. Welch & Wilkinson, 2004).

This paper illustrates how the political environment conditions the Chinese business landscape. We are in particular interested in the political embeddedness of firms and business activity (Hadjikhani & Sharma 1999; Halinen & Törnroos, 1999; Salmi, 1995; Welch & Wilkinson, 2004). We contend that there are three important reasons to study the political embeddedness of firms in the Chinese context. Firstly, the increasing importance of China in the global economy has solicited a large scholarly interest in the dynamics of Chinese business networks. To explain these dynamics it is necessary to understand the political environment, and its connection with the business sphere. The close ties between political actors and business in an authoritarian context has not yet been an explicit focus in the IMP context. Secondly, the Chinese business landscape embeds in an environment, which has proved to be politically stable at the same time as significant change has occurred in form of a transition from a rigid plan economy to capitalism. Thirdly, the scale in which, new business networks have emerged in strategically important industries in China, suggests that the state play an important role in the formation of these networks. Hence what is particularly interesting with China is that the state has managed to form, and direct industrial networks at a scale that has not been previously discussed in the IMP literature. The aim of this paper is to investigate the relationship between the political environment in China and the formation of business networks.

The empirical context of this study is the Chinese biotechnology industry, which has been identified by the Chinese government as one of seven future industries and consequently been given a high priority in national policy plans. Since the government promotion of the industry started in the 1980s, a large number of firms and biotechnology zones throughout China have been established. Today the Chinese biotechnology industry comprises of more than 400

firms (Chen et al., 2007). The growth of the industry illustrates that critical resources for industrial development have to a large degree been under the control of the state actor. The paper organizes as follows; in the next section the theoretical framework is presented. Thereafter follows a description of the method. The subsequent section presents the case, based on a single case study, and this follows by an analysis. The conclusion including suggestions for further research concludes the paper.

## THEORETICAL FRAMEWORK

### Industrial networks and the political context

The IMP approach analyses a wide range of inter-organizational networks made up by actors in business and non-business spheres (Håkansson & Waluszewski, 2002). The approach builds on an understanding that firms are embedded in networks where actors are interdependent (Ford et al., 2003). An action within the network has consequences for the parties directly involved in the exchange but can also affect the actors that connect to these parties peripherally (Håkansson & Waluszewski, 2002). Hence, the IMP approach has been describing dynamics in networks and, how stability and change co-exist (Johanson, 2001). Conventionally the analytical attention of the industrial network approach is aimed at the interaction in a network through three dimensions, namely actors, resources and activities (Håkansson & Snehota, 1995). Welch and Wilkinson (2004) also concede that a network's contextual setting is an important dimension in order to explain interaction among business actors. For example a country's political system plays a role in how business actors organize and behave, but as Hadjikhani and Håkansson (1996) note the political environment has traditionally been taken for granted and the interaction between firms and government bodies is often simplified.

Since the late 1990s, scholars in the IMP tradition have, however, increasingly studied the impact of politics and political institutions on business networks (e.g. Hadjikhani & Sharma, 1999; Welch & Wilkinson, 2004; Hadjikhani et al., 2009; Jansson et al., 2007). These studies broadly investigate four aspects of the political context (Welch & Wilkinson, 2004). Firstly, the political institutions and the institutional ideas that set the boundaries for what is acceptable business behaviour (Salmi, 2004; Jansson et al., 2007). Like Welch and Wilkinson (2004) suggest the political environment influences network behaviour through disruptive and facilitating activities in various ways. Secondly political actors directly support or impede business interaction by participating in business networks (Hadjikhani & Håkansson, 1996; Hadjikhani et al., 2009). Thirdly, government-firm relationships are important to study as the government often controls certain resources. For instance the government has access to a variety of relationships to other organizations, business or non-business actors, which can be of importance for firms (Okhmatovskiy, 2010; Hadjikhani & Håkansson, 1996, Sheng et al., 2011). Hence established relationships with the government can result in increased legitimacy for specific firms (Welch & Wilkinson, 2004). Fourthly, firms can become involved in the political system, by forming public opinion or through direct lobbying activities (Halinen & Törnroos, 1998). Aggregated the above studies, describe the political embeddedness of firms and business networks.

