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Crisis coordination in centralized regimes: Explaining China's strategy for combatting the COVID-19 pandemic

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ABSTRACT

Based on the existing literature on government policy and crisis management, this article provides an internal-external and vertical-horizontal coordination framework with which to study coordination in a highly centralized regime. Four types of top-down crisis coordination are introduced to explain how resources fragmented among various sectors, regions, levels, and organizations are swiftly mobilized and deployed to support a strong crisis response. The article's analytical framework is applied to China's strategy to combat the COVID-19 pandemic. It shows how the sequence of coordinative action combined all four types of crisis coordination and how the coordinative measures co-exist in a hybrid and layered pattern, which enables highly centralized regimes to mobilize various resources across the country and achieve their final aim of crisis termination.



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Introduction

Since the 1960s, it has become evident that increasing global institutional fragmentation and more complex governance require coordination among multiple jurisdictions and organizations to develop a consensus and establish effective strategies to achieve their goals (Pollitt and Bouckaert 2017). Coordination has become a central keyword in the wake of the New Public Management (NPM)-based reforms, which emphasized decentralization and structural devolution, resulting in structural fragmentation (Bouckaert, Guy, and Verhoest 2016; Christensen and Laegreid 2008; Laegreid et al. 2013). Coordination among different actors, organizations, and levels is often seen as a key precondition for governments to address complex governance challenges and hence as a way forward (Lodge and Wegrich 2014).

Owing to higher pressure, an increased level of uncertainty, and time limitations, the traditional problems of organizational coordination multiply in crises; moreover, the stakes associated with success or failure are vastly raised under conditions of adversity (Kettl 2004, 66). Wicked problems pose highly complex and ambiguous policy planning and development challenges, and also raise implementation and service-delivery problems that cannot be solved within a single sector or administrative level (Head and Alford 2015). Transboundary and mega-crises, in particular, transcend national borders, administrative levels, ministerial areas, and organizational units, presenting a challenge to existing interfaces between organizations and thereby creating more complex and multifaceted coordination problems (Ansell, Boin, and Keller 2010). Systematic knowledge is required about how to handle such challenges in order to reduce some of their

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apparent ‘wickedness’. However, comparative studies show that coordination is more difficult to achieve during crises than under normal circumstances (Christensen, Laegreid, and Rykkja 2016).

The focus in this article is on coordination strategies and types in China during the COVID-19 pandemic. Even though this is not a comparative study, studies of a wide range of key and exemplary countries have shown that crisis coordination has been both a key factor of and a big challenge for the response to COVID-19, both in centralized and decentralized countries (Greer et al. 2021). China is a centralized state, which makes it potentially rewarding to study and compare it with other types of regimes. The strengths and weaknesses of crisis coordination in centralized regimes such as China is more salient than in decentralized and democratic regimes (Chen 2016). On the one hand, as a unitary regime, the Chinese central government, which has jurisdiction over all local governments, is capable of mobilizing a quick nationwide crisis response (Hu et al. 2020). On the other hand, large-scale mobilization involves more capacity and actors both vertically and horizontally, potentially increasing the fragmentation, complexity, and hybridity of such a system (Shih 2021).

Since the early 1980s, when China adopted its reform and opening-up policies and transformed itself from a highly centralized authoritarian regime to a new, hybrid political system with somewhat softer hierarchical features, crisis management coordination has become a challenge, featuring a growing trend toward local autonomy and fragmented authoritarianism (Liu and Christensen 2021). The experience of several crises has necessitated greater scientific, technical, and professional coordination by China’s centralized regime. Coordination is particularly crucial in countries such as China (Chen 2016), where centralized authoritative intervention often takes the form of short-term mass mobilization.

From late December 2019, the unprecedented COVID-19 epidemic escalated from a single health event into a full-blown crisis. The open-ended nature of the crisis posed additional challenges and made it much harder to deal with than crises with more sharply delineated timeframes (Boin, Lodge, and Luesink 2020). Despite being the first country to report COVID-19 cases and having the largest population and many densely populated urban centers, the Chinese government used national-style mobilization, called an ‘all-out peoples’ war’, for containment and has had one of the most successful responses to COVID-19 in the world as of late 2021. The Chinese central government countered the crisis with strong coordination capacity as a critical component of crisis management among sectors, regions, levels, and organizations to support the coercive implementation of its anti-virus policy (Hu et al. 2020).

Accordingly, the research questions of the study are:

- What overall characterizes the coordination of China’s strategy to fight the COVID-19 pandemic?
- What types of coordination have been employed, in what sequence, and how have they been combined?
- How can one understand this development in terms of a structural approach to coordination, which uses two main dimensions—vertical-horizontal and internal-external—taken from organization theory?

Coordination may vary among public organizations depending on whether their structural specialization is based on purpose, process, clientele, or geography (Egeberg and Trondal 2018). In highly centralized regimes, resources are concentrated at the center, and local government is directly under the command of the central government. This study examines what kind of formal coordination mechanisms are used by those engaged in crisis management. Four types of top-down crisis coordination—centralized, functional, network-based, and comprehensive—are outlined, based on an internal-external and vertical-horizontal framework (Egeberg 2012).

Through its in-depth analysis of China's response to the COVID-19 pandemic, this study can help us to understand how China has succeeded in controlling the spread of the virus by using different types of top-down coordination in a hybrid and layered sequential pattern (Streeck and Thelen 2005). It thus supplements the existing literature on crisis coordination, especially how top-down crisis coordination mechanisms work in centralized regimes, compared to the most common bottom-up coordination mechanism in decentralized and democratic regimes.

Crisis coordination—an analytical basis

Coordination involves a set of activities or processes aimed at achieving common objectives that cannot be accomplished by a single organization or actor (Comfort 2007; Jarzabkowski, Lê, and Feldman 2012). The process entails aligning organizations from different backgrounds under often tricky conditions (Lodge and Wegrich 2014). The structure of public organizations and the way they function can be described and analyzed according to two central sets of variables: specialization and coordination, both of which have vertical and horizontal components (Christensen and Laegreid 2008). As the division of labor becomes more and more detailed in public organizations, and the system increasingly complex, coordination and cooperation become key components in the relationship among various functions within the organization and between different organizations (Egeberg and Trondal 2018).

