



UNIVERSITY OF AMSTERDAM

## UvA-DARE (Digital Academic Repository)

### Experts and the science-policy interface in China's climate policy

Chen, L.-Y.

**Publication date**  
2022

[Link to publication](#)

#### **Citation for published version (APA):**

Chen, L.-Y. (2022). *Experts and the science-policy interface in China's climate policy*. [Thesis, fully internal, Universiteit van Amsterdam].

#### **General rights**

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

#### **Disclaimer/Complaints regulations**

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

## **Chapter 10: Conclusions**

### **10.1 Introduction**

Concerning the SPI on climate governance and China, there are four knowledge gaps in the existing literature—lack of: (1) exploration of SPI in the Global South context; (2) exploration of SPI from a multi-level or cross-level perspective; (3) theoretical discussion and concept definition of SPI in different political systems; and (4) exploration of SPI and China's climate policy.

To bridge the scholarly gaps, I first defined each element of SPI and developed an analytical framework to introduce the typology of policy problems as a novel approach for analysing SPI. With the focus on China's climate policy and nine embedded case studies, I explained how SPI plays out in an authoritarian context and a multi-level governance framework. Regarding the relationships between science/knowledge and policy/politics, I paid particular attention to politics to analyse the nuanced science-policy-politics nexus rather than the simplified linear route of science informs policy. Employing interpretive research methodologies, I demonstrated how experts engage in the policy process and explained their perceptions of the roles they played in the governance dynamics.

After the comprehensive examination of SPI at four levels (i.e., international, national, provincial, and prefectural) of China's climate policy (including a cross-level analysis), Chapter 10 addresses the overarching question and sub-questions raised in Chapter 1. Section 10.2 summarises the main research findings regarding each element of SPI at multiple levels of China's climate policy. Section 10.3 explains the experts' varied roles and policy impact through the typology of policy problems. Section 10.4 addresses the conditions for mediating SPI in an authoritarian regime and gives recommendations for driving China's climate policy through mediating SPI. Section 10.5 discusses how this thesis bridges the existing scholarly gaps and contributes to theorising SPI by employing an interpretive policy analysis (IPA) and a multiple/cross-level analysis of SPI in an authoritarian context. Section 10.6 presents my reflections and recommendations for future research.

### **10.2 Differentiating SPI elements in China's multi-level climate governance**

This section summarises the main research findings to address the sub-questions raised in Chapter 1: (1) Who are the experts that are engaging with the policy process? Who are the policymakers? (2) What kinds of science do experts generate and what kinds of science do policymakers need in order to make decisions, and why? (3) What are the political

considerations of policymakers before making the decisions? Based on the analytical framework developed in Chapter 2 (see *Figure 2.10*), I synthesised the SPI elements of the nine case studies in *Table 10.1*.

*Table 10.1 Synthesis of SPI elements in nine case studies*

Studied case	Governance level	Problem type	Relevant knowledge	SPI models	Experts' impact on the policy stages
1. CEPC	International	UP	FK+DK	PP+CP (national level); SP+CP (international level)	National policy formulation: very high (5); global policy formulation: very low (1)
2. CBP		UP	FK+DK		National policy formulation: high (4); global policy formulation: low (2)
3. TD&T		MSP (e)	DK+AK		National policy formulation: very high (5); global policy formulation: high (4)
4. Target-setting on emissions reductions	National	MSP (e)	FK	SP+PP	Problem definition, agenda-setting, and policy formulation: high (4)
5. The Climate Law		UP	DK+AK	SP+PP	Problem definition and agenda-setting: high (4); policy formulation: moderate (3)
6. Carbon tax vs. ETS		MSP (e)	DK+AK	SP+PP	Carbon tax: problem definition and agenda-setting: high (4); policy formulation: moderate (3); the ETS: problem definition, agenda-setting, and policy formulation: high (4)
7. LCPC	Provincial / prefectural	MSP (m)	DK+AK+SK	SP+PP+CP	Problem definition and agenda-setting: very high (5); policy formulation: high (4); implementation: high (4)
8. EI		MSP (e)	FK+SK+AK	PP+CP	
9. Pilot ETS		MSP (e)	AK+SK	SP+PP+CP	
<p>* UP = unstructured problem; MSP(e) = moderately structured problem (ends); MSP(m) = moderately structured (means).</p> <p>** FK = fundamental knowledge; DK = discursive knowledge; AK = applied knowledge; SK = stakeholder knowledge.</p> <p>*** SP = science-push; PP = policy-pull; CP = co-production</p>					

Source: Author's analysis in Chapters 5-8. Regarding the explanation of experts' impact on the policy stages, see Chapter 5 for cases 1-3; Chapter 6 for case 4-6; and Chapters 7 and 8 for cases 7-9.

### 10.2.1 Who are the experts? Multiple scientific input for China's climate policy

There is multiple scientific input rather than only semi-official think tanks which are dominant in China's climate policy process. Experts from universities, NGOs, and international organisations also have the tickets to get into the policy process across levels, particularly in the low-carbon development (LCD) and low-carbon economy (LCE) related policy projects. This finding echoes some literature that under China's authoritarian political regime, experts as knowledge-oriented actors are the few exceptions of influential policy actors (Lo, 2010; Liu, 2013; Wübbecke, 2013 (a); Chen, 2017; Lo and Chen, 2019).