The term embeddedness is derived from sociology where it is emphasized that organizations' economical decisions are embedded in networks of social relations (Granovetter, 1985). The

concept of *political embeddedness* refers to “a specific form of social embeddedness characterized by a mix of formal and informal ties with political agents” (Krug, 2012: 4) along with “...bureaucratic, instrumental, or affective ties to the state and its actors (Michelson, 2007: 352). Through this perspective organizations becomes embedded in each other through interaction which creates opportunities but also constraints (Welch & Wilkinson, 2004; Sheng et al., 2011). According to Okhmatovskiy (2010) the concept of political embeddedness includes understanding the role of the state as a “regulator”, but also as an “economic actor” directly involved in business networks. In this respect the state-firm relationship should be treated as a reciprocal relationship where both the state and firm exercise “mutual influence” (ibid). The descriptions of a large number of scholars, suggest that this relationship is particularly apparent in China (e.g. Low & Johnston, 2006; Peng & Zhou, 2005; Peng & Luo, 2000; Li & Zhang, 2008).

#### Political embeddedness of industrial networks in the Chinese context

The political embeddedness of networks in emerging economies in the IMP approach has mainly been illustrated through the political and economic transitions that occurred in Eastern European economies in the 1990s (Johanson, 2001; Salmi, 1995). As Salmi (1995), notes the political and economic transition that occurred in Russia drastically changed the formal and informal rules for how firms should behave. China has similarly experienced, on the economic level, considerable changes. The transition, from a rigid plan economy to a socialist market economy, however, has been accompanied by a political stability that has not been experienced by Russia. Compared to other major economies China is governed by an authoritarian state where the legitimacy of the state is closely linked to the notion of economic growth (Göbel, 2011). This has resulted in the active participation of the state in economic and industrial development (Beeson, 2009). The authoritarian system suggests that the state and its associated agents have the monopolist opportunity to govern industrial activities (Göbel, 2011). In a similar vein, Whitley (2000) describes the Chinese business landscape as state organized, where the state governs discourses and guides business interaction.

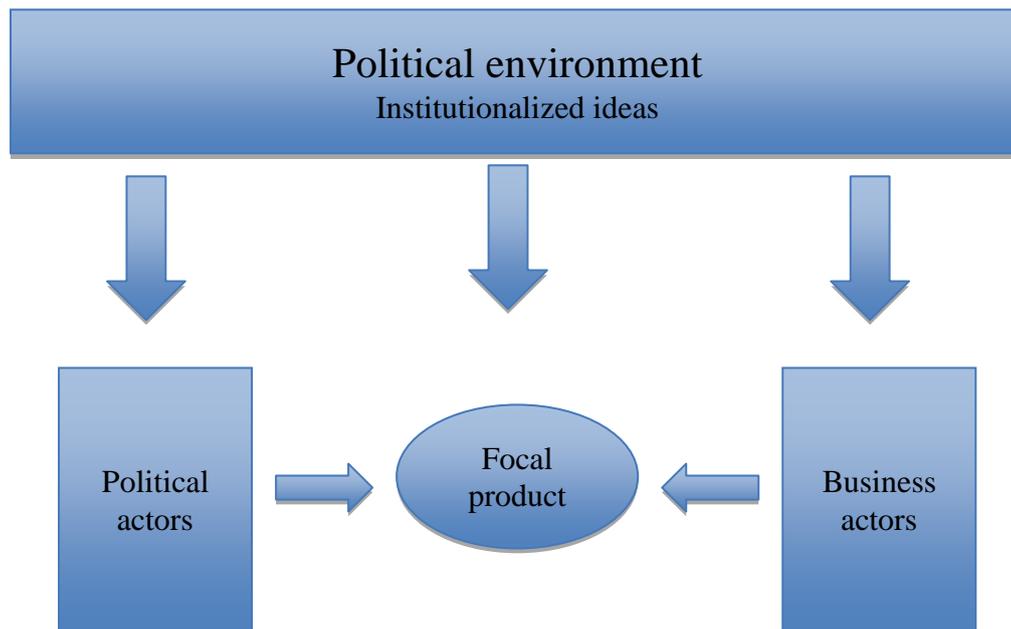
Hence, Chinese firms particular in industrial sectors important to China’s continued prosperity frequently encounter the state as a natural part of everyday business activity (Child, 1994). A reason for this intense interaction between the state and firms can be traced to the specific political context (Peng & Heat, 1996). Moreover, the relationships with government bodies are seen as integral and necessary due to lack of established institutions and legal frameworks (e.g. Hoskisson et al., 2000). A business landscape where both a market economy and a planned system works side by side, suggests that ties to government bodies are considered to be even more crucial (Krug, 2012; Li & Zhang, 2007). This creates a specific conception of the Chinese business landscape, where the state interchangeably promotes capitalistic activity on the one hand and enjoys discretionary power in planning the economy on the other hand. As Low and Johnston (2006) note, this has led to an ambiguous business environment, partly as a result of conflicting policies between various policy organizations. The observation is in line with Hadjikhani and Håkansson (1996), which emphasize that the state is not a unified organization but are made up of several institutions that can have diverse goals, and prioritizations. The above understanding suggests that the political environment needs to be described in form of two dimensions. Firstly the political institutions, including the ideological and normative structures that guides general business behavior, and secondly, the specific political actors active involvement in business networks.