Vertical and horizontal coordination

The vertical coordination perspective is a traditional hierarchical approach (Bardach 2001). It assumes that organizations and work are divided by function and that functions are devised based on the tasks of government (Kettl 2003, 258). Structured coordination in a hierarchical organization is thus viewed as the result of formal mechanisms that specify how people and organizational units should work together in a rational manner within clear lines of authority (Morris, Morris, and Jones 2007). In the face of complex processes and ambitious goals, coordination is achieved in organizations through the use of hierarchical positions, legal-rational authority, specialization of tasks, and merit among members of the organization (Jennings and Ewalt 1998; Wise 2006). Without some form of guidance, hierarchical coordination is unlikely to be efficient or timely. The classical hierarchical model is strong in terms of accountability and role definition, and it excels in the performance of routines and repetitive tasks within specific sectors. However, such organizational or institutional arrangements with strong functional sectors may be highly inflexible. It is difficult to establish clear top-down linkages in multi-organizational settings owing to the lack of authority over other organizations (Wise 2006). Vertical and hierarchical coordination have to be supplemented by horizontal coordination.

The horizontal coordination perspective concerns the interaction among interdependent organizations or units at the same hierarchical level (Egeberg 2012). Contrary to the hierarchical approach, horizontal coordination among organizations is based on a mutual need to share resources, authority, knowledge, and technology, using negotiation and mutual adjustment instruments (Morris et al. 2007, 95). In an administrative system with strong line ministries, 'minimum coordination' implies noninterference in order to minimize conflicts among administrative domains. Each minister controls policy and administration within his/her policy area.

A general challenge related to the vertical dimension is to direct more central resources toward subordinate institutions and levels, thereby pursuing consistent policies across levels, but at the same time political executives must use strong central instruments to retain control, in other words, there must be a balance between control and autonomy (Egeberg and Trondal 2018). On the horizontal dimension, measures of various degrees of formality, from mergers to cross-sectoral bodies, programs, projects, and networks are increasingly being used to modify the

“siloization” or “pillarization” of the central public administration (Gregory 2003; Osborne 2010). However, wicked issues often create hybrid forms of coordination that combine a complex mixture of vertical and horizontal specialization and coordination (Christensen and Laegreid 2008).

Crisis coordination

Most research on coordination concentrates on non-crisis settings. Some coordination mechanisms work best when the ‘task environment’ is stable and uncertainty is limited (Chisholm 1989). However, coordination is also an important function in the domain of disaster and crisis management (Boin and Bynander 2015; Kettl 2004), and a central theme of this domain (Keast and Mandell 2011; Morris et al. 2007). A crisis creates conditions where ‘coordination by formal structures and planned responses’ is especially challenging and may be supplemented by additional coordination measures (Dynes and Aguirre 1979; Majchrzak, Sirkka, and Hollingshead 2007). When governments face wicked problems that do not fit into traditional functional structures, crisis management becomes a complex and fragmented affair. Coordination becomes more difficult because agencies are required to handle critical tasks quickly.

Formal command-and-control coordination mechanisms that follow hierarchical lines and routine procedures may have limited applicability in crises (Ansell et al. 2010), because the hierarchies may be too rigid and too slow to adapt to sudden changes and unanticipated problems (Wise 2006, 311). Crisis managers in multi-organizational settings facing transboundary crises often lack authority over other organizations, making it difficult to establish clear top-down control. Clarke (1999) calls contingency plans ‘fantasy documents’, which are replaced by a focus on coordination as an ‘emergent property of a collectivity’ (Bardach 2001). The basic underlying principle is simple: when people face an unforeseen problem that is hard to solve, they will be inclined to seek collaboration to come up with solutions (Okhuysen and Bechky 2009). Improving coordination among organizations is more effective than structural reorganization since the latter is typically too slow to adapt to sudden change (Brattberg 2012).

Crisis management coordination must therefore occur simultaneously on the vertical and horizontal dimensions (Hu et al. 2020). The top-down hierarchical perspective assumes that the organizations to be coordinated are identifiable and a hierarchy will facilitate strong central control. Public leaders may effectively use ‘command and control’ as a steering technique for emergency coordination while local officials cultivate working relationships with their state and federal counterparts to improve vertical coordination (Brattberg 2012).

However, a crisis situation means deep uncertainty (Kahneman and Klein 2009). Complex, unstable, and unpredictable environments require flexibility, rapid decisions, and a greater decentralization of authority with less emphasis on formal structure. Horizontal coordination is more flexible and versatile and makes it easier to collect and process information from the bottom up and from the outside in, which is a limitation of vertical coordination (Laegreid and Serigstad 2006).

Under both hierarchical and horizontal forms of authority, coordination requires more overt strategic thinking to align, organize, and differentiate participating organizations’ activities between beneficiaries, tasks, regions, and tactics. A hybrid approach labeled ‘contingent coordination’ could provide a path through the multifaceted problems of uncertainty in which separate and distinct actors at different levels of government, each within their formal hierarchical structure, work collaboratively when the situation demands cooperation (Kettl 2003). Contingent coordination can occur in both the traditionally hierarchical and horizontal forms as the situation warrants (Morris et al. 2007). It is one practical way of better balancing place-based and function-based capacity.

Pollitt and his colleagues pointed to the agency as a model covering both vertical and horizontal components (Pollitt et al. 2004). Along the vertical dimension, delegated regulatory agencies

with a semi-autonomous status operate on the principle of professional knowledge (Christensen and Laegreid 2008), while the horizontal dimension enhances overall responsibility by assigning responsibility in a specific area (Laegreid and Serigstad 2006). Ansell and Gash (2007, 544) proposed a combination of both perspectives and developed a theory of ‘collaborative crisis governance’. This theory further recognizes that collaboration has to be analyzed at different levels: from local and intra- and inter-organizational cooperation to cooperation between formal organizations and emerging networks (Martin, Nolte, and Vitolo 2016).