Among research institutes, **semi-official think tanks and universities are more influential than other categories of experts.** The ERI and NCSC, which fall under the NDRC and MEE, alongside Tsinghua University, are the most critical players in China's national climate policy. **The policy impact of the research institutes reflects the pecking order and the priorities of the Chinese central government** (Chen, 2009). Ministries on energy and economic policies are more powerful than those on environmental protection, forest, or agriculture in practice (G. Chen, 2012; L. Chen, 2017). Hence, research institutes working on 'energy system engineering' and low-carbon policies are often more high profile than others (Chen, 2017: 373-374). My research also shows that **more social scientists such as environmental economists, law and policy researchers have recently been involved in China's climate policy** (Interviews 10, 20, 21, 22, 51, 54, and 56). This finding differs from the past literature asserting that social scientists had been somewhat excluded from China's climate policymaking (Li, 2013: 420).

Concerning the variations of experts across levels, **research institutes in Beijing have formed a comprehensive 'national team' covering virtually all aspects of China's climate policy. Each institute has built its reputation in different domains but does not monopolise the knowledge market.** The 'knowledge network' at the provincial or prefectural level is relatively smaller than the national level. The Research Centre on Climate Change/Low-carbon Development co-built by local governments and universities, or existing government-affiliated think tanks provides the primary support to local climate policymaking and implementation. Like the national level, **research institutes involved in China's local climate governance concentrate primarily on climate change mitigation, particularly 'energy conservation and emissions reduction.'** The main reason is that the Chinese government has set energy conservation as part of the target responsibility system (TRS) to assess local officials and cadres (Lo, 2020).

### 10.2.2 Who are the policymakers? From science and environment to energy and economic development

The past three decades have witnessed the development and change of influential

governmental players in China's climate policy. Under the State Council, the powerful ministry has evolved from the scientific (i.e., the CMA) and environmental protection administration (the NEPA) in the early 1990s to the energy and economic development ministry (the NDRC) since the 2000s. However, since climate change is so complex and is related to many ministries/departments' jurisdictions, **there is bureaucratic competition within both central and local governments.** In 2018, the distinctive institutional change is that the Ministry of Environmental Protection (MEP) was renamed as the Ministry of Ecology and Environment (MEE) and took over the NDRC's role in leading China's climate policy in 2018. The government restructuring indicates the Chinese government's dual attempts. First, China seeks to resolve the long-standing problem of fragmentation of authority—while the MEP is responsible for regulating carbon monoxide (CO), control of carbon dioxide (CO<sub>2</sub>) falls under the NDRC (Ma and Liu, 2018). Second, promoting the concept of ecological civilisation (EC) as the core doctrine of its global and national development strategy, China attempts to situate climate change with environmental governance and pollution control under the EC discourse. Yet, **we need more time to observe whether the MEE can overcome the fragmented structure of authority and bureaucratic competition that hinders some stuck policies** (e.g., the carbon tax and China's Climate Law discussed in Chapter 6).

### 10.2.3 Policymakers' demand and experts' provision of knowledge

Policymakers across governance levels demand different scientific input for decision-making (see *Table 10.2*):

**(A) Policymakers at higher governance levels (i.e., international and national level) demand and accept more scientific and discursive knowledge to gain influence in global climate politics and guide domestic policy directives.** For instance, they need a science-based proposal to negotiate with China's allies and opponents for fair burden-sharing of GHG emissions reductions. Domestically, they need an understandable narrative with a vision to guide domestic stakeholders in China's low-carbon (economic) development.

**(B) Policymakers at the lower governmental levels (i.e., provincial and prefectural levels) demand more administrative and stakeholder knowledge to implement policies and ensure reaching the goals set by the upper-level government,** e.g., the toolkits for developing the low-carbon plan for provinces and cities and the administrative guidelines for emissions inventorying and running the ETS.

(C) To meet policymakers' demand for knowledge in different political settings, experts' objectives and roles in engaging with China's climate policy vary across governance levels (see *Table 10.3*). Apart from pure scientists or advisors, experts play additional roles such as political actors or agents of the officials to support Chinese

policymakers.

**(D) Chinese experts are both scientists and political actors when participating in international climate talks as Chinese delegation members.** When speaking to international audiences, their main object is to secure China's national interests and image (CAST, 2007; Interviews 13, 14, 18, and 19).

*Table 10.2 Knowledge policymakers demand and experts provide in China's multi-level climate governance*

Governance level	Policymakers' demand and experts' provision of knowledge (analysed cases)
International	(1) Fundamental knowledge (CEPC and CBP) (2) Discursive knowledge (CEPC, CBP, and TD&T) (3) Applied knowledge (TD&T)
National	(1) Fundamental knowledge (Target-setting on CO <sub>2</sub> emissions reduction) (2) Discursive knowledge (carbon tax, ETS, and Climate Law) (3) Applied knowledge (carbon tax, ETS, Climate Law)
Provincial	(1) Discursive knowledge (LCPC, ETS) (2) Applied knowledge (LCPC, EI, and pilot ETS) (3) Stakeholder knowledge (EI and pilot ETS)
Prefectural	(1) Discursive knowledge (LCPC and ETS) (2) Applied knowledge (EI, LCPC and pilot ETS) (3) Stakeholder knowledge (EI and pilot ETS)

Source: Author.

