Adapted from: Zhang, J. Y. (2012) *The Cosmopolitanization of Science: Stem Cell Governance in China*, Basingstoke: Palgrave Macmillan, Chapter 1.

The Cosmopolitanization of Science: Stem Cell Governance in China

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It is almost a cliché to say that we are in a globalized world. This may be especially true for the life sciences. Thanks to the development of telecommunication and information technology, the latest research findings seem to be at the command of one's finger tips. With international travel made easy and surging R&D investments in Asia, the world scientific atlas is covered with complex and interwoven networks of human mobility. The old catchphrase 'brain drain', which describes developed countries cheery-picking young talents from developing countries, seems to give way to the new caption: global 'brain circulation'. It is not uncommon for one research project to be streamlined and coordinated in several laboratories dispersed across the world.

Yet how this globalization process is taking place, how it is steered and how it shapes international conflicts and global welfare on the ground are questions that never cease to attract fresh insights. On the one hand, some see globalization as a means to attain cross-border conformity or even a synonym of 'Westernization'. Even many who identify themselves as proponents of universal values, may still explicitly or implicitly promote what Immanuel Wallerstein (2006) criticized as 'European universalism' (as oppose to intended 'universal universalism'). On the other hand, some see globalization as merely assembling world cultures as mosaic displays in consumer catalogues, with limited interpenetration among them.

Similar ambiguities of how globalization functions and its consequences are highly relevant to the life sciences. It may be easy to acknowledge that contemporary scientific research, as many other social practices, relies on 'glocalization', or an alignment of international networking and local management. However in elucidating how such processes are steered and how research norms are shaped on the ground, discussions often slip into an implicit global/local, or more precisely a West/Rest, dualism. One is reminded, as a matter of fact, that not all members in world scientific communities posses equal influence. As David Baltimore (2008), former President of the American Association for the Advancement of Science, remarked 'Yes, the world is flatter, but it is still tipped in a Western and Northerly direction'. At the same time, it is also a fact that Asian countries are emerging powers in the life sciences. The rise of 'Asian biotech', with its regional scientific and political characters, 'represents a "Sputnik opportunity" for Asian states seeking to "catch up with" and potentially surpass "the West"' (Ong, 2010, p5).

My research on the formation of China's governance of stem cell research in relation to international debates suggests an alternative view. In fact, the development of stem cell research in China consists of a number of overlapping social spheres and heterogeneous dynamics that cannot be simply divided into 'the Global vs the Local', 'the International vs the National' or 'the State vs the Civil'. Key stakeholders (e.g. scientists, ethicists, and administrators) I interviewed comprehend ethical and regulatory concerns with influence from both within and without their national boundaries. These stakeholders both respond to and transform the means of negotiating ethical and regulatory schemes. Most of the research groups I visited see the nature of their daily laboratory research or clinical treatments as simultaneously global and local. They view themselves as at once the recipients and architects of evolving international research norms.

Building on Ulrich Beck's social scientific cosmopolitan theory, I encapsulate this both/and experience in China's stem cell development as 'the cosmopolitanization of science' (Zhang, 2010a; 2010b). More specifically, the term cosmopolitanization of science denotes an evolving

dialogical activity carried out by stakeholders at all levels which often simultaneously cut across different conventional (team, institutional, regional, nation-state) borders. Such dialogical activities may not always lead to consensus, but they are attempts to craft schemes to accommodate diverse interests. They enable and necessitate stakeholders to continuously compare, reflect, criticise, mediate and benefit from world scientific divergences, such as in areas of professional codes of conducts, research ethics and R&D regulations. In other words, as is demonstrated throughout this book, what the development of China's stem cell research exhibits is neither a linear globalization as 'China becoming the West' nor a simple glocalization as 'global research with Chinese characteristics'. Rather, it is a cross-border dialectic process in which existing Chinese characteristics are being reiterated and transformed. Concurrently, this transformation from a developing country alters the global research paradigm.

Therefore, my approach in this book is both pragmatic and constructive. It is pragmatic in the sense that emerging scientific norms on the ground demands a new conceptual framework. Yet, a dearth of research in developing countries at the grassroots level represents a critical gap in knowledge. This study employs and develops a cosmopolitan analytical framework to comprehend the both/and situation taking place in China, a key representative of less advantaged countries. My approach is constructive in the sense that, through empirical examination, it provides correctives to existing cosmopolitan frameworks which are established mainly on Western data sources. Critical analysis of China's experience helps to illuminate the connection between ongoing internationalization and its effects on scientific governance in practice.