An internal-external and vertical-horizontal framework for crisis coordination

Based on the existing literature on crisis coordination (Christensen and Laegreid 2008), we propose a hybrid perspective, embracing an integrated framework of crisis coordination. Structurally, scholars distinguish between the internal-external and vertical-horizontal dimensions of crisis coordination, which cover diverse types of coordination (Verhoest et al. 2010). The internal-external dimension refers to the division of functions within a certain sector or public agency (or ministry), or between these units, which may concern fiscal, political, or administrative resources and the governance capacity related to them. For some simpler crises, such as small-scale fires, coordination would be within a sector or government agency (such as the fire service agency): this is referred to as intra-sectoral coordination in our study. Transboundary crises, on the other hand, whose functional boundaries encompass more than one sector or government agency require inter-sectoral coordination, a pooling of resources, and the capacity of several agencies.

The vertical-horizontal dimension can also be described in terms of an autonomy-interdependence continuum, which captures the ways different governmental levels relate to one another and is conceptualized as ‘a two-way process characterized by the extent to which government units located on different levels are invited or pressed to operate in a mutually coordinated manner’ (Bolleyer and Thorlakson 2012, 569). When a crisis happens at the local level and is defined as a local affair, its management will mainly be the responsibility of the local government, and central government will assign additional resources if necessary (Brower and Abolafia 1997). Under these circumstances, crisis coordination will increase across the different levels of government, which is referred to as vertical coordination. Unlike vertical coordination, horizontal coordination denotes the interdependence of different sectors/agencies on the same level of government, which is of special importance if local crises are wicked, meaning that they involve several sectors (Egeberg 2012).

Structural arrangements and cultural context have a significant impact on achieving a workable balance between hierarchical and network coordination solutions (Christensen et al. 2016). Relations between central and local government and between the state and society have a profound influence on crisis coordination capacity and performance (Boin, Kuipers, and de Jongh 2019; Csehi 2017; Mao 2021). While coordination between government and non-government actors is thought to be weak in a centralized authoritarian regime, it has a greater role to play in Western democracies (Klijn and Koppenjan 2012). A complicated wicked problem warrants differently balanced hybrid solutions. Precisely for this reason, there is a need to discuss the combination of the two dimensions presented.

Owing to its huge and complex political-administrative system, China has in recent years had to balance a centralized structural design with the autonomy of lower levels of government and other institutions, ideally trying to combine centralization and autonomy. In crisis situations, combining internal-external and vertical-horizontal coordination becomes a key challenge for the Chinese government (Liu and Christensen 2021).

Coordination in centralized countries is different from coordination in countries with a pluralist structure. In the former, the central authority has more power and resources and a greater influence on local government. The central government has more crisis coordination capacity

Table 1. Four types of crisis coordination in highly centralized regimes.

	Hierarchical coordination	Horizontal coordination
Intra-sectoral	I. Centralized coordination	II. Functional coordination
Inter-sectoral	IV. Comprehensive coordination	III. Network coordination

*Adapted from Christensen and Laegreid (2008)

within a highly centralized regime but often less coordination with other social actors. What is more, crisis management is highly politicized, and the government relies heavily on top-down high-stake accountability, which is very different from pluralist and decentralized systems (Christensen and Ma 2020). This structure means that the central authority will be able to mobilize more resources to solve wicked problems in the short term, but its exposure to outside (local) information becomes constrained because of the lack of diverse, independent sources of information under a highly centralized regime (Chan and Zhao 2016). Thus, it is assumed that coordination within such a regime plays a more significant role than coordination with outside actors. Within this regime, differentiating between the horizontal and vertical axes allows for cases where incentives for horizontal interdependence are matched with a stimulus for autonomy in vertical relations.

Four types of crisis coordination in a highly centralized regime

This study theorizes four mechanisms used to handle different types of coordination problems during transboundary crises such as the COVID-19 pandemic. We assume that the various coordination mechanisms supported campaign-style implementation during the crisis (see Table 1).

The first is labeled *centralized coordination* and combines hierarchical and intra-sectoral coordination. In the case of a simple crisis in a single functional jurisdiction, vertical-internal coordination denotes professional efforts by the administrative leaders of central departments/agencies to strengthen coordination to support a local response (Ansell and Gash 2007). Under this coordination model, vertical coordinative power is stronger than horizontal coordination, which means that the leading central government ministry—in the case of a pandemic, the National Health Commission (health ministry in China)—will intervene in the crisis response of local government by assigning material, technical, and human resources. Within a limited jurisdiction, tailor-made institutions will solve top-down organizational conflicts within policy systems. This may occur in the initial phase of a crisis when the policy problem is a professional issue or a crisis management task and can be relatively clearly handled within policy functions or localities. However, once a crisis spreads, large-scale sectoral coordination is called for.

The second type is *functional coordination*, combining several functions of a sector in a process of horizontal coordination. In this type, crises are handled by a leading ministry, while agencies involved in the same sector collaborate to provide mutual support as required (Ansell et al. 2010). A leading ministry coordinates the different units within policy departments at the central level, while both large-scale cross-sectoral cooperation and cross-level intervention are relatively weak. This is particularly the case with recurring natural disasters (such as typhoons and floods), which do not transcend the boundaries of administrative levels, ministerial areas, or organizations but simply require that other departments assist the leading ministry in its response.

However, managers in multi-organizational settings often lack authority over other organizations or encounter problems getting their authority accepted, making it difficult to establish such clear top-down linkages (Brattberg 2012). So the challenge is to develop inter-sectoral collaboration on different levels to supplement hierarchical authority.

The third coordination approach on the horizontal dimensions is *network-based coordination*. This may entail establishing executive networks among the various central departments and agencies carrying out crisis management responsibilities (Klijn and Koppenjan 2012). The health

emergency management system at the central level is polycentric with multiple decision-making centers requiring collaborative leadership at the top to facilitate collective action in implementing national policies and plans coherently. National leaders who have a higher rank than ministers need to act as moderators in a network coordination arrangement designed to help solve coordination problems among different sectors, central departments, and local governments. Under national leadership, a number of central departments may simultaneously coordinate with several local governments. At the horizontal level, the scale of network-based coordination is larger than functional coordination. However, coordination at the central level cannot solve locally emerging problems in a timely manner. Thus, locally based coordination with high authority is required.