## Framework

This study investigates the political embeddedness of networks, and in particular the formation of industrial networks in China. The framework focuses on the political institutions, in which networks are embedded and also the political actors that are participating in a focal network. The political institutions can be understood in terms of institutional ideas, which provide the rules of the game in a society (Salmi, 2004). Institutions reflect the schemas, rules, norms and routines that function as authoritative guidelines for social behaviour and function as coercive, mimetic and isomorphic (DiMaggio & Powell, 1983). The political institutions influence how firms act and relate to their contexts, both the larger environment and their network. Firms conform to the expectations of the external environment in order to gain legitimacy (Low & Johnston, 2006; Jansson et al., 2007). This means, for firms, to achieve an understanding that its actions are consistent with some “socially constructed system of norms, values, beliefs, and definitions” (Suchman, 1995: 574). Norms and rules therefore create stability to network interactions and encourage resistance to change by established actors (Welch & Wilkinson, 2002). In this study we are interested in the institutional environment and more specifically the main institutionalized ideas with regards to industrial development in China. To investigate the influence of institutionalized ideas, this study suggests that they are enforced or inherently activated by specific state related actors. The analysis thus, focuses on political actors, related to the state, directly involved in business networks: how they represent particular institutionalized ideas, but also in which ways they contribute to the formation of network interfaces.

The framework is illustrated in Figure 1 below. A focal biopharmaceutical product, derives the network, and identifies the actors involved in the development and commercialization. The framework highlights the main institutional ideas concerning industrial development as a representation of the political environment. These in turn affect the political actors, their interaction with business actors and their influence on the formation of interfaces within the network.

Figure 1. Analytical framework



## METHOD AND RESEARCH DESIGN

This study applies a case study methodology to illustrate the political embeddedness of business networks in the Chinese context. A number of scholars emphasize the usefulness of case study methodology when studying development and change processes (Dubois & Gadde, 2002). According to Halinen & Törnroos (2005) case studies are particularly useful in creating in depth descriptions of interaction patterns. A single case study is suitable when the researcher seeks to take into account the specific context and provide contextual insights (Dubois & Gadde, 2002)

The case context is the Chinese vaccine sector, which embeds in the state promoted biotechnology industry. The case study illustrates the formation of a network around a Hepatitis A vaccine (HAV). The development, production and use of the vaccine, serves as the focal point through which the surrounding network is identified. The empirical study started in 2004, through the assistance of GE Healthcare. A biotech instrument, used for biopharmaceutical production, functioned as the starting point for the investigation. The case developed through investigating this particular biotechnology instrument and the network was identified by using the 4R model (Håkansson & Waluszewski, 2002). By following the resources surrounding the focal instrument, a network of actors emerged, centering on the development, production and use of the Hepatitis vaccine (Linné, 2012).

The main empirical data was collected through 15 interviews with respondents involved in the development process of the focal vaccine, and also employees of GE Healthcare in China. Secondary materials have also been used, to understand the contextual setting, and the policies in the Chinese biotechnology industry.