However, two points are important to clarify the premises of this book. First, this book is a study of the cosmoplitanization process. It does not argue that scientific research in China is 'cosmopolitanized'. In fact, all Chinese stakeholders I interviewed are not devoid of critical views on current organizational constraints and administrative inefficiencies in China. These deficiencies are discussed throughout this book, especially in Chapters Five and Six. However, there emerges a new approach, which this book identifies as the 'cosmopolitanization of science', of how the scientific community in China reflects on these constraints and how it overcomes them. It is this emerging outlook, which has shown increasing significance in scientific governance, that this book focuses on. Second, using stem cell research in China as an example does not mean that China represents 'the' cosmopolitan model. Quite on the contrary, as will be further explained later in this chapter and emphasised throughout the book, cosmopolitanization denotes a family of cross-border communication patterns with certain core resemblances. The scope of this book mainly focuses on the professionals (that is scientists, clinicians, ethicists and policy-makers) role in the evolvement of stem cell governance in China. As such, my study demonstrates only one among many possible patterns. Nonetheless, it provides us with preliminary insights on some of the key features of the cosmopolitanization process.

In this Introduction, I first provide a brief background of the scientific research environment in China. I then give a literature review of cosmopolitan theories. Sociologist FEI Xiaotong's theory on the organization of Chinese societies is also included as it helps to contextualise later discussions of this book. Following a description of methodology, the chapter layout is specified in relation to four core features of the heuristics of cosmopolitanization (Zhang, 2010a).

CHINA'S STEM CELL RESEARCH IN THE CONTEXT OF COSMOPOLITANIZATION

China's recent development in the life sciences has benefited both from local and global contributions. Domestically speaking, the Chinese government has been highly devoted in supporting scientific advancement. During the period of 1995 to 2005, China's R&D expenditure has sustained an annual average growth rate of more than 18%. In year 2007, Chinese government

financial investment on R&D ranked 3rd in the world (OECD, 2007a). Stem cell research is one of the expanding fields in China. The number of stem cell-related projects funded by National Natural Science Foundation of China (NSFC) has increased from 9 projects in 1999 to 166 in 2007 (isis.nsfc.gov.cn). The amount of investment also rose steadily, currently at 44.09 million RMB. Attention from the other two major national research foundation, the National Basic Research Program (the 973 Program) and the National High Technology Research and Development Program (the 863 Program), have also upgraded stem cell research's profile[1]. Meanwhile, stem cell progress in China also encompasses a wide range of international input. One example is Chinese institutions' enthusiasm in attracting overseas-returns Chinese as a means to transform a '"brain drain" into a "brain circulation"' (OECD 2007b, p29). Many have noted the highly internationalized nature of the Chinese HRST (Human Resource in Science and Technology), due to the increasing ratio of scientific personnel trained abroad (Fox, 2007; Schaaper, 2009).

The pace of scientific progress in China, however, is also subject to both local and global constraints. From a national perspective, despite generous institutional patronage, further reform of its scientific infrastructure may still be needed before China can fully take advantage of this increased spending. In terms of science productivity per unit of investment, China ranked only 17th globally (Corbyn, 2008). Overseas-returns often find themselves debilitated by the old rule of 'an inclination toward competition and secrecy, rather than openness' (Solo and Pressberg, 2007, p106) that still predominant among Chinese academia (Hao and Liu, 2005). From an international perspective, in order to participate in global research, Chinese institutions have had to shape its regulatory policy to fit international standards. At one level, with a pragmatic attitude towards science and in the absence of religious objections, stem cell research does not evoke the same disputes in China as it has initiated in the West. Yet at another level, ethical policy in China is at a premium, not only because of its traditional high regards for social welfare, but also because of the globalization of research. International collaboration promotes good scientific practice as well as encourages the standardisation of ethical concerns. China is one among many nations participating in a careful negotiation of acceptable limits and practices. One example is that originally, research on embryos would not invoke much anxiety in China, as it is a country with no equivalent to Christian debates over the status of the human embryo. However, currently, no stem cell conference in China would omit such a debate. Also, as early as the late 1980s, Chinese scientists and bioethicists have urged the government to regulate assisted reproductive technology (ART). The publicity of Dolly in 1997 led scientists to call for the development of governmental regulations of biotechnology (Qiu R-Z, 2007). The acknowledgement of these problems was not based on uneasiness from within Chinese culture, but rather in response to ethical concerns first identified in foreign countries. In other words, when different nations import scientific technology, they also import many foreign concerns.

As different research parties become ever more inter-dependent yet maintain their individual sovereignty, scientific communities confront with a question common to many sectors in modern societies: How to promote international interests whilst respecting cross-cultural differences. In analysing how such concern can be fully addressed, social theorist David Harvey (2000, p529) encapsulated, 'cosmopolitanism is back!' As for my investigation in China's stem cell governance, two points regarding a cosmopolitan outlook are of primary appeal: a) it does not simply juxtapose 'National' (in this case, 'China') with the 'International', while overlooking other possible social networks that contribute to shaping scientific practices; and b) it captures the dynamics of two-way cross-border interactions. The first point will be further explained in the Methodology section. As for the second point, before moving to the theoretical literature review, let me first give some basic

[1] According to its official website (www.973.gov.cn), the 973 Program initiated two national Major Projects on stem cell research as early as 2001. Among the 82 Major Projects it launched in 2006, seven are stem cell-focused. In 2006, the State Council issued 'The National Mid-term and Long-term Science and Technology Development Plan (2006-2020)', in which stem cell research was identified as one of the frontier development subjects. In the same year, the 863 Program launched a new Major Project on 'Stem Cell and Tissue Engineering' (MOST, 2006).

depictions on the current role of international exchange with examples from both China's scientific front and the ethical/regulatory front.