Finally, *comprehensive coordination* combines inter-sectoral and hierarchical-vertical coordination and aims to resolve a multitude of vertical conflicts between central policy departments and local governments (Kettl 2003, 2004). As power rests with a strong centralized government, local activities are supposedly under the control of the central government. An all-encompassing lead agency may be established which represents the central authority in the place where the crisis is occurring. Usually, a high-profile leader from the central government will lead the ad hoc command headquarters to coordinate and mobilize resources in the short term. In this comprehensive coordination approach, a central body with legitimacy and response capacity can effectively use 'command and control' as a steering technique and convene platforms for local governments to initiate collaboration and coordinate and bridge communication. Vertical coordination may be carried out by local officials cultivating working relationships with their state counterparts (Brattberg 2012).

This study assumes that the evolving process of combining four approaches to crisis management may be a temporary arrangement to cope with transboundary and mega crises (such as the COVID-19 pandemic) and will be determined by the characteristics of the crisis, but also by structural and cultural preconditions (Lodge and Wegrich 2014).

The Chinese context

Since the early 1980s, China has developed from a highly centralized authoritarian regime into a more hybrid political system with authoritarian features. The centralized structure established by the leadership of the Communist Party of China (CPC) is based on a common administrative system and shapes the unique system of dual party-state leadership/authority and therefore also the crisis response.

The National Health Commission (NHC) is the lead agency in managing public health crises (Liu and Christensen 2021). All crises are classified into four grades of severity: very severe (I), severe (II), serious (III), and common (IV). Local governments are initially responsible for emergencies in their jurisdictions, while the relevant central functions will become involved in the crisis response process and provide guidance in the professional domain. When a crisis escalates from a local incident into a national disaster and exceeds the capacity of one central department or local government, the central government will intervene in multiple ways. In general, crises are coordinated among sectors, agencies, and localities, as stipulated by disaster-specific response plans based on function and geographical location (Kettl 2003).

Thus, the crisis decision-making process is highly centralized (Heilmann 2016, 42). The central-level authority often launches a kind of campaign to reach a consensus on policy targets and create temporary coordinative structures to supervise policy implementation (Sun and Guo 2017). National-style coercive implementation penetrates every corner of crisis management and is usually used to handle wicked issues with vague administrative boundaries (Heilmann 2016). The centralization of power seeks to mitigate the political and administrative fragmentation and decentralization that are a feature of the day-to-day workings of the bureaucracy so that all kinds of resources needed to respond to an urgent crisis can be deployed quickly (Hu et al. 2020; Yang

2020). Generally, in the process of crisis response, a centralized hierarchy within the governing system supports the strong administrative mobilization capacity for policy implementation across policy sectors, but the coordinative instruments and their effects are varied.

Research methods and data collection

The unprecedented COVID-19 pandemic was selected as the core case for this study. COVID-19 hit the Chinese city of Wuhan in late December 2019 and early January 2020. After about two weeks of continuous investigation, the Chinese government shifted gears and on January 20, 2020, initiated a nationwide mobilization to contain the virus, allowing China quickly to control its spread and prevent large-scale outbreaks in other major urban centers. By early March 2020, community transmission had become fully traceable in the vast majority of regions in China. China's fight against the COVID-19 pandemic, characterized by a 'total mobilization' of state and community resources and personnel (Shih 2021), saw a full display of crisis coordination mechanisms.

In terms of data collection, this study mainly relies on first-hand information from participant observation. One of the authors has participated in the process of crisis response in the policy expertise body National Health Committee (NHC) of China since the very beginning of the crisis. Adding to this, 10 central actors were interviewed (see [Appendices 1 and 2](#)). Secondhand information, particularly the official documents released by the Chinese government (such as the White Paper 'Fighting COVID-19: China in Action' issued by the State Council Information Office in June 2020) and the scientific reports released by the World Health Organization (WHO) and the Chinese scientific community (such as the Report of the WHO-China Joint Mission on COVID-19 and the Joint WHO-China Study Report on COVID-19 Origin Tracing, released in February 2020 and February 2021 respectively), were also collected and analyzed.

Four coordination mechanisms of crisis management used during the COVID-19 process in China

Centralized coordination within the sector: the working group within the National Health Commission

The first cases of COVID-19, which was initially called "pneumonia with unknown etiology", were officially reported in Wuhan in China's Hubei Province in late December 2019 (Lu, Stratton, and Tang 2020). Until January 20, 2020, the viral pneumonia outbreak was defined as "a local health issue", meaning that the prevention and control of the epidemic was mainly managed by the local authority with professional guidance from the central health department. Subsequently, a program of epidemic prevention and control, which included closing the Huanan Seafood Market (the site of the first major cluster) and conducting etiological and epidemiological investigations, was launched by the local government.

While the local authority was busy performing its duties, the National Health Commission (NHC), the national-level authority for managing health crises in China, began to get involved. On December 31, 2019, after being informed of the outbreak, the NHC sent a working group for epidemic response, which was composed of national-level health officials as well as leading specialists on infectious diseases from all over China, to Wuhan to guide the city's response and conduct on-site investigations. After reviewing clinical data on forty-one patients who had been admitted to Wuhan hospitals with pneumonia-like symptoms before January 2, 2020, the group agreed on a set of protocols and criteria to identify a much larger sample of potential cases so that a larger set of clinical data could be reviewed (Li et al. 2020).

To provide better guidance to local governments, a second working group, consisting of the most prominent virologists, infectious disease scientists and first-line doctors in China, was sent to Wuhan on January 8. Ten days later, a third working group, with Zhong Nanshan (a medical scientist who had gained an extraordinary reputation during the SARS crisis in 2003) as the chief expert, arrived in Wuhan to investigate the outbreak and confirmed that the new coronavirus could be transmitted between humans.