(E) At the national level, experts play multiple roles with the objective to enhance the scientification and rationalisation of climate policymaking. In addition to informing policymakers of scientific recommendations, some experts are policy entrepreneurs that proactively lobby officials at different levels to adopt new ideas (e.g., LCD and LCE) and measures (carbon trading).

(F) Experts' roles and objectives are relatively simple at the local levels: serving the officials and getting the job done. In addition to providing recommendations, local experts frequently act as agents of the officials to carry out policy projects more deeply. While the centre experts mainly communicate with decision-makers, local experts expand the scope of audiences to include all types of stakeholders, such as citizens and industries, to enhance their policy compliance.

*Table 10.3 Experts' multiple roles at different levels of China's climate policy*

Governance level	Role of experts in the policy process (analysed cases)	Objectives of the experts in the policy process
International	(1) Scientists (CEPC, CBP) (2) Political actors (TD&T)	Secure China's national interests and image
National	(1) Scientists (National target-setting on CO <sub>2</sub> emissions reductions) (2) Advisors (carbon tax, Climate Law) (3) Policy entrepreneurs (ETS)	Enhance the scientification and rationalisation of China's climate policymaking
Provincial	(1) Scientists (EI, pilot ETS) (2) Advisors (LCPC, pilot ETS) (3) Policy entrepreneurs (LCPC) (4) Agents of the officials (LCPC, EI)	Serve the officials and get the job done
Prefectural	(1) Advisors (LCPC, pilot ETS) (2) Agents of the officials (EI) (3) Policy entrepreneurs (LCPC)	Serve the officials and get the job done

Source: Author.

#### **10.2.4 Division of labour (cooperation) and tensions between cross-level dynamics of SPI**

There is a division of labour, cooperation, and tensions among the cross-level interactions of experts and policymakers in China's multi-level climate governance:

(A) In relation to the science-push model, international-domestic linkages of foreign scientific communities and Chinese domestic research institutes exert a certain degree of impact on problem definition, agenda-setting, and policy formulation.

(B) The centre-local interactions of research institutes occur at all stages of China's climate policy. The top-down and bottom-up knowledge travel jointly shapes the national policy framework.

(C) The provincial-prefectural relationships facilitate vertical and horizontal knowledge travel to drive policy diffusion in China's local climate governance.

(D) The cross-level tensions between experts and policymakers mirrors the conventional centre-local relations in China's political system and the varied knowledge capacity and considerations of policymakers across governance levels (see *Table 10.4*).

The LCPC programme can best explain the different concerns of centre and local policymakers/experts: When disseminating the idea of 'low-carbon development' and

'low-carbon economy' to the Chinese localities, the centre policy actors stress the concept 'low-carbon' for achieving national GHG emissions reduction target. Yet, provincial and prefectural officials focus more on 'development' and 'economy' when discussing the same term, since they have to ensure the development of local industries.

*Table 10.4 Centre-local tensions in the low-carbon province and city pilot and emissions inventorying*

	Centre perspective	Local perspective
Low-carbon province and city pilot	<ol style="list-style-type: none"> <li>1. Focus on 'Low-carbon' when discussing the concept of low-carbon development/economy</li> <li>2. Encourage the localities to innovate policy measures through trial and error</li> </ol>	<ol style="list-style-type: none"> <li>1. Focus on 'development/economy' when discussing the concept of low-carbon development/economy</li> <li>2. Expect the guidelines and instructions from the central government</li> </ol>
Emissions inventory	<ol style="list-style-type: none"> <li>1. Establish a standardised theoretical framework to connect to the international system and prepare for the ETS</li> <li>2. Expect the EI compiled by local governments to be meticulous</li> </ol>	<ol style="list-style-type: none"> <li>1. Consider the national guidelines to be too theoretical and difficult to 'down to earth'</li> <li>2. Adopt the strategy of 'grasping the large and releasing the small' and 'be rough rather than meticulous'</li> </ol>

Source: Author.

Emissions inventorying is another example that demonstrates the contradictory attitudes between the centre and local actors. While the Beijing officials and experts compiled the guidelines based on considerations of comprehensiveness, local actors complained that such guidelines are too high-end and theoretical to apply. Further, rather than viewing emissions inventorying as a foundation for climate change mitigation, local actors see EI as Beijing's attempt to monitor local energy conservation and emissions reduction performances.

### **10.2.5 Political considerations of policymakers before making the decisions**

Before making the decisions, some political considerations are critical for explaining the Chinese policymakers' uptake and adjustment of the experts' scientific input.



**(A) Timing.** Although the experts have provided sufficient scientific input, Chinese policymakers will not announce a decision when the time is not ripe. For instance, they refused to make any commitment to climate change mitigation before 2009. When the time had become ripe (when China had become the world's largest GHG emitter), Chinese policymakers set an ambitious goal based on the experts' suggestions to demonstrate that China is combating climate change seriously.

**(B) Protect national interests.** China used to support the 'per capita emissions' approach when accounting for each country's GHG emissions since China's per capita emissions are low. Yet, when its per capita emissions were rising rapidly, China proposed the cumulative emissions per capita (CEPC) approach. Since its CPEC are low, China can avoid blame and ask for more rights to emitting GHGs.