Cosmopolitanization of scientific practice

Debates on the regulation of stem cell research raise a direct challenge to life itself in many parts of the world. British philosopher John Harris (2006) has summarized three constitutional characteristics of stem cell research that draw forth ethical responses from Western society: firstly, the usage or rather 'sacrifice' of human embryos in the foreseeable future; secondly, the inevitable cloning of totipotent stem cells, even in cases of research involving therapeutic cloning; and, thirdly, regenerative therapy accompanying life enhancement technology.

As discussed in previous section, stem cell technology in China initially did not generate the same dispute as in the West[2] and has been put into a wide range of clinical uses in China. Yet local research practice has not been shielded from global debates. In fact, as international investment, natural resource and academic exchange are becoming the norm, ethics is no longer a segmented social aspect that derives solely and directly out of cultural specification. Scientific practice and researchers' acknowledgement of their roles in stem cell research are shaped as much by national factors as they are by debates in the global scientific and bioethical communities.

On visiting a regional headquarters of the China Hematopoietic Stem Cell Data Bank, the director told me how her awareness of ethical issues was expanded by visiting Western stem cell banks. In the original planning of their office space, people walk in and are first welcomed by a whole wall of glass panelled covered shelves, with hundreds of binders holding donor data. She explained as follows:

> It wasn't considered an ethical issue. It was an aesthetic issue. Plus, it is difficult to persuade people donating blood stem cell in China (because traditionally blood is considered as essence of vitality). I thought a whole wall display of the data books behind the glass panel is a magnificent display of our hard work. It would boost up morale… But during my visit to stem cell donor data banks in the US, I did not see any data collection shelves for my whole trip. I asked them why. They told me data books are stored in limit-access rooms to project patients' privacy. Then I realized: Ah! The display of shelves is an ethical issue (original emphasis).

If this director had not been committed to facilitating Chinese stem cell bank development with reference to global experience, she might have never considered the arrangement of data books as a matter of ethics. While in the US, arrangement of data books implies protection of patients' confidentiality and professional accountability, in China, it was originally perceived as an 'aesthetic issue'. Yet the trip to America made her think from an alternative perspective: office space arrangement not only matters to staff members, but also has wider implications to stem cell donors, patients and medical practitioners. The original purpose of this director's visit was the technical details of operating a stem cell bank, such as the acquirement, storage and shipment of stem cell lines. The consequence of the exposure to foreign practice, however, has unexpectedly extended the range of ethical-related issues that China's stem cell banks acknowledge.

Transnational research exchange may not only turn former non-ethical issues into ethical concerns and also stipulate a re-evaluation of existing judgements. One immediate example is the understanding on the usage of surplus embryos in the gynaecology department of the Third Affiliated Hospital of Peking University. When the department first started stem cell research

[2] It must be noted here that this is not to say that there is no social concern over the usage of embryos or adult stem cells in China. Bioethicist NIE Jinbao's early study on abortion in China has already contested the idea that Chinese culture attach little human value to embryos (Nie, 2005). Yet, since the Chinese mainstream, influenced by Confucius traditions is inclined to define personhood as a social status one develops after birth, stem cell research invoked comparatively little social uneasiness in China (see Yu and Fan, 2007; Zhai, 2006).

several years ago, using surplus embryos from IVF patients who successfully gave birth to a baby was not seen as ethically 'problematic'. It is not only because of the different cultural values attached to an embryo, but also because of the fact that with the one-child policy in China, there is a rare chance for surplus embryos ever to be used. 'If it was anything,' as one clinician recalled, 'it was regarded as an endeavour to recycle medical waste, with the potential to benefit everybody.' It wasn't until the gynaecology department sought partnership and publications in the West that such conduct was recognized as questionable. Currently a more comprehensive informed consent procedure for donors has been put in place in response to global calls to promote ethical governance. Meanwhile, compared to many other countries, surplus embryos are still widely accessible to researchers in China.

These are just two simple examples of how cross-border communications may exert normative influence over research practices. Although in-depth analysis is to be carried out in later chapters, two points may already be argued. Firstly, in both cases, the acknowledgement of potential regulatory concerns (patient data storage and surplus embryo usage) raised by their Western peers and the subsequent adaptations of local practice are not the primary communicative aims. They are rather the side-effects of transnational scientific communication. There is no textbook answer to the complete set of ethical issues stem cell bank administrators or stem cell scientists should be aware of. Instead, what stakeholders have on hand is a growing list of items they need to take into consideration. This list expands, in an unanticipated and seemingly disorganized fashion, as stakeholders' communicative circle expands. Secondly, in both cases, there is no single identifiable authority that pressures these Chinese stakeholders into modifying their research to the 'correct' norm. Rather, differences are reflected upon and mediated primarily at the grassroots level. The co-existence of divergent approaches in stem cells is one example of what Kwane Appiah asserted in Cosmopolitanism: Ethics in a World of Strangers (2006, p78): most disputes arise not because of 'clashing conceptions of "the good". On the contrary, conflict arises most often when two peoples have identified the same thing as good.' As demonstrated throughout this book, especially in Chapters Three, Four and Seven, these entangled webs of cross-border contacts and the absence of a single authority enables an array of grassroots contributions to the normalization of research practice.