Typically, the temporary ad hoc working group formed to provide vertical guidance and assistance to local governments was a centralized coordination mechanism. Under this mechanism, the working groups acted as a helping hand to local governments and covered two functions for the NHC: they provided technical support to the local health bureau and they supervised local governments to ensure that they took appropriate, scientifically based infection control measures. For example, on January 14, the NHC held a national teleconference, warning that there was great uncertainty about the new disease and that more research was needed to understand its mode of transmission and the risk of human-to-human transmissibility.

The working group within the NHC proved to be an efficient coordination mechanism for actors in the health sector. Scientific research on COVID-19 was much more advanced than it had been during the SARS crisis of 2003. This provided a strong basis for winning the battle against the epidemic. On January 7, the China CDC succeeded in isolating the first novel coronavirus strain; the next day, an expert evaluation team designated by the NHC initially identified a new coronavirus as the cause of the disease; on January 15, the NHC unveiled the first version of the *Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia and Protocol on Prevention and Control of Novel Coronavirus Pneumonia*. On January 20, after three weeks of continuous investigation of the outbreak, the third working group confirmed that the disease could be spread between humans after finding two cases in southern Guangdong province among people who had not been to Wuhan (Ji et al. 2020).

Functional coordination within the health system: the leading group of the National Health Commission

In order to enhance coordination between the central and local authorities, cooperation within the health system at the national level was becoming urgent. The national health system in China is divided into four separate sections, administered by the central government, the local government, the army, and the armed police respectively. These do not have jurisdiction over each other and are reluctant to share and release information to each other. The scientific community also plays an important role in virus detection and isolation, clinical diagnosis, laboratory testing, and vaccine development. As the SARS crisis in 2003 demonstrated, the segmented structure of China's health system hampered the effective gathering and sharing of information and efficient action, enabling the epidemic to spread between the civilian sector and the military sector and ultimately across the country (Thornton 2009; Kania and McCaslin 2020, 22–24).

After learning the lessons of the SARS crisis, the NHC was defined as the hub of the national health system, and it was decided to establish a task force involving top officials from both the military and civilian sectors at the national level during outbreaks of severe infectious diseases. This happened in the cases of A(H1N1) flu in 2009 and Ebola in 2014. In 2011, a coordination mechanism was jointly formulated by the NHC called the Health Bureau of the General Logistics Department of the Central Military Commission and the Headquarters of the Armed Police Force, which proved to be effective in reducing the fragmentation of routine bureaucratic operations in the health sector.

As the 'pneumonia with unknown etiology' became more serious, in addition to sending working groups to the local authority, the NHC also started to establish a task force within the

national health system to combat the disease. Its aim was to strengthen horizontal communication and mobilize health resources administered by different bureaus and units.

On January 1, 2020, a leading group was set up within the national health system to oversee the disease response, with the NHC's director Ma Xiaowei as its chief. The responsibility of the leading group was to '[discuss] and analyze the development of and changes in the epidemic, to study and deploy prevention and control strategies and measures, and to provide timely guidance and support to Hubei Province and Wuhan City to carry out case treatment, epidemic prevention and control, and emergency disposal' (Health Emergency Office of the National Health Commission of China 2020). To ensure that all the system's resources would be mobilized, members of the leading group included officials and experts from different bureaus within the national health system, such as the military sector and the scientific research sector, both of which had gained a wealth of experience in whole-genome sequencing and virus isolation.

The leading group was a sectoral coordination mechanism at the central level and focused on sectoral coordination and cooperation between bureaus within the national health system. While the epidemic was defined mainly as a health issue, this proved to be effective in reducing horizontal conflicts between administrative domains, and the NHC was transformed from a disadvantaged bureaucratic department to a professional organization tasked with allocating resources effectively (Mei 2020). After its establishment, the leading group held inter-departmental meetings every day, and eventually formed a higher-level coordination mechanism—the Joint Prevention and Control Mechanism of the State Council on January 20.

Network-based coordination between sectors: The Joint Prevention and Control Mechanism of the State Council

January 20, 2020, was a turning point for the Chinese response to COVID-19, because it was then that experts concluded that the new coronavirus was spreading between humans. By then, fourteen doctors and nurses had been infected in Wuhan, and the virus had spread from Wuhan to other parts of the country. As the situation became more pressing, the Chinese leadership began to manifest a systematic response to COVID-19: the prevention and control of the virus was defined as 'an all-out war' and 'the top priority of government at all levels'. Extreme measures, such as suspending all public transport within the city, were rapidly implemented by the Chinese government that same day. The pneumonia was classified as a statutory Class B infectious disease, but the preventive and control measures applied were those for a Class A infectious disease, which included border controls and quarantine. Three days later, all inbound and outbound traffic from Wuhan was stopped, marking '[the] beginning of an all-out battle to protect Wuhan and Hubei from the epidemic' (State Council Information Office 2020).

As the fight against COVID-19 escalated from 'a medical and health issue' to 'a comprehensive task' and then to 'an all-out war' (People's Daily 2020, February 4), the limitations of the leading group mechanism in coordinating sectors and agencies outside the health system at the same administrative level became plain. The establishment of an inter-sectoral coordination mechanism at the national level, which could mobilize resources from various functional sectors and departments, therefore became an urgent task. On January 21, as the country faced a potentially large-scale outbreak of the disease with the approaching Spring Festival break (January 24 to 31)—during which the population was traditionally extremely mobile—the joint mechanism within the national health system was upgraded to the Joint Prevention and Control Mechanism (JPCM) of the State Council, China's cabinet. This involved multiple sectors in dealing with the COVID-19 pandemic. Four days later, the Central Leading Group for COVID-19 Prevention and Control, headed by Premier Li Keqiang and working under the leadership of the Central Politburo Standing Committee of the CPC, was established. Since then, the JPCM has acted as a comprehensive executive agency for the central leading group.

Table 2. The organizational structure of the Joint Prevention and Control Mechanism (JPCM) of the State Council.