### THE CHINESE BIOTECHNOLOGY SECTOR

Biotechnology business is highly interrelated with scientific advancements and research. Before 1978 the Chinese science and technology system was closely linked to the heavy industry and the defense sector, and had little association with the private business sector (Gao & Tisdell, 2004). Deng Xiao Peng's introduction of the "open-door" policy in 1978, had aimed to transform China from a heavily planned economy into a "socialistic market economy". The policy developed closer links between science and technology, and the business sector. In order to support economic growth the Chinese government started to direct attention towards high-tech industries, one being the biotechnology industry. Since the mid 1980s the Chinese government has promoted the biotechnology sector. A number of state policies have aimed at establishing a science base, including the establishment of a number of research institutes and universities focused on science related to biotechnology. Aligned with this development, there have also been several government directed incentives for firms to join the biotechnology industry. Two decades after the government promotion commenced more than 400 universities and research institutes were involved in research related to biotechnology science production. In 2007 it was estimated that more than 500 Chinese firms were involved in the production of biopharmaceutical drugs, and 35 biopharmaceutical drugs had been approved for use on the Chinese market (Chen et al., 2007). The development illustrates the active participation and heavy involvement of state actors in both science and business. The results, and the output, which has been achieved in the last two decades suggests that networks have been formed at a large scale, and steered by political actors. In the recent national five-year plan (2011 – 2015), the Chinese government identified the biotechnology industry as one of seven priority industries and it was emphasized that policy

support was to be directed towards drug innovation and the creation of production capabilities (NPC, 2011). These goals have however been at the attention of state actors earlier. We describe this in the next section with an example of the development and commercialization of a vaccine.

#### The development and commercialization of a Hepatitis A vaccine

The Chinese vaccine sector has undergone major changes since the millennium shift. Before 2001 China has only had one supplier of vaccines, the state-owned China National Biotech Group (CNBG). CNBG supplied all vaccines to one buyer, the public health bureau China Centre of Disease Control and Prevention (CDC), which is organized under the Ministry of Health (MOH). A deregulation of the vaccine sector occurred 2001 and the government allowed private vaccine firms to enter the vaccine market. In 2005 a second round of deregulation occurred when the government allowed hospitals to directly cooperate with vaccine suppliers without having to inform the CDC. With the dissolution of the vaccine monopoly both the number of Chinese vaccine firms and new vaccines has increased. There were in 2007, roughly 50 vaccine producers in China (Zhou, 2007). Moreover, 50 different vaccines targeting 25 diseases were available (Hendriks et al., 2010). Despite the increasing number of firms, CNBG still have dominant position on the market. The group supplies 90 % of the vaccines included in the China National Immunization Program (CNIP), which is monitored and controlled by the CDC (Zhou, 2007). There are 15 diseases included in the program and CDC is the only buyer of CNIP vaccines in China. This means that in order to become a supplier to the CNIP, firms need to sell to the CDC. The profit margins for the vaccines are however low, as the government has pressed down the prices. Moreover the government has protected the industry by only granting Chinese firms access to the CNIP. The next section describes the development and commercialization of a vaccine included in the CNIP targeting Hepatitis A (HAV).

With approximately 17 million newborns each year in China there is a substantial demand for Hepatitis A vaccines (Cui et al, 2009). The large number of vaccinations needed in relation to the relative few vaccine suppliers has caused a chronic shortage of supply related to vaccines included in the CNIP (Zhou, 2007). Consequently the Chinese government is encouraging new firms to join the industry and existing firms to produce larger quantities of vaccines included in the CNIP. The following HAV has been included in the CNIP since 2008 (Hendriks et al, 2010). The origins of the vaccine are found in state supported research. In the mid-1990s a Chinese state-owned research institute initiated the development of a new vaccine targeting Hepatitis A. This research institute had more than 50 years experience from vaccine development projects, and was receiving instructions from the CDC on what vaccines to focus on. When clinical trials of the vaccine started in the end of 1990s the researchers involved in the vaccine research were allowed to create a spin-off firm (Alpha). The HAV became the Alpha's first development project. After the HAV project was transferred to the newly established firm the development continued with clinical trials performed at hospitals belonging to the CDC. Alpha completed clinical phase three trials of the HAV in 2004.

#### Connecting to the private sector for large scale production

To continue the realization of the HAV Alpha needed to find a collaboration partner that had the resources to both produce and commercialize the vaccine. Through some Alpha researchers' personal contacts a partner was found in another newly formed biopharmaceutical firm, Vaccine Bioengineering, located in the Zhangjiang High-tech Park in Shanghai. The firm had been established in 2003 as a subsidiary to a large private conglomerate, in the chemical-petrol, and heavy industry.