Cosmopolitanization of ethical and regulatory outlooks

The founding of bioethics in China in late 1980s corresponds to the opening-up policy and the decision of the Chinese government to join global development. Since the publication of Chinese textbook Bioethics in 1987, the author QIU Renzong has been considered the father of modern Chinese medical ethics. Not only because this textbook provides a comprehensive review for contemporary ethics, but also because QIU's initiative to introduce Western debate into China has profoundly influenced the second generation of Chinese bioethicists. A parallel governing ethos of 'gearing to Western standards (yu guoji jiegui)' can also be traced at the onset of recent stem cell development. The first recommended draft for national stem cell guidelines (Ethical Committee of CHGC, 2001) bears resemblance to the UK's Human Fertilization and Embryology Act (1999). A series of regulatory initiatives made by the Ministry of Health (MOH) and Ministry of Science and Technology (MOST) regarding stem cell research (MOH 2003, MOH and MOST 2003) offered little that was new or unique beyond reemphasizing existing international principles.

In short, for the large part of the last three decades, the development of China's scientific governance seemed to suggest a 'one-way' blending. This is to say, China's ethical stance and regulatory framework were 'globalised' only in the sense that Chinese stakeholders were attentive in catching up with the world's mainstream opinions. Yet China's scientific governance was not globalised (or 'cosmopolitanized') in the sense that Chinese particularities and international developments were not connected as mutually constitutive. When China takes further steps to integrate its own scientific development with the world, grafting Western theory and frameworks

onto existing society has its limits. Meanwhile, as individual research is becoming subject to international scrutiny, without sound justification of the value system at work, China's pragmatic attitude, the lack of Western equivalent legislation, and the absence of public debate are perceived as features of the '"Wild East" of biology' (Dennis, 2002, p334). This phase in scientific development echoes what historians XU and LUO (2007, p141) found in the wider social context during a similar period. China has exhausted itself in trying to 'join globalization' or 'blend in with mainstream civilizations', but seems to have received more rejection and repulsiveness the harder it tried.

In recent years, Chinese stakeholders have begun to realize that future success lies neither in overturning international conventions nor in following others, but on being networked with the modern world and being accommodated by others on the basis of mutual appreciation (Zoellick, 2005). In response to Western scepticism, social scientists have adjusted their endeavour to introduce and justify 'Chinese' bioethics and to establish an era of 'Asian bioethics' in order to find 'common ground with non-Asian counterparts on important issues' (Qiu, 2004a). Issues such as Chinese definitions of 'personhood' (Zhai, 2006), family-centred nature of social ethics, emphasis on collective decision-making (Guo and Tu, 2001; Zhang and Sun, 2004), and the traditional cultural belief which holds a positive attitude towards advancement and human rationality (Li, 1998 and Lai, 2004) are some of the key themes which Chinese scholars introduced in their discussions with international peers.

At the 8th World Congress of Bioethics held in Beijing, CHEN Zhu (2006), the current Minister of Health, stated that national governance on biomedicine should achieve harmony but not homogeneity (he'erbutong) with the international community. A more noticeable change is a grassroots level engagement with global communication. The awareness of global trends and different opinions from outside China has led scientists to re-examine and re-calibrate their research activities. Such reflection did not remain at a conceptual level but, as will be shown later in this book, has been translated into actual individual responsiveness in bridging divergence and promoting mutual trust with their international peers. Despite the fact that China has been heavily influenced by the West, many researchers would agree with ethicist NIE Jingbao that 'there is certainly a "Chineseness" to emerging frameworks' (Nordling, 2006).

The development of stem cell research in China thus offers a case study of a transition from a 'global monologue' into a 'cosmopolitan conversation' (Appiah, 2006). Developing countries that used to follow Western mainstreams and adopted 'catching-up' strategies are starting to realize that the best way to regain influence in a global conversation not only lies in being an open-minded listener, but in taking the initiative to join the conversation and be heard. It is still premature at this point to tell to what extent and in what ways these new governance initiatives successfully promote research. In addition, China, as many developing countries, is far from exerting the same influence over issues as their Western counterparts. Yet ignorance to the emerging transformation of governance approach would hamper us from conceptualizing what is really happening in scientific development.