Section	Leading ministry	Number of member ministries
S1: Coordination	National Health Commission	9
S2: Epidemic prevention and control	National Health Commission	6
S3: Medical treatment	National Health Commission	5
S4: Research	Ministry of Science and Technology	9
S5: Public communication	Publicity Department of the CPC	5
S6: Foreign affairs	Ministry of Foreign Affairs	9
S7: Medical material support	Ministry of Industry and Information Technology	15
S8: Life maintenance supplies	National Development and Reform Commission	15
S9: Social stability	Ministry of Public Security	7

Having originated during China's fight against the A(H1N1) flu in 2009 and now acting as the headquarters for the epidemic response, the JPCM of the State Council had become an institutional arrangement in pandemic preparedness and response in China (Xue and Zeng 2019). It has been officially reported that the reason for setting up the mechanism to deal with the COVID-19 pandemic was to '[form] an effective joint force for epidemic prevention and control' (State Council Information Office 2020). A total of thirty-two ministerial-level departments, as well as the military sector, cooperate under the JPCM, and nine internal sections were set up to coordinate the different types of response (Table 2). Each working group was headed by a leading official of a relevant ministry, and ministerial participation was related to the function of the group.

Driven by strong political leadership, the JPCM was designed to overcome the boundaries between the different administrative sectors and agencies and became the coordination center for the COVID-19 response at the national level. On January 24, 2020, through the JPCM's coordinating, a total of 346 medical teams composed of 42,600 medical workers and 965 public health workers from other provinces and the military were reported as having been dispatched to Hubei Province. 40,000 construction workers and several thousand sets of machinery and equipment were mobilized to build the 1,000-bed Huoshenshan Hospital and the 1,600-bed Leishenshan Hospital, which were completed in just ten days and twelve days, respectively. On February 7, as the epidemic evolved, the joint mechanism announced a cross-provincial collaboration program of 'one province for one city', involving sixteen provinces, each of which helped one Hubei city with medical personnel and equipment (Hu et al. 2020). Official reports stated that, from January 27 to March 19, 2020, 928,800 tons of epidemic prevention and control materials and daily necessities were transported across the country to Hubei via railways, highways, waterways, civil aviation, and express postal services (State Council Information Office 2020).

Comprehensive coordination among sectors and agencies: the Central steering group for Hubei province

As the number of symptomatic patients exploded from January 20, 2020, onwards, the epidemic quickly overwhelmed both testing and treatment capacity in Wuhan and Hubei, requiring swift mobilization of resources to fill these gaps. The situation thus escalated from a local incident to a national crisis, and the health issue became a political issue that went beyond a normal crisis response. Therefore, it was necessary to establish a comprehensive vertical coordination mechanism among sectors and agencies, both to aid local governments in controlling the epidemic and to ensure that they implemented policies in a timely and appropriate manner.

On January 25, 2020, New Year's Day in China's lunar year, a Politburo Standing Committee meeting chaired by President Xi Jinping announced the formation of a Central Steering Group, a plenipotentiary body headed by Vice Premier Sun Chunlan, which was sent to Hubei '[to] oversee epidemic control on the ground' (Xinhua 2020a, January 25). The Central Steering Group worked

Table 3. The hybrid dynamics of coordination mechanisms in the fight against COVID-19 in China.

	Hierarchical coordination	Horizontal coordination
Intra-sectoral	I Centralized Working Group of the NHC December 31, 2019	II Functional Leading Group of the NHC January 1, 2020
Inter-sectoral	IV Comprehensive Central Steering Group to Hubei January 25, 2020	III Network-based Joint Prevention and Control Mechanism of the State Council January 21, 2020

in Hubei for three months and returned to Beijing on April 27th, when the last hospitalized COVID-19 patient in Wuhan was discharged, at which point the COVID-19 situation in Hubei and Wuhan was scaled down from ‘acute’ to ‘routine’. As a follow-up to the Central Steering Group, an inter-departmental liaison group under the Joint Prevention and Control Mechanism of the State Council was dispatched to Wuhan on May 4 for the next phase of epidemic prevention and control (Xinhua 2020d, May 4).

Comprising eleven ministerial-level officials from the State Council Office and relevant central ministries and agencies, the Central Steering Group consisted of four internal sections: a) supervision, b) medical treatment, c) material support, and d) expertise (Xinhua 2020c, February 21). Acting as a go-between for the central and local governments, the Central Steering Group for Hubei functioned both as an enabling mechanism to provide scientific guidance and medical supplies for Hubei and Wuhan, and as a pressure mechanism to strengthen overall supervision of the prevention and control of the disease at the front line. It was officially reported that the Central Steering Group had conducted thirty-five special studies on medical treatment, made twenty-three on-site visits to designated hospitals and shelter hospitals, and put forward the general idea of moving forward in coordinating severe and mild diseases and promoting scientific and targeted treatment (State Council Information Office 2020). Meanwhile, the Central Steering Group undertook the responsibility of ‘war supervision’ of the field work in Wuhan, holding to account local officials who failed to act. For example, on February 10, the Central Steering Group for Hubei held talks with officials including the Deputy Mayor of Wuhan at which it questioned the delay in sending critically ill patients to the designated hospital, demanding that they apologize to the patients individually (Xinhua 2020b, February 11).

Discussion and conclusion

The main objective of this article was to understand how complex crisis coordination in a centralized regime may occur. The case study of China’s fight against the COVID-19 pandemic uses a framework from structural organization theory to describe a highly centralized regime’s coordination effort in terms of vertical-horizontal and internal-external dimensions (Christensen and Laegreid 2008; Egeberg and Trondal 2018; Verhoest et al. 2010). Coordination mechanisms and government capacity are established solutions to fragmentation and workload explosion in public emergencies. Generally, mandate-driven coordination capacity in a centralized regime is strong (Mao 2021). The Chinese leadership used a coordination strategy characterized by a complex, hybrid, and layered pattern of the four coordination types outlined—centralized, functional, network-based, and comprehensive (cf. Streeck and Thelen 2005). The main feature was first to use coordinative central groups to focus more narrowly on the immediate emergency; then to broaden the policies, actors, and sectors involved internally in the health sector and across sectors; and finally, to introduce comprehensive, hierarchical cross-sectoral authority to help stop the pandemic where it had started. This is summed up in Table 3.