**(C) Scale (factors at the higher and lower governance levels).** While making a decision, Chinese policymakers consider factors at the present governance level and factors at the higher (international) and lower (subnational) governance levels. For instance, carbon taxation cannot bring interests to the local level (but raise local opposition) and cannot influence international society. The ETS seems less harmful at the local level and can affect the international carbon market and the global political economy. Therefore, although the experts preferred levying a carbon tax rather than building an ETS, Chinese policymakers eventually chose the ETS.

**(D) Political performance and accomplishment.** While the experts provide suggestions based on professional expertise and scientific research, policymakers consider more about their political performance and accomplishment. At the national level, the significant case is that all the three ministries: the NDRC, MOF, and MEP were promoting carbon taxation to consolidate their position in the State Council. At the local level, while the experts listed the suggested measures in the low-carbon plans, provincial and municipal policymakers often showed great interest in some visible measures, such as building a low-carbon industrial park and other ways of enhancing the city's reputation (Chen, 2017: 373).

**(E) Feasibility and achievability.** When setting a policy goal, it must be feasible and achievable. The significant case is when China announced the date to peak CO<sub>2</sub> emissions, policymakers did not choose the most ambitious option (2025) suggested by the experts, but the safer option (2030) (China Development Institute, 2017). At the local level, while the national policy guidelines and frameworks were too theoretical and high-end to down to earth, local actors developed their own strategies (e.g., grasping the large and releasing the small) to complete the work (Chen, 2017).

**(F) Target responsibility system (TRS).** Local officials and Party cadres see the TRS as

a doctrine since it is set to evaluate their performance. Hence, while the experts innovated new policy measures and mechanisms, local officials always inquired about “whether such measures meet all the requirements set by the central government, their timeous completion, and their achievability” (Chen, 2017: 374).

**(G) Regional competition.** For local officials, city/province branding is a critical part in terms of regional competition. Since local officials and cadres are seeking leverage to enhance their governance performance, they welcomed those measures and development strategies that could help promote their territories. This explains why policymakers in some of the least developed regions adopted the concept of low-carbon development and low-carbon economy earlier than some east coast cities.

### 10.3 Explaining the experts’ varied roles and policy impact through the typology of policy problems

How to explain the different policy impact of experts in China’s multi-level climate governance? I situated nine case studies into four types of policy problems and found that the typology of policy problems and the concept of problem structuring (Hisschemöller and Hoppe, 1995; Hisschemöller and Gupta, 1999; Hisschemöller et al., 2001 (b); See 2.4.2) can help illuminate the varied roles of experts and their policy impact in different cases (see *Figure 10.1*). While the experts’ impact on unstructured problems is limited, they successfully facilitated problem structuring to solve the moderately structured problems (ends) and moderately structured problems (means).

First, those cases in which Chinese experts have a low impact (level 1-2) on policy decisions are all unstructured problems (CEPC, CBP, and Climate Law) (cell A). While trying to provide new insights to facilitate problem structuring to address the present issue, the experts are primarily problem recognisers rather than problem solvers (Hisschemöller et al., 2001 (b): 453). Since the 2000s, Chinese experts and policymakers have co-generated the CEPC and CBP as science/politics co-constituted sword and shield to use in the international climate negotiations. Yet, the global society has not accepted their proposals due to the contested values and policy-relevant knowledge regarding the fair sharing of GHG emissions. Similarly, although the experts have provided insightful knowledge (the draft law) to the centre policymakers and raised problem awareness in policy debate, their efforts get stuck due to some fundamental controversies of policy goals and instruments among the central government apparatus. From these cases, we learn that although experts are expected to play an important role in addressing unstructured problems, real-world politics can restrict their effect on final decisions.

Figure 10.1 Linking SPI in nine case studies to the four types of policy problems

		Consensus on norms and values	
		No	Yes
Certainty on knowledge	No	<p><i>(A) Unstructured problem</i> <i>Science as problem recogniser</i></p> <p>International level: CEPC and CBP: PP+CP with high impact on China's policymaking (5); SP+CP with low impact on global policymaking (1-2)</p> <p>National level: Climate Law: SP+PP with moderate impact (3)</p>	<p><i>(B) Moderately structured problem (ends)</i> <i>Science as advocate</i></p> <p>International level: TD&amp;T: PP+CP with high impact on both China's policymaking (5); SP+CP global policymaking (4)</p> <p>National level: Target-setting on CO<sub>2</sub> emissions reduction: SP+PP with high impact (4) Carbon tax vs. the ETS: SP+PP with moderate impact (3) vs. SP+PP with high impact (4)</p> <p>Provincial and prefectural levels: EI: PP+CP with high impact (4-5) Pilot ETS: SP+PP+CP with high impact (4-5)</p>
	Yes	<p><i>(C) Moderately structured problem (means)</i> <i>Science as mediator</i></p> <p>Provincial and prefectural levels: LCPC: science-push, policy-pull, and co-production (high impact (4-5))</p>	<p><i>(D) Structured problem</i> <i>Science as problem solver</i></p>

Legend: \* Experts' policy impact: 1 = very low; 2 = low; 3 = moderate; 4 = high; and 5 = very high.

\*\* ⇨ = the direction of problem structuring.