Comprehending China's stem cell research in the context of cosmopolitanization

In the past decade, China has been committed to joining international organizations and associations[3], however the differences in institutional infrastructures and social conventions requires a different emphasis in terms of policy making. The internationalization of science does not

[3] In relation to stem cell research, China's participation in global regulatory initiatives in the past decade includes, the Guidelines on Ethics in Medical Genetics (WHO, 1998); the Universal Declaration on the Human Genome and Human Rights (UNESCO, 1997), the Helsinki Declaration on Ethical Principles for Medical Research Involving Human Subjects (WMA, 2000), the Human Embryo Research and International Solidarity and Cooperation (UNESCO IBC, 2001) and the Universal Declaration on Bioethics and Human Rights (UNESCO, 2005). China also supported United Nation's ban on human cloning for reproductive purpose.

show an erosion or disavowal of diversity. On the contrary, it manifests the fact that there are values that are, and should be, universal, just as there are values that are, and must be local. On occasions, the global scientific exchange does transform local non-ethical issues into ethical concerns, or convert formerly acceptable conduct into inappropriate action. But such local transitions are not necessarily enhanced by receiving an 'all-embracing, one-size-fits-all global solution' (OECD, 2007c). It is carried out through a more complex dialogical process with attentiveness to different political conventions, social structures and cultural traditions. Such global mindset cannot be taken for granted as an automatic derivative from transnational interactions. In fact, as demonstrated in Chapters Two and Four, a reflexive attitude towards cross-border differences emerged only procedurally in China's stem cell community through a decade (and ongoing) dialogue with their international peers, and in some cases, only after forfeiting a high scientific cost. Thus, what the development of stem cell research shows is not only how a five-thousand-year-old society tries to accommodate new ideas, but also how China is adapting itself to and has a say in 'a new universal culture of particularities' (Davies, 2007, p141). Therefore, I employ cosmopolitan theory in general, and the concept of 'cosmopolitanization' from sociologist Ulrich Beck in particular, along with sociologist FEI Xiaotong's works on China, as a more helpful heuristic to understand the current status of social regulation on bioethical issues.

COSMOPOLITAN THEORIES AND CHINA'S SOCIAL PARTICULARITY: A LITERATURE REVIEW

So what exactly does 'cosmopolitanization of science' incorporate? As this book is an empirical investigation rather than theoretical exploration, I will list here only three key aspects of cosmopolitanization that are essential to the analysis of this book.

Firstly, the cosmopolitanization of science is the process of international research exchanges. That is to say, cosmopolitanization is not only particular actions that took place across national borders, nor does it denote a specific stage in the 'sequence' of social development stage. Rather, cosmopolitanization of science encapsulates a series of activities, a 'non-linear dialectical process' (Beck, 2004[2006]; 72-73), which took place both within and without nation-state. It is an interactive approach that shapes and is shaped by international scientific development.

Secondly, the cosmopolitanization of science does not parallel monologues in which members of the international scientific community simply talk past each other, but a conversation that leads to the adaptations and modifications from participants. From the point of local scientific practice, this means the 'globalization from within, globalization internalized' (Beck, 2002: 23, original emphasis). In other words, the cosmopolitanization of science is not 'a celebration of the beauty of a collection of closed boxes' (Appiah, 2005[2007]: 256) in which various research traditions are displayed as a mosaic of exhibits. Rather, it is a process in which foreign concerns, alternative laboratory practices and rival scientific perspectives are digested and accommodated into transforming research convention inside nation-state societies. From the point of international scientific community, this means an abandonment of seeking an 'all-embracing, one-size-fits-all global solution' (OECD, 2007b), but instead constitute global scientific governance on basis of 'diverse but practicing' world members (Conley, 2002).

Thirdly and most importantly, cosmopolitanization highlights the possible impact reflexive efforts from a variety of social levels have over the outcome of cross-border scientific exchange. This transnational exchange involved in cosmopolitanization is not the same as what Roudometof suggests as a process that is imposed on us and 'does not refer to qualitative feelings or attitudes of individuals, and it is not affected by what people think of it' (Roudometof, 2005: 118). Quite on the contrary, a key for local science to be cosmopolitanized is to have individual stakeholders being

engaged in global communication 'not merely by employing new technologies and networks of communication, but also by using them self-consciously to create public spheres to pursue justice, create innovative practices' (Bohman, 2007: 189) and promote shared future benefits (Giddens, 1999; Beck, 2008).

In short, the cosmopolitanization of science refers not only a willingness in being networked with the world, but also encompasses more substantive responsiveness in achieving a cooperative agenda that is agreeable to all parties at stake. Through such process, differences may not be resolved, but can be pacified (Appiah 2006: 69-85); regulatory framework may not be homogenized but harmonized (Boesz and Lloyd, 2008). In regards to China's scientific development, cosmopolitanization hosts the challenge of how China can take advantage of its local financial, political and social support while at the same time participating, among many other countries, in a careful negotiation of acceptable scientific limits and practices.

A COSMOPOLITAN PERSPECTIVE OF A COUNTRY SPECIFIC STUDY

The major source of information for this project is obtained from site visits and interviews with people who are directly related to stem cell research, namely Chinese scientists from different stem cell laboratories, bioethicists in major research centres and policy makers in the Ministry of Health. In total, I have conducted 48 interviews, including two MOH officials, one former popular science editor, seven bioethicists, and thirty-eight stem cell researchers from 22 key research teams. The bioethicists interviewed, four based in Beijing and three in Shanghai, were the core group who took part in the first draft of Chinese stem cell guidelines and have been the most influential in China's policy making in this field.