A highly effective centralized coordination response to the COVID-19 pandemic

Even though the current study is not primarily an effect study, and we do not have data on the internal workings of the different coordinative groups, we can only reflect on whether the complex coordination system rolled out was effective or not. It was definitely effective in stopping the pandemic at an early stage, but how effective was it in aligning government levels and sectors at the same level?

The four coordination mechanisms or types were adopted successively or in some cases simultaneously at the central level, which seems to have enabled China to mobilize various resources across the country and achieve its final aim of stopping the epidemic (Mei 2020). The evolving process of coordination mechanisms indicates that more overt and integrative coordination strategies to align, organize, and differentiate participating organizations' activities between beneficiaries, tasks, regions, and tactics is put in place. These ad hoc crisis coordination mechanisms worked at different levels of government within the formal hierarchical structure, and they complemented one another in terms of function (Hu et al. 2020). Within the central healthcare sectors, the type I working group operates at the executive level, while the type II leading group plays a strategic role at the macro-level. In terms of the coordination direction, the type II leading group and the type III joint mechanism resolve conflicts among central sectors, while the type I working group and type IV steering group coordinate the relationship between the central and local levels. There is also a parallel development, in both hierarchical and horizontal coordination, from intra-sectoral to inter-sectoral coordination. The 'glue' of the top-down coordinative efforts was political saliency and the involvement of top leaders (Mao 2021; Mei 2020). Due to the challenges of using formal command-and-control coordination mechanisms in crises (Ansell et al. 2010), the four informal coordination mechanisms as temporal arrangements were used to address critical task quickly.

The common denominator behind the different types of coordination was the establishment of collegial coordinative groups, with the generic name of 'leading groups', with different purposes and composition. This is an organizational instrument used over a long period of time to tackle urgent political matters (Kim 2003; Tsai and Zhou 2019). Converging toward an all-encompassing dominant 'lead agency model', all relevant coordination activities were transferred to tailor-made institutions as the crisis spread (Christensen et al. 2016). This pattern of vertical coordination can solve inflexible problems in the classical hierarchical model that excels in the performance of routines and repetitive tasks within specific sectors (Wise 2006). Contrary to the voluntary horizontal coordination based on a mutual need and trust in the bottom-up mode (Morris et al. 2007, 95), coercion in the horizontal coordination is salient in this case.

The success of coordinating measures, or indeed whether they are implemented at all, largely depends on the urgency of the matter at hand and on the resources provided by those who wish to implement new measures; it is hence dependent on various kinds of governance capacity (Lodge and Wegrich 2014). Coordinative capacity seems to have interacted in a positive way with other types of capacity—analytical capacity through the early involvement of experts, regulatory capacity through the use of some established crisis laws and institutions, and delivery capacity through the facilitation of services for people, even in Hubei and Wuhan.

In terms of an institutional approach, the choice of new coordination arrangements, in the form of improvisation and temporary collegial organizations, supplements existing formal organizations, which is only possible using versions of established coordinative mechanisms (Czarniawska 2009). Organizing for emergency preparedness and crisis management is, therefore, also to a great extent path-dependent (Krasner 1988; Selznick and Carlston 1957). In this case the development of these structures followed what Streeck and Thelen (2005) call 'institutional layering', a result of a process where new institutional elements are added to existing ones over time. The evolution of four types of crisis coordination reveals that traditional types of coordination will be combined with more context- or temporal-based coordination forms determined by the

type of crisis, and the balance and scale of their resource provision will change over time (Mao 2021; Yan et al. 2020).

Top-down hybrid coordination in centralized and decentralized regimes

Stronger coordination and working relationships need to be fostered in today's multilevel, supra-national governance systems, as crises are becoming more and more transboundary—legally, geographically and functionally (Boin and Lodge 2016). How does the Chinese coordinative crisis management system—as seen in how it dealt with the Covid-19 pandemic—measure up to other types of systems, especially decentralized ones? Around the world, crisis response systems are usually designed to be bottom-up responses that begin at the local level (Schneider 1995). During the pandemic, when virus cases surged beyond the capacity of local governments, central governments stepped in to assist with resources and oversight as needed. In the case of China, the country's centralized structure shapes the various types of crisis coordination and thus is different from pluralist countries in how coordination modes for coercive policy implementation are initiated, operate, and function (Hu et al. 2020). These types of coordination drive rapid top-down resource mobilization and help crisis managers overcome internal fragmentation within the regime by facilitating information flow and exchange, resource supply, collaboration, common decision-making, and implementation (Jing 2021).

As we have seen, the Chinese central government gradually superseded or replaced local governments with different coordination mechanisms in its response to the epidemic. In a decentralized regime, by contrast, the function of higher levels of government is to assist in the coordination of services and to support the local response, after receiving assistance request from lower level of government (Kapucu and Moynihan 2021). In the United States and Germany, for example, governors issue requests for federal assistance during a response only after local resources have been exhausted. In a centralized regime, the involvement of the central government implies generally a proactive and even command-and-control approach.

In terms of resource mobilization and allocation, the coordination capacity of the central government in a centralized regime is stronger than the central government in a decentralized regime during a crisis (Shih 2021). The central government is typically given broad powers during emergencies, allowing it to mobilize national resources effectively. In contrast to China, a decentralized regime such as the United States federalist system, concentrates only a limited degree of power in the federal government and empowers each state to operate its own public healthcare infrastructure (Kettl 2020). State governments are independent decision-making centers with high levels of autonomy, including in deciding how to mobilize and allocate state resources to respond to COVID-19 and work with other state governments in disaster response (Hu et al. 2020; McDonald, Goodman, and Hatch 2020). Contrary to the relatively independent and tension-filled relationship between federal and local government in United States, including during crises (Sadiq, Kapucu, and Hu 2020; Kettl 2020), the central authority in China is always dominant, especially when a crisis is likely to threaten the regime's stability.