The newly formed Vaccine Bioengineering had no prior experience of the development of vaccines or biopharmaceutical drugs. The firm was established without having a drug to develop or produce but was searching for suitable drug development projects. With the employment of a new General Manager in 2004 the search for suitable development projects for the firm was intensified. The General Manager of Vaccine Bioengineering had extensive experience from vaccine development at Wuhan Institute of Biological Products (WIBP), a vaccine institute belonging to the CNBG. Moreover, he had strong connections with the researchers in charge of developing the new HAV. Due to the background of the General Manager along with personal insights in the development of the vaccine, Vaccine Bioengineering approached Alpha and showed interest in the product. Since both Alpha and Vaccine Bioengineering were searching for a collaboration partner a sales agreement between the two were signed in second quarter of 2004. Vaccine Bioengineering bought the vaccine and the underlying patent from Alpha, and agreed that collaboration between the two parties was to continue throughout the development. There was a clear division of labor between the two parties; Alpha focused on developing the vaccine while Vaccine Bioengineering focused on the production process. In order to be able to produce the new vaccine Vaccine Bioengineering needed to set up a production facility and invest in high-end production equipment. The firm used mainly domestic suppliers as partners, but GE Healthcare became a supplier of the advanced lab equipment. Since Vaccine Bioengineering used imported production equipment it needed to negotiate with the Chinese customs concerning import taxes. Official rules states that high-end equipment can be imported at lower taxes (between 10-17 %) if the buying firm can show the need for high-tech equipment. The experience and prior relationships of the General Manager of Vaccine Bioengineering, with officials at the custom office led to the firm getting the imported equipment tax-free.

#### Approval of the new HAV vaccine and the connection to CDC

The new vaccine had been approved as an Investigational New Drug (IND) in 2000, and a New Drug Application (NDA) was filed in 2004. This meant that the vaccine was ready for commercialization, but was awaiting the approval of the Chinese authorities, which occurred in 2007. After the production site was given a current Good Manufacturing Practice (cGMP) status in 2009, the vaccine was officially included in the CNIP. The decision to include the HAV, and grant Vaccine Bioengineering the status as a supplier to the CNIP was made by the CDC already in 2007. The CDC had from the beginning been involved in the development of and was the sponsor that sourced the development of the vaccine. Hence the original researchers knew from the start that the main customer would be the CDC. Given this relationship, the clinical trials of the HAV could also be undertaken at CDC's assigned hospitals for drug testing.

The CDC's clinical resources stretched all throughout China's 54 provinces, down to regional and local levels. There were established distribution channels that could access all these different sites, and medical expertise was available. When Vaccine Bioengineering approached Alpha concerning the transfer of the HAV it was clear that CDC was the sponsor of the vaccine. Without CDC's approval the business transaction would not have been possible, as the CDC was the future customer and controlled critical resources in the development. An area, which CDC did not want to focus on was the production. Since Vaccine Bioengineering had the financial strength to build up a production facility and with its recruitment of a well-established researcher from the public research field, the CDC accepted the partnership. Hence, a firm such as Vaccine Bioengineering that had no prior experience of vaccine research and commercialization could join the industry, by fitting into a

larger network guided by the CDC. There was in particular a need to fill the gap caused by a 30% shortage of Hepatitis A vaccines in the CNIP due the lack of large-scale production possibilities.

The realization of the vaccine has been enabled by two strong funding sources. The research institute where the HAV was initiated was fully state funded. The creation of Alpha was made possible through the Ministry of Science and Technology's (MOST) 863 program supporting high tech research and development. Vaccine Bioengineering and the funding for the production facility was enabled through a large private investment from a large Chinese conglomerate, which is also the owner of the firm. It is estimated that the conglomerate, in the petrochemical industry has invested more than RMB 2 billion (US\$ 260 million) to establish Vaccine Bioengineering. During the development and production of the vaccine Vaccine Bioengineering has also received local government support. The firm was given the "high and new technology enterprise" award by Shanghai municipality in 2008, and received subsequent grants from the Shanghai Science and Technology Committee.