At the beginning, this research, as many previous country-specific social studies of scientific practices (such as Cao and Suttmeier, 2001; Doering, 2004; Sui and Sleeboom-Faulkner, 2007), was carried out in a systematic manner, with the aim of building onto existing categories of social knowledge, that is experience of Chinese researchers in recent scientific advancement. Some influential examples of such studies are works by Joseph Needham (1981), Laurence Schneider (2003) and Geoffrey Lloyd (2004), who have respectively highlighted themes such as the cultural reverence of science, and societal emphasis on the instrumentality of science, as 'Chinese' characteristics.

Yet as my research progressed, attempts to describe a phenomenon as exclusively 'Chinese' or as a 'national' characteristic proved methodologically challenging. For example, what is the connotation of being a 'Chinese' scientist? To delineate what distinguishes 'Chinese' scientists from 'non-Chinese' scientists may not be as straightforward as one might imagine: To begin with, should 'Chinese' be interpreted as an indication of ethnicity or nationality? Surely such definitions do not have universal appeal. When the media broadcasts scientific findings made by 'American' scientists, 'British' scientists or 'German' scientists, most of the time, it merely refers to scientists whose laboratory is within the American/British/German border. Then, should the adjective 'Chinese' be aimed at describing interviewees' work place? This interpretation has also shown increasing limitations. One reason is that funding schemes, such as the Changjiang Scholar program, which aims to attract overseas scientists to contribute to China's development, encourage scientists to hold dual positions in both Chinese and foreign institutions. Does this mean then, a person can be a 'Chinese' scientist one minute, and another minute not 'Chinese', when stepping into different laboratories? A third way would be to define Chinese scientists by their allegiance to a specific scientific culture. Yet through shared online databases, telephone, email, and easy international travel, scientists in China are 'becoming more and more cosmopolitan' (Qiu, R-Z 2007). Among the 22 stem cell teams I visited, 64% of the senior scientists have had more than one

year of training or working experience abroad. Almost 40% of them have obtained their doctoral degree in the West. A majority of the senior scientists had established semi-regular international contacts (through research collaborations, visiting fellowships, conference invitations and so on). All researchers, regardless of their professional rank and research roles, spent on average 2 hours every day reading foreign academic journals. In terms of professional associations, one could be a 'Chinese' scientist as well as a 'British' or a 'German' scientist. An alternative route for defining 'Chinese' is from a legal/political perspective. That is to say that all interviewees' professional conducts are subjective to the system of rules set by the government of People's Republic of China. Yet at least in the field of stem cell research, for most of the last decade, national legislation lagged behind the rapid development of this novel field. Scientifically, 'Chinese' stem cell researchers are as much a subject of 'national' policies as of 'international' rules.

In short, no single criterion can fully represent what 'Chinese' means, nor can the adjective 'Chinese' encompass all of the above criteria at all situations. To the best extent, this list of criteria together describes many of the shared qualities of scientists interviewed. National tags that used to indicate incontrovertible and precise social 'boundaries', now seem to convey ambiguity. Categorization words, such as 'Chinese' that were suppose to 'clarify' research premises now need to 'be clarified'. This point will emerge several times through the analysis of this book and will be revisited again in the Conclusion.

The point is not to deny the existence of particularities to China's scientific practice. As will be demonstrated throughout this book, in parallel to an increasing awareness of an interrelatedness with the world, there is also a growing 'ethos of macro-independencies with an acute consciousness…of the inescapabilities and particularities of places, characters, historical trajectories and fate' (Rabinow, 1996, p56).

The point is to highlight the possibility that while 'Chineseness' may not be exclusively unique, it may be a particular recipe of inclusiveness, through which scientists in China address many concerns raised both at home and in other parts of the world. To comprehend how this inclusiveness has been initiated and nurtured, it is important to examine Chinese scientists' experience and their interpretation of the conflicts, dynamics, and imperatives that are embedded in the paradigm of the cosmopolitanization of science.

FOUR CORE FEATURES OF COSMOPOLITANIZATION AND CHAPTER LAYOUT

There are two ways of looking at the chapter layout of this book. One way is to see them sequenced as different phases of stem cell research and their respective governance issues. Chapter Two illuminates China's regulatory framework of the life sciences and its early administrative rationales regarding stem cell research. Chapter Three investigates the factors that shape research motivation, which is key to comprehending governance dynamics and administrative effectiveness. Chapter Four is on the shift of strategies amongst Chinese scientists and ethicists in responding to global scepticism towards China's stem cell governance in the last decade. Chapters Five and Six respectively analyze, in carrying out research programs in China, the structural and administrative particularities stem cell scientists confront with. These two chapters further elucidate how institutional reform, in addition to individual efforts, may be required to meet current regulatory challenges. Chapter Seven focuses on how scientists promote their research agendas to an international audience through increasing participation in governance initiatives both home and abroad.

There is second way of looking at the organization of chapters. That is, their arrangement also facilitates the examination and refinement of what I have called the cosmopolitanization process, which consists of four key elements (Zhang, 2010a, p273). I first give brief explanation to the four elements in turn. I then describe how they relate to the chapter organization.

