Author's response to reviews

Title: Seizing the strategic opportunities of emerging technologies by building up innovation system: monoclonal antibody (mAb) development in China

Authors:

Mao-Yu Zhang (mollycheung1212@hotmail.com)
Jian Li (jamesli@umac.mo)
Hao Hu (haohu@umac.mo)
Yi-Tao Wang (ytwang@umac.mo)

Version: 3 Date: 1 October 2015

Author's response to reviews: see over
Response Letter to Health and Research Policy and Systems
30/09/2015

Re: MS: 1173141354159099
Titled as “Seizing the strategic opportunities of emerging technologies by building up innovation system: monoclonal antibody (mAb) development in China”

Dear Editor and Reviewers:

Thank you for the constructive reviews of our manuscript!

Following your comments, we have completely revised our manuscript. The changes have been highlighted in blue in the revised manuscript. In addition, we have prepared a point-by-point response to the reviewers’ concerns as attached below. We hope the manuscript is suitable for publication in Health Research Policy and Systems.

Sincerely yours,

Hao Hu, Ph.D.
State Key Laboratory of Quality Research in Chinese Medicine, Institute of Chinese Medical Sciences, University of Macau
Macau
Email: haohu@umac.mo
Telephone: 00853-88228538
Response to Reviewer 1

The authors of this article made great efforts for revising the article.

- **Response:** Thank you very much for your encouragement!

However, there are still some insufficient points that I wish the authors to make further changes.

1. **Section 5 of the revised version:** Please rank your analysis of functions according to your labels of functions shown in section 2. Until this version, the writing of the article still seems unclear to me how the virtuous cycle of the innovation system was started. This section should be very important, yet the authors provide only short descriptions.

- **Response:** Thanks for your comment! We have ranked our analysis of functions according to the theoretical framework. In addition, we have revised the paragraphs of the virtuous cycle of the mAb innovation system in China. Literature has indicated that a common trigger for virtuous cycles of an innovation system is function 4: guidance of the search (Hekkert et al., 2007). The virtuous cycle of mAb innovation system in China also started with Function 4 but with its own characteristics. We have completely rewritten the related paragraphs as:

  “In general, the virtuous circle in China starts with F4: ‘Guidance of the search’. The state fully realized the unique opportunities of mAb as an emerging technology and set the direction of mAb industry development in China. Motivated by the state encouragement, entrepreneurial activities (F1) were taken by different type of entrepreneurs. Then, targeted mAb technologies were developed (F2) and diffused (F3) through networking among firms and universities. In particular, in order to make further technology development possible and knowledge diffusion, the government established a state-level scientific research system and contributed to international cooperation. The rapid technology development and diffusion provided further advocacy coalition (F7) for mAb in China. In this case, the legitimacy supported by state is beginning to stimulate market formation (F5) and mobilize all kinds of resources (F6), like finance, human resources, etc., into the mAb industry. Thus, a complete virtuous cycle of mAb innovation system has been established and operated in China.

  To sum up the experience, the main force behind the development of mAb in China has been the strong political commitment to mAb technology, which activated other functions of mAb innovation system. Positive feedback loops have been established with the legitimacy of this technology elevated with knowledge development and market formation.
The regulatory mechanisms have successfully contributed to the emergence of a massive mAb innovation system in China."

2. Section 6 of the revised version: Basically I don't understand why the authors pay so much attention to the comparisons between China and the US and India. Is this kind of comparisons necessary? Or at least the authors should be clear why they have such sections.

- **Response:** Thanks for your comment! We conducted such kind of comparative discussions according to the comments from reviewers. As the establishment and operation of technological innovation system will be affected by the contextual factors, a comparative analysis will help to explore the specific characteristics of Chinese mAb innovation system. To explain our purpose, in this revision, at the beginning of “6.Discussion”, we have added “To distinguish the characteristics of mAb innovation system in China, a series of comparative discussions are presented in the followings parts. First, we compare the Chinese mAb innovation system with the mAb innovation system in USA, which is regarded as the most leading mAb innovation system in the current world. Second, we compare the Chinese mAb innovation system with the mAb innovation system in India, which is catching up global frontier rapidly. Third, a comparison between mAb and chemical drug in China is conducted. With these comparative analyses, it will contribute to deeper understanding about how the mAb innovation system in China was founded. After these comparative discussions, implications from this study will be presented to provide references for how to build innovation system to seize emerging technologies.”

Thanks again for your comments and suggestions!

Best regards,
Response to Reviewer 2

Zhang and colleagues have made significant modifications of the manuscript. The current manuscript is organized in a much clearer way and the authors' purpose and the study process are described well. I just have a couple of minor comments as listed below.

- **Response:** Thanks for your encouragement and comments!

1. The authors should expand a bit more on how the framework was used in analysing the qualitative data, its applicability in the case of mAb, and validation to other similar research in China.

- **Response:** Thanks for your comment! Following your suggestion, we have revised the paragraph as “With all the material collected from the multiple sources described above, we conducted the data analysis in two stages. First, following the components of technological innovation system, we categorized the materials into four aspects: mAb technology development, mAb firms, research institutes and their networking with firms, and institutions. All the quantitative and qualitative materials were used as complementary and used to cross-check our findings. Second, based on the results of the first stage, we analyzed the functions of mAb innovation system in terms of the seven dimensions as defined in Section 2. As such kind of analysis framework for technological innovation system has been widely validated in studying emerging technology, it is appropriate to apply such kind of analysis framework to analyze mAb innovation system. The final results of analysis are reported in the next two sections.”

2. The authors compared the Chinese mAb case to those of the US and India, as well as the chemical drug case in China, which are very useful strategies to strengthen the resultant propositions and improve the validability of findings. I will suggest the authors explained a bit more either in Methods or in Discussion on why they conducted such comparisons and what are the benefits.

- **Response:** Thanks for your suggestion! In this revision, at the beginning of “6.Discussion”, we added “To distinguish the characteristics of mAb innovation system in China, a series of comparative discussions are presented in the followings parts. First, we compare the Chinese mAb innovation system with the mAb innovation system in USA, which is regarded as the most leading mAb innovation system in the current world. Second, we compare the Chinese mAb innovation system with the mAb innovation system...”
in India, which is catching up global frontier rapidly. Third, a comparison between mAb and chemical drug in China is conducted. With these comparative analyses, it will contribute to deeper understanding about how the mAb innovation system in China was founded. After these comparative discussions, implications from this study will be presented to provide references for how to build innovation system to seize emerging technologies.” We believe this will help readers to understand why we conducted such kind of comparative discussion.

I suggest the authors to think about these two suggestions which I believe will help improve the strength of the manuscript. I accept the manuscript and trust the authors to make relevant modifications.

- **Response:** Thank you again for your valuable comments and trust!

Best regards,