#### ANALYSIS

The political environment and the influence on the formation of a business network  
The policy discourse that frames the development of the biotechnology industry centers around two main ideas: indigenous innovation and, the need for domestic production capabilities. The institutionalized ideas of creating indigenous innovation and production capabilities relate to a larger state attempt at promoting stability for the Chinese economy, and the political system in general (Göbel, 2011). In order to achieve this, state driven attempts at forming business networks are a necessary step in order to dictate development direction. The findings that the influence of these institutionalized ideas can clearly be traced down to specific business interactions, and the formation of certain interfaces between actors, resource and activities. The following analysis identifies some of the critical interfaces, triggered by the political environment.

##### Network interaction and the role of the state actors

An important interface created by the political setting, is the relationship between Vaccine Bioengineering and Alpha. The researchers of Alpha belonged to an established state-supported research organization, but were allowed to create a spin-off around the new vaccine and continuing the development of the vaccine outside of the research institute. Vaccine Bioengineering was established with no prior experience from biopharmaceutical development. A reason for this is that industrial policy encourages firms from other industries to diversify and join the biotechnology and biopharmaceutical sector, in particular those firms with the financial means to set up large-scale production. A large conglomerate was the financier of Vaccine Bioengineering. In addition to the large investment made by large conglomerate, funding was also available from national and local governments. Together Alpha and Vaccine Bioengineering formed a relationship that connected development and production of the new HAV.

The case illustrates that specific political actors, implement the policies that are promulgated at a central level. The main policy actor, CDC, is a key organization in the network, controlling resources in development and production and is also the main user. As such the CDC functions as a bridge between development, production and use of the vaccine.

CDC has been instrumental in allocating resources for actors at various stages of development of the vaccine. CDC was the sponsor of the vaccine from the beginning, and provided Alpha with financial support, and also connected Vaccine Bioengineering with hospitals where clinical trials were conducted. Moreover the hospitals are important in connecting the producer of the new vaccine with the end-users. Since the CDC is the only buyer present in the case the government also represents the main financing unit of the final product. Thus the CDC displays a multitude of roles in creating the new vaccine and the new vaccine is dependent on the established organization belonging to CDC during its innovation process.

The business actors are not necessarily driven by the same logic as the state actors, but in an effort to gain critical resources they are heavily interlinked with political actors. A favorable relationship with authorities is integral for the access to resources. For example the CDC provided Vaccine Bioengineering with the access to hospitals performing clinical trials. The interface between the customs and Vaccine Bioengineering illustrate that there is flexibility in the negotiation with authorities. Vaccine Bioengineering imported tax-free high-tech equipment, through an established personal relationship.

To sum up, this study illustrates the formation of the vaccine network, and the role of the state and political actors. The state influence permeates the value chain from development to use of the vaccine. The strong ties between the political actors and the business actors, allowed the vaccine to be developed, and produced in a relative short amount of time. What we find is that the state actor is present in critical positions in the network, such as development, production and use. This suggests that drug innovation in China is not an autonomous process, but often controlled and supported by the state.

## CONCLUDING DISCUSSION

This study has investigated the formation of a biopharmaceutical network in China. The conclusions relate to the findings from the analysis of two dimensions, the political institutions and the role of the specific political actors in the activated network. What is interesting with the case of China, are the connections that firms have to the political sphere. In the IMP field the political embeddedness of Chinese business networks has not been extensively addressed. The notion that business and politics is highly interconnected institutionally, particular in industrial sectors, which is deemed by the political regime as strategically important for national development, have several implications.

Firstly, the political system allows for a specific style of central governance that is conducive for the state induced formation of business networks. The Chinese state directly or indirectly controls resources, both through discourse and network involvement, that were important in the development, production as well as use of the new HAV at focus. On the institutional level, several important policy narratives and discourses guide the direction of technological development and business interaction. The most pronounced institutionalized ideas that could be traced down to the network level were the discourses concerning innovation, and the indigenization of technologies. Resources are allocated to national firms to bridge development, production and use, which often are in the management of the public sphere.

Secondly, the interaction at the network level shows how firms both comply with the dominating policy discourses in order to gain legitimacy and resources, but their activities also transcended the boundaries of what is prescribed on a normative level. This is partly due to the state being a diversified set of actors. Various state actors or state related actors participated in the focal biopharmaceutical network. These contributed with different resources and ideas, allowing the firms some flexibility in decision-making and also giving firms important roles as active mediators in the political environment. An important skill appears to be how to manage in the particular political setting.

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