1) Shared future benefits: The cosmopolitanization of science is based neither on self-interest nor on an ambiguous universal welfare. Rather, sustainable scientific partnership is built on mutual recognition of benefits and mutual consent on how such benefits are to be pursued. More importantly, collective/collaborative endeavours formed among social actors are not necessarily confined by traditional social boundaries (such as institutional, regional, national) or previous collective memories (such as shared training background, cultural commitment), but are oriented towards securing future benefits. In other words, cross-border collaboration is not simply trading existing intellectual resources, but is aimed at generating new research capital.
2) Passive ethicization: In a cosmopolitan world, 'various cultures and regions of the world are proceeding along various routes to various ideas of modernity' (Beck, 2000, p88). Ethicization is a process that maps out and makes different societies aware of such diversity. In this book, I do not mean ethicization in a normative sense, as distinguishing good and evil, or right and wrong. Rather, ethicization denotes a form practical reasoning that is a) based on issues such as responsibility, obligation, entitlement, autonomy and development, and b) imposed on stakeholders as a necessity in managing increasing cross-cultural collaborations and exchanges.
3) Reflexive negotiation: While ethicization originates from the recognition of the dependence on others, negotiation is rooted in the acknowledgement of the interdependence between the local and the global. The negotiation initiative advances mutual tolerance, justifies the legitimacy of local agendas, and generates new alternatives for joint efforts. It is through reflexive negotiation that 'difference' becomes a constructive rather than a debilitating force.
4) Continuous performance: The cosmopolitanization of science is also closely linked to the fact that science has become an enterprise of manufacturing risks (Giddens, 1999a). As science failed to provide certainty, the disappearance of the assumed single (scientific) authority within society has given way to the emergence of a number of competing authorities with different agendas. Thus, the continuous performance in establishing global credentials is ever more important, as scientific reputation becomes a key 'social capital' in international communications. At one level, continuous performance means incessant presentation over a long period of time. At another level, it also implies concurrent actions from all levels of an identified group. When global dialogues are becoming multi-tiered and wide-ranging, every researcher's conduct may carry individual, institutional, regional and global implications at once.

These are four interwoven elements that often functions in tandem. For example, primary identification of shared future benefits may initiate awareness-rising among stakeholders of existing differences (initial ethicization). This leads to a first attempt of negotiation, which guides stakeholders to an expanded level of mutual knowledge (second ethicization), generates a second round of self-reflection and negotiation, and so on. In this process, the acknowledgement of a shared future may be adjusted and actors' negotiation leverage fluctuates with their accumulated social capital. That is, their perceived credentials by global others. As these four elements are interconnected, it is impossible to make a singular linkage between a particular research practice and one of these elements. However, it is possible to analyse different themes of stem cell research with different focuses. Thus, the chapters of this book are organized as follows.

Chapter Two maps out the administrative structures (funding bodies, regulatory institutions and existing policies) and provides a reference point of a non-cosmopolitan governance practice for later chapters. More specifically, it examines the making of The Ethical Guidelines for Research on Human Embryonic Stem Cells in 2003, which is characterized by heavy reliance on a conventional 'act-in-response' regulatory ethos and a linear correlation between existing problems and a field of relevance (such as seeing stem cell governance as only relevant to 'hard-core' scientists). This is what I termed as an 'authoritarian post-hoc pragmatism'. This conventional regulatory approach ignores the cosmopolitan nature of contemporary research, such as embodied scientific uncertainties and co-existence of international rival views which prompted Chinese scientists and

ethicists to call for regulation in the first place. Consequently, since its promulgation, these Guidelines have received much criticism amongst Chinese stockholders.

To investigate how and why 'shared benefits' can be formed and sustained across conventional (institutional, professional, national) borders, Chapter Three provides detailed analysis of interviewees' research motivations, such as what interviewees see in stem cell research as most promising, why senior researchers chose to switch to this novel area, why overseas scientists chose to return to China, and what inspired junior researchers to take up such topics. Geographic belonging, professional belonging, cultural belonging and political belongings are just a few of the most evident examples of a diversity of means for Chinese researchers to frame their reasoning. This finding of a co-existence of different paradigms involved in Chinese researchers' research outlook is important. It indicates the diversity of social actors and the overlapping yet different social perspectives that need to be responded to in the course of stem cell research governance.

Chapter Four demonstrates how ethicization has influenced China's stem cell research and how a grassroots reflexivity is emerging. Chapter Four divides the last decade's development into three phases. In the early phase of China's stem cell research, namely the period between 2000 and 2003, Chinese policy and institutional support of life science submissively followed international discussion and passively avoided cross-border confrontation. This resulted in a disruption of China's pioneering hybrid embryo research program and a misperception of China as the 'Wild East'. With increasing transnational scientific exchanges, in the second phase (year 2004-2007) of stem cell development, communicative efforts from Chinese scientific elites with a more active and constructive attitude improved the scientific community's ability to deal with divergent opinions. By the time of my fieldwork, however, engagement in transnational communication had further deepened to a wider grassroots level. Interviewees acknowledged the once assumed foreign/Western authority was nothing but 'imaginary'. Amongst multiple valid means of reasoning, Chinese stakeholders' assess and respond to global divergence by learning from each other's differences and translating such knowledge into day-to-day undertakings. In comparison with the situation a decade ago, interview data indicates an emerging reflexivity in Chinese scientists' comprehension of the dependency and interdependency with the international community.