Source: Author put the nine case studies into the framework developed by Hisschemöller and Hoppe (1995) and Hisschemöller and Gupta (1999).

Second, while the experts have a high impact on moderately structured problems (ends) and moderately structured problems (means), the processes and outputs of SPI are different. In moderately structured problems (ends) (cell B), experts play as advocates for raising new regulatory targets and policy measures at the higher levels of governance (i.e., the international and national level). Since different research institutes have varied proposals and options, policymakers made final decisions in the political realm (TD&T at

the international level and target-setting on CO<sub>2</sub> emissions and carbon tax vs. the ETS at the national level). At the lower government levels (i.e., the provincial and prefectural levels), experts work closely with the officials (presenting the policy-pull and co-production models of SPI) to overcome the problem of lacking certainty of policy-relevant knowledge (EI and pilot ETS).

In a moderately structured problem (means) (cell C), experts are mediators that successfully coordinate the dispersed and sometimes controversial policy targets to compile the low-carbon plan for local officials (LCPC).

From the above discussion, this research echoed the basic assumption that experts can stimulate problem structuring by mediating SPI to reconstruct the present problem to better address the problem (Hisschemöller et al., 2001(b)). While the extant literature lacks theoretical discussions of SPI, introducing the notion of policy problems and problem structuring can help analyse experts' varied roles and policy impact.

#### **10.4 Conditions for mediating SPI in an authoritarian regime**

What are the features of SPI in an authoritarian context? Traditional stereotypes suggest that experts are merely a governing tool to rationalise and legitimise the political leaderships' decision (Li, 2017; Zhu, 2019). Yet, the role of experts and policymakers' uptake of expert knowledge in authoritarian settings remain unanswered in the extant literature (Jones, 2019). This section first addresses the overarching question of the thesis, namely the conditions for experts to influence China's climate policymaking. I then discuss what this means for the future of China's climate policy and gives a practical recommendation for driving China's climate policy through enhancing SPI.

##### **10.4.1 Political settings and officials' political considerations as main conditions for experts to successfully influence China's climate policy**

Section 10.2.5 has summarised some political considerations that are critical to understanding Chinese policymakers' uptake and adjustment of experts' scientific input: (a) timing; (b) protection of national interests; (c) scale (factors at the higher and lower governance levels); (d) political performance and accomplishment; (e) feasibility and achievability; (f) target responsibility; and (g) regional competition. Following the research findings, this sub-section adds the conditions for experts to drive China's climate policy: (A) Experts' scientific advice and policy recommendations meet the needs of policymakers. If the officials recognise the experts' input as 'policy-relevant,' such input would have better chances to transform policy. (B) Government officials attach importance to the presented policy issue in which experts are involved. In practice, this is usually due to government

officials' thoughts of political achievements and other considerations rather than professional advice.

First, whether experts' scientific advice and policy recommendations meet policymakers' needs is critical for mediating SPI. As presented in Section 10.2.3, policymakers at different governance levels require different types of knowledge in order to make a decision. To make their recommendations policy-relevant, experts should focus on a question that already exists in climate governance. Meanwhile, rather than exploring the policy issue from an academic perspective without potential solutions, experts' policy recommendations should provide specific alternatives that they expect the government to adopt (Chen, 2017: 367; Interview 38).

Second, whether government officials attach importance to the presented policy issue influences the adoption of experts' scientific input. If the political leaderships at higher governmental levels stress a particular policy, local officials face the 'internal pressure' to ensure the accomplishment of the task and will command experts to implement the project conscientiously (Chen, 2017: 374-375; Interviews 01, 32, 33, and 52). If the authorities at higher governmental levels do not focus attention on a certain issue, local officials may act perfunctorily; experts therefore face less pressure to carry out the policy project (Chen, 2017: 375; Interviews 56, 57, and 60).

Worth noting is that policymakers' uptake of experts' input usually does not depend on their thoughts regarding professional advice but other considerations. On the one hand, parochialism, fragmented authority, and horizontal competition among ministries and officials' priorities and concerns are decisive to the officials' final decisions (Chapters 6, 7, and 8). For instance, while local officials accept the experts' suggestion to launch a low-carbon city pilot project, they may be more relevant for 'city branding' than for energy conservation and emissions reduction (Chapters 7 and 8). Meanwhile, in the one-party state ruled by the Chinese Communist Party (CCP), local cadres are inclined to pay more attention to political achievements to meet the indicators set by the target responsibility system (TRS) (Chen, 2017; Chapters 7 and 8).

In essence, in an authoritarian regime, once the central government decides that a topic is important, e.g., climate change, science can become influential. This is a hypothesis that can be tested in other authoritarian contexts. However, this thesis has not investigated under what conditions an authoritarian regime is likely to prioritise specific issues.

#### **10.4.2 What does the feature of SPI in an authoritarian context mean for the future of China's climate policy?**

To contextualise SPI in China's authoritarian context for discussing the future of China's

climate policy, I raise two points for discussion.