Thus, in the face of a mega-crisis, a centralized coordination effort at the national level is deemed desirable, rather than fragmented local, city, or regional efforts (Kim, Oh, and Wang 2020). The crisis coordination mechanism in centralized regimes provides inspiration for decentralized ones. As crises escalate, local and state governments require greater guidance and support from the central/federal government. Agencies with response capacity and legitimacy need to convene platforms for central/federal departments and local/state governments to initiate collaboration, coordinate purchasing orders, and bridge communication.

Finally, with respect to vertical and inter-sectoral coordination, the main challenge is to match place-based problems with functionally organized services, to balance the internal security mission with other existing missions that remain important, and to meet citizens' expectations in a

fragmented system, meaning combining governance capacity and legitimacy (Christensen et al. 2016). These challenges demand a new, more flexible system of contingent coordination that matches the government's capacity to handle new and unpredictable crises and situations with a high impact but low probability (Kettl 2003). As seen in China's response to the COVID-19 pandemic, crisis coordination took place simultaneously on the vertical and horizontal dimensions from the very beginning, highlighting the central concentration of power in a highly centralized regime, which is different from that in pluralist countries (Boin et al. 2019).

However, China's success in stopping or slowing COVID-19 within its borders, that was supported with the help of four coordination mechanisms in the centralized regime, does not prove that centralization regimes are generally the best coordinated. For example, Canada's decentralized federal structure governments quickly formulated and implemented a pandemic policy response with a different set of measures in the government and among the public (Fafard et al. 2021).

Our study shows that there is an ad hoc mixture of coordinative measures used, but studies of the handling of COVID-19 in China also show that the overall centralized structure of the system is in fact influencing heavily the modus operandi mixture (Hu et al. 2020; Jing 2021; Mei 2020). This means that any crisis is a combination of relatively stable frames and different mixtures of measures that varies among crises (Shih 2021; Yan et al. 2020; Yang 2020). In this way the study elaborates on classical themes in public management theory that also are mentioned often in crisis management studies (Ansell and Gash 2007; Boin et al. 2019; Comfort and Kapucu 2006).

In a wider comparative perspective, political institutions clearly shaped the politics of pandemic response and the way choices were made, but outcomes will vary (Boin et al. 2020; Greer et al. 2021). Thus, to explore shared patterns of regulations and behavior across regime types is a potential productive research direction. Moving forward, further research should address the context and diversity of centralized and decentralized regimes, both in democratic and authoritarian states.

A case for more inclusive collaboration in a centralized regime

While complex horizontal-vertical and intra-inter institutional arrangements were constructed to achieve transboundary cooperation in a centralized regime, a review of China's strategy for combatting the COVID-19 pandemic reveals some vulnerabilities that need to be attended to.

First, local autonomy was sometimes constrained by strong centralized command, which may have delayed the local response at the early stage when the epidemic was not yet serious. When a disaster happens, local officials will always arrive at the scene earlier than central officials and bear the main responsibility for disaster response in the initial stage. Top-down coordination challenges the formal lines of central hierarchical authority, but a strongly centralized style of crisis management may weaken and confuse the authority of local government (Yang 2020).

Second, beyond formal institutional arrangements such as the National Public Health Emergency Command Headquarters, established in accordance with *the Law on the Prevention and Control of Infectious Diseases* and *National Contingency Plan*, all four coordination mechanisms were temporary and task-oriented, which will undoubtedly increase the costs of coordination among their members, hinder institutional memory and make it more difficult to learn from the crisis. Considering the huge cost of national mobilization, the informal institutional structure of crisis coordination is more adept at mega-crisis response than at dealing with routine circumstances (Shih 2021).

Finally, the 'bottom-up' approach, which is thought to be a more effective way of responding to wicked problems (Wise 2006), does not play a core role in a centralized regime such as China. Coordination is more mandated, and formal collaboration has more of a voluntary aspect (Kapucu and Moynihan 2021). Collaboration competency is critical for effective crisis leadership,

especially for large and novel crises in an intergovernmental system and shared governance model (Blondin and Boin 2020). Although horizontal and network coordination are becoming more prevalent than before, even in China (Liu and Christensen 2021), more inclusive coordination beyond the ruling regime needs to be built to streamline a wide range of organizations from the nonprofit and private sectors.

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Appendix 1

The list of interviewees

No	Affiliation	Core theme
1	Vice Director-General of the National Health Commission (NHC) of China	The organizational structure of China's fight against COVID-19
2	Epidemiologist of the China CDC	Experts' role in the prevention and control of COVID-19 in China
3	Vice Director-General of the Wuhan City Government	The responsibility division between the Central Steering Group and local government
4	Division Chief of the central steering group	The operational mechanism of the Central Steering Group
5	Division Chief of the Hubei Provincial Government	The organizational structure of Hubei's fight against COVID-19
6	Division Chief of the National Health Commission (NHC) of China	The operational mechanism of the Joint Prevention and Control Mechanism of the State Council
7	Division Chief of Beijing Health Commission (NHC)	The operational procedure of the paired assistance mechanism to Hubei Province
8	Member of the Advisory Group of the National Health Commission (NHC) of China	Experts' role in the prevention and control of COVID-19 in China
9	Division Chief of the National Health Commission (NHC) of China	The adjustment of China's response level in dealing with COVID-19
10	Member of the Working Group of the National Health Commission (NHC) of China for the epidemic response for Wuhan	The operational mechanism of the Working Group of the National Health Commission (NHC) of China for Wuhan

Appendix 2

Interview questions:

1. Did you participate in the national response to the Covid-19 epidemic?
2. Which organization and when invited you to go to Wuhan on-site?
3. What kind of role did you play in the process?
4. Do you know other colleagues in your group?
5. Which organization and who led you and your colleagues on-site?
6. Can you briefly introduce the work procedure when you are on-site?
7. Which aim is your work on-site? Generally, how do you appraise your and your colleague's work?
8. Do you think is there any limitations or further improvements to your work?
9. Do you mind we publish this paper based this original material? If it is, which section do you don't want to share with others?