Chapters Five and Six further investigate how reflexive negotiation is carried out at home, or how Chinese stakeholders mediate global alternative research experience not with the 'Other', but with existing Chinese conventions. It is useful to be reminded that the cosmopolitanization of science is not only limited to issues with potential global outreach or exchanges that took place cross-borderly. More importantly, it denotes the ability of 'globalization from within, globalization internalized' (Beck, 2002, p23, original emphasis). The unprecedented degree of public concern over recent medical advances has led to a number of regulatory reactions. In the midst of an expanded vision of promoting stem cell research provided by various international experiences, how Chinese stakeholders mediate new possibilities into institutional reforms at home is important.

As pointed out at the beginning of this chapter, it is too premature to argue China as 'cosmopolitanized', a state of governance which embodies a fully open, reflexive, responsive and democratic infrastructure. In fact, fieldwork suggests that China still needs much reform in its scientific organizations to fully take advantage of its increasing R&D investments and its pro-science social environment.

Chapter Five examines the challenges of international research brought to China's scientific field from the perspective of how stem cell research is socially organized. At the micro-level, data suggests a 'one-professor-many-student' structure dominates the 22 teams that I visited. At the macro-level, the managerial segregation among ministries described in Chapter Two at the onset of stem cell development still exists. These characteristics have been a dominant theme in Chinese scientific community in the last few decades. However, as the ratio of overseas experience increases and as cross-border collaboration becomes more frequent, scientists interviewed have become

increasingly anxious about the consequential social barriers and jurisdictional inconsistencies to China's conventional architecture of scientific institutions. In interviewees' narratives, global alternatives are not so much of 'higher' authority, but more as a constant point of reference in illuminating how they recognize their responsibility, needs, entitlements and limits.

Chapter Six investigates scientific institutions' regulatory ethos. Peer-review in funding procedures and the Science Citation Index-oriented performance evaluation are two imported practices, with the original expectation of improving fairness and introducing a healthy competitiveness in Chinese science. However both practices have proven inadequate, in some cases detrimental, in supervising knowledge production and distribution. Many scientists interviewed argue that simple transplants (or globalization) of new experiences into old regulatory soil is not enough. A corresponding in-depth reform (or a cosmopolitanization) of traditional policy making rationale is needed before China can fully take advantage of new regulatory practices.

Finally, the governance of science is not just about governing the production and application of knowledge, but also about regulating non-knowing. Chapter Seven employs the development of stem cell therapy to analyze how Chinese stakeholders have developed 'continuous performance' (both in terms of time length and contributions at all levels) in building scientific credentials and effective governance. In contrast to the authoritarian post-hoc pragmatism exhibited in early stem cell governance, a top-down institutional approach that focuses on identifiable, foreseeable or calculable harm is inapt to address the embedded ambiguity and risk of stem cell therapies. This problem becomes more acute as Chinese stem cell scientists seek wider acceptance beyond their immediate circle. Fieldwork indicates many emerging self-organized dialogical initiatives by Chinese stakeholders in assimilating various notions of 'risk' into their strategic reasoning at home. Yet, to improve practice and local governance 'from within' is often not the sole aim of these dialogues. Rather, it is to cultivate a sense of tolerability and collegiality 'from without'.

In short, few would dispute that effective governance of the life sciences not only requires being well-informed about technicality and complexity of science itself, but also requires attentiveness in how science is done. As has briefly outlined in this chapter, the increasing reliance on cross-border scientific communication has transformed the ways in which local and global research conventions are constructed. This study provides an initial empirical discussion on this topic, namely how the participation of global/local scientific exchange has shaped the development of China's stem cell research.

For stakeholders on the ground, the internationalization of science can be Janus-faced. It may suppress diversities, for it inflates transnational conflicts of interests by making them visible in the details of everyday laboratory work. Meanwhile it proliferates channels of communication for cross-border mediation. In some cases, such as demonstrated in Chapters Two, Four and Six, the depth of global communications ceases at the point of 'passive ethicization'. While in other cases, such as in Chapters Four and Seven, there is an increasing presence of reflexive responsiveness from social actors at various levels. Not only do these two faces of globalization co-exist in Chinese stem cell research, but there is a constant intermingle of the two. However, as is demonstrated throughout this book, Chinese stakeholders gradually learnt to steer the two faces of internationalization. It is precisely this conscious steering from stakeholders on the ground that demarcates a cosmopolitanization process from banal globalization or a simple Westernization. Thus this monograph is less interested in making a normative characterization of a 'Chinese' stem cell research, for it bespeaks nothing but blindness to the complexity and fluidity within societies. This research is more keen on elucidating the evolving logic underlying a decade's transnational scientific exchanges in China and how such emerging rationales shape the successes as well as failures in its stem cell research.