**(1) Concerning the top-down governance approach, the authoritarian regime provides a favourable condition for steering China's domestic climate policy development through enhancing SPI.** As Pieke (2009: 4) notes, "Since the late 1990s, it has become increasingly clear that the weakening of the Chinese Party-state has not happened." Due to the increasing control of the central government during the Xi Jinping era, local governments are pressured to implement low-carbon projects in such a way that the authoritarian nature is enhanced rather than weakened (Habich, 2016). The hierarchical political system with the TRS for local cadres forces local implementation to meet specific policy targets, particularly energy conservation and emissions reduction. Once experts' recommendations are adopted in the national policy framework, the policy ideas are disseminated to the local levels through vertical knowledge travel.

**Yet, we can still criticise the top-down knowledge production and transfer mechanism as a 'technique of governance' (Foucault, 1980) of the authoritarian regime for specific purposes.**<sup>72</sup> For example, while the central government promulgates the guidelines of a particular measure to reduce GHG emissions, local actors have to follow the command to achieve the goals set by the central government. Then, we can question whether local actors are consciously addressing climate change or just following the centre order. My research has demonstrated the significant regional variation in Chinese localities' institutional/knowledge capacity for addressing climate change. In this regard, **China faces the challenge of improving the local institutional/knowledge capacity that enables local policy actors to reconstruct and interpret the meaning of climate policies according to local knowledge, interests, and existing development strategies. Otherwise, one can question that China's local climate policy is not driven by science and expertise but forced by the Chinese authoritarian regime through the target responsibility system for local officials.**

Ideally, the Beijing experts' strategy to influence local climate policy is to "teach a person how to fish rather than give her a fish" (Chapter 9). That is, through training programmes and toolkits to empower local actors. However, **due to the limited time, energy, and capacity of local officials, it turns out that local Chinese officials demand customised knowledge (namely applied knowledge) to carry out specific projects to reach the particular policy targets demanded.** Except for energy conservation and

---

<sup>72</sup> From the Foucauldian-governmentality perspective, "Power rests on a base of knowledge that provides the authority for its exercise and the right of certain persons to exercise it" (Brass, 2000: 322). As Foucault (1980) put it, "Power produces knowledge in order to rule, regulate, control, and discipline" (Brass, 2000: 306); and "Knowledge in turn was put to the service of the administrative state and became itself a part of 'the machinery of power'" (Foucault, 1980: 176; Brass, 2000: 306).

emissions reduction, the extent to which local officials have mainstreamed the concept of addressing climate change into the existing development plans remains doubtful.

(2) Concerning the horizontal governmental relations, the fragmented structure of authority and bureaucratic competition in China's political system obstructs policymakers' uptake of scientific input. The best example is the Climate Law. Even though experts have provided the recommended draft law, China's fragmented decision-making system and bureaucratic competition among the centre ministries has become the primary obstacle for transforming experts scientific input into a legally binding text. Before 2018, even the most powerful organ in the State Council—the NDRC—could not coordinate the legislation, although China unveiled a government restructuring in 2018, moving the Department of Climate Change (DCC) and its official think tank, the National Centre for Climate Change Strategy and International Cooperation (NCSC), from the NDRC to the new Ministry of Ecology and Environment (MEE). Considering that climate change is such a complex issue that links to more than twenty ministries and agencies, the MEE has to prove its ability to strengthen policy coordination.

(3) Although China's fragmented feature of decision-making may obstruct the mediation of SPI, this thesis asserts **an opportunity to facilitate China's climate policy coordination by building a knowledge network as a desirable platform for government organs and expert institutes**. In the current Chinese bureaucratic system, each government sector has its research institute providing direct assistance on policy planning and implementation. While the officials from different ministries or departments can only meet at the leading group meetings or the joint meetings for addressing climate change, the experts employed at those research institutes have more opportunities to communicate with one another. If the experts can enhance collaborative cooperation when undertaking policy-oriented research before policymaking, their policy recommendations may assimilate each other's results. Hence, each department's policy decision is likely to present a degree of coordination rather than fragmentation.

The above assertion is in line with some previous studies on experts in China's local climate governance (Mai and Francesch-Huidobro, 2015; Chen, 2017). Further, it echoes the FA or the FA 2.0 perspective: "In China's fragmented political system, 'policy communities' are an important source of information and strategic coordination of discrete and sometimes disparate actors" (Lieberthal, 1992; Mertha, 2008: 156).

#### **10.4.3 Recommendations: driving China's climate policy through mediating SPI**

Based on the discussion of SPI in an authoritarian context, this sub-section addresses another critical question: How can we drive China's climate policy by enhancing the

interplay between experts and policymakers? Considering that the policy-pull and co-production models seem to have a higher impact on policymaking than the science-push model, I develop a strategy to increase the possibilities of the policymakers' uptake of scientific input. The strategy includes a two-round interaction with Chinese officials to strategically change science-push to co-produce policies with policymakers or shape policymakers' demand for policy-relevant knowledge.

In Round One, the first step of the experts is approaching the officials to transfer an idea like 'low-carbon economy' or promote a policy alternative such as 'adopting carbon trading.' While not knowing the policymakers' attitudes, experts first inquire whether the officials are willing to support the research on the policy idea or instrument. Once permission to initiate a research project is obtained, the experts' second step is communicating with the officials when undertaking the project, putting together their recommendations and the policymakers' needs regarding the research topics (Interviews 40, 41, 52, 54, 57, and 60). Once Chinese officials accept the new policy idea or intend to experiment with new policy measures, they demand more scientific input to consider the policy programme or launch a pilot project.

Then, both the co-production and policy-pull models may occur in practice. Officials tend to commission expert institutes to initiate the second round of research projects regarding the pre-evaluation and preparation of new policy programmes. Experts and officials are more likely to co-design and co-produce a policy in this round of interaction, given that they have built up a certain degree of mutual understanding. Meanwhile, if policymakers have limited knowledge or capacity to deal with specific policy projects, they may mandate experts to complete the policy work directly. While the result is satisfactory, the experts' scientific input is likely to transform into a policy decision or action.

## **10.5 Theoretical contributions and implications**

This section explains how this thesis bridges the existing scholarly gaps and contributes to theorising SPI by employing an interpretive policy analysis (IPA) and a multiple/cross-level analysis of SPI in an authoritarian context.

### **10.5.1 An expanded understanding of knowledge, mindsets of experts, and policy stages**

While the extant SPI literature primarily focuses on the role of science/knowledge at the stage of policymaking, this thesis expands our understanding of the experts' engagement with virtually all phases of China's climate policy. The IPA approach helps researchers highlight the different objectives and interpretations of policymakers and implementing



actors. It points out that China's climate policy is not just about national policymaking/state regulation vs local implementation/compliance. Rather, local actors are learning and redefining policies based on local knowledge and trial-and-error (e.g., develop strategies for low-carbon development and low-carbon economy) in each stage of the policy process (Grin and Loeber, 2007). In other words, local policy actors (policymakers and experts) are not implementing an already-formed policy; it is their collaboration that is the policy (Colebatch, Hoppe, and Noordegraaf, 2010; Adams, Colebatch, and Walker, 2015).

Another contribution of IPA is its focus on discursive knowledge (knowledge as a frame, narrative or discourse). As shown in *Table 10.2*, while only high-level political decision-makers demand fundamental (scientific) knowledge, policymakers at all governance levels demand discursive and applied knowledge to make decisions and disseminate to the target groups and stakeholders. In practice, discursive knowledge is as essential as fundamental and applied knowledge. It equips policymakers with a science-politics co-constituted sword and shield for international climate negotiations (e.g., the CEPC and CBP in Chapter 9) and a catchy slogan (e.g., low-carbon development and low-carbon economy) to speak to local actors. Further, it is worth exploring whether discursive knowledge is more important than fundamental and applied knowledge, in which types of policy problems, and in what policy stages.

Third, the IPA approach helps researchers understand the different mindsets of experts at different administrative levels. Rather than only seeing themselves as scientists, Chinese experts have the motivation to secure China's national interests at the international level. Instead of directly engaging with the policy process, they play the role of advisors aiming to enhance the scientification of policymaking at the national level. Lastly, experts are more used to work with the officials to directly carry out the policy work at the local level (*Table 10.3*).

### **10.5.2 A multi-level and cross-level perspective for analysing SPI**

Although the extant literature has engaged with SPI over the last fifty years, it has not developed a multi-level analytical framework. Hence, this thesis enriches the theoretical discussions on SPI by presenting a multi-level and cross-level analysis of SPI and China's climate policy.

First, I demonstrated that not only top-down knowledge travel exists in China's multi-level climate governance. Behind the development of the national policy framework are local pilot programmes and local case studies (e.g., the low-carbon city and province pilot and the pilot ETS), indicating a bottom-up knowledge travel (Chapter 9).

Second, the thesis revealed that policymakers made decisions not just under the

political settings at the given governance level. They also have to consider factors from the higher and lower governance levels (e.g., the policy choice between carbon taxation and carbon trading in Chapter 6).

Third, I demonstrated that the same experts' engagement with the policy process could be interpreted as different SPI models. For instance, while the carbon budget proposal (CBP) presents the policy-pull and co-production models of interaction among Chinese experts and policymakers, it also shows a science-push model when Chinese experts speak to international audiences (Chapter 5). Similarly, while we can adopt the science-push model to describe Beijing experts' contribution to developing guidelines and toolkits for local actors, it is also a policy-pull model since Chinese centre policymakers demand the experts to do so (Chapter 9). This finding expands the traditional view of SPI, pointing out an opportunity to better synthesise SPI and a multi-level and cross-level perspective.

### **10.5.3 A contextualised examination of SPI in China's authoritarian regime with the focus on the politicisation of science**

Existing studies have paid particular attention to 'science meets politics' in the context of liberal democracies, i.e., science and expertise in public deliberation (Brown, 2014) and democratic decision-making processes (Jasanoff, 1990; Fischer, 1990, 2000, 2009; Lentsch and Weingart, 2009; Baekkeskov and Öberg, 2017). Scholars have recognised a bundle of elements that may politicise science and expertise—party politics, ballots, interest groups and lobbying, constituency pressures, funding resources, ideological struggles, and so on (e.g., Rich, 2004). Meanwhile, the function of social sciences in modern societies (Lindblom and Cohen, 1979; Wagner, Wittrock, and Whitley, 1991; Wagner et al., 1991) and political decision-making (Jennings and Callahan, 1983; Maasen and Weingart, 2005; Christensen, 2018) has also been widely discussed with case studies on liberal democratic countries. However, we have limited knowledge about SPI in an illiberal and authoritarian context.

To fill the scholarly gap, I paid particular attention to the politicisation of science to supplement the understanding of SPI. I explained how China's bureaucratic competition, centre-local tensions, and the target responsibility system (TRS) for local officials and Party cadres influence China's climate policymaking and implementation. I also raised several political considerations of centre and local Chinese policymakers before making decisions, e.g., timing, political performance, feasibility and achievability of the alternatives, etc. While the previous studies focus primarily on the scientisation of politics and policymaking, the political considerations and conditions are presented to explain the policymakers' uptake of experts' scientific input in China's authoritarian regime. I hypothesise on the basis of this study that while in authoritarian countries local officials will be satisfied with

applied knowledge once the centre policymakers have accepted the fundamental and discursive knowledge. This may not be the case in democratic countries where even local governments may need convincing about the fundamental and discursive aspects of the program.

Once we focus on the science-policy-politics nexus, we can continue to ask whether the politics of science in illiberal and authoritarian contexts differs from those in liberal democracies? Or, is there no fundamental difference between SPI in democratic and dictatorial regimes? For instance, the cognitive conflict on emissions inventory between different levels within an authoritarian state (Chapter 9) is likely to be much more significant in democratic states, especially those developing countries pursuing economic growth. Also, the tensions between 'development/economy' and 'low carbon' may reflect similar conflicts worldwide. In this regard, the political considerations and conditions for explaining SPI identified in this research (e.g., horizontal/vertical power relations and concerns of timing and political performance) can also be a hypothesis to test in other countries, not just authoritarian regimes.

To sum up, science and policy do not interact in a vacuum but in a context-specific political landscape. In addition to depicting the various forms of SPI in different regimes, researchers should consider the nature of politics to better understanding the interplay between science and policy.

## **10.6 Reflections and recommendations for future research**

This thesis focused on the role of experts in China's multi-level climate governance. It contributed to an improved understanding of the relationships between experts, policies, and politics in an authoritarian context. However, there are some limitations regarding the case selection, the collected data, and the substantive research scope.

First, this research chose Guangdong Province as a case to study SPI in China's provincial climate governance. Guangdong is a well-developed province and is a place with high knowledge capacity and a knowledge network well-formed by the experts. Hence, it allows this study to explain how local Chinese experts influence local climate governance. Yet, given the variation in the defining character of Chinese territories, additional case studies and comparative studies of different provinces and cities are needed to create a more comprehensive picture of how experts engage with particular policies in the Chinese political system. For instance, focusing on some under-developed provinces or cities with insufficient knowledge capacities could lead to another picture of SPI in China's local climate governance.

Second, in terms of research methods and data collection, one primary limitation of my research is the lack of analysis from the government officials' perspective. This is due to a relatively low number of the officials interviewed and a tense political atmosphere in China. Although it could be challenging, I suggest that future research collects more interviews with the officials to draw on how the government interprets the experts' scientific input and the intersection of science and policy. Also, due to the political sensitiveness, I seldom directly ask the experts' assessment of government policy or their thoughts on politics. Future research can inquire not only how experts engage in the policy process, but also their evaluations of policies.

Third, while China has asked for international equity regarding the fair share of GHG emissions reduction (Pan and Chen, 2010; Harris, 2011; Wu, 2013), this thesis has not investigated whether China has attempted to promote equity at the domestic level. Hence, future research can pay attention to inter-province equity when China is stepping to peak its CO<sub>2</sub> emissions before 2030 and reach carbon neutrality by 2060.

Fourth, I chose China as a case to study SPI in a multi-level framework and an illiberal context. Yet, it remains unclear whether the political settings, policymakers' political considerations, and conditions identified in China can be generalised to explain the role of experts in countries with the feature of dictatorship or autocracy (see: Wilson Rowe, 2013; Jones, 2019). Therefore, more case studies are needed to depict SPI under the Global South and a non-democratic regime.

Concerning the substantive research scope, I focused primarily on experts' engagement with China's climate mitigation policy because the Chinese government has prioritised the efforts of energy conservation and emissions reduction during the past two decades. Yet, the role of experts in China's climate adaptation policy should not be omitted since the attributes of climate adaptation-related experts and government officials can differ from that of climate mitigation policy. Future research can expand the research scope to investigate experts' engagement with both China's climate mitigation and adaptation policies.

If I could re-do this research, I would make two differences in conducting fieldwork and interpreting the relationships between experts and policymakers. To lower the difficulties in conducting in-depth interviews in China (see 3.5.4.4), I would find a gatekeeper and apply for a guest position at a research institute. The assistance from the gatekeeper and an affiliated status at a domestic institute would largely reduce the uncertainties while increasing the possibilities of conducting interviews.

Lastly, I would adopt a more fundamental co-production perspective when collecting data regarding the relationships between experts and policymakers. My thesis has

included the STS and co-production perspectives (see 2.3.3.3 and 3.2) to explain the co-constitution of science and politics. However, I tended to seek evidence that proves experts have changed policy or policymakers' thoughts (which reflects the conventional science-push model) when conducting interviews. I faced difficulties collecting the proof and eventually realised that the co-production model of experts and policymakers occurs more than I expected in practice. Hence, if I could re-do the research, I would look for more cases and empirical data that present a co-production model to demonstrate the nuanced interaction between science, politics, and climate policy in China.