

A BOUNDED AND INCREMENTAL DESIGN APPROACH TO PUBLIC ADMINISTRATION: 30 YEARS AFTER SHANGRAW AND CROW'S REVOLUTIONARY APPROACH*

Lihua YANG

Lihua YANG

Professor, School of Government, Institute of State
Governance Studies, and Institute of Public Governance,
Peking University, Beijing, China
Tel.: 086-159-1095.0699
E-mail: lihua.yang@pku.edu.cn

Abstract

Design is a living phenomenon of public administration, but it has not been thoroughly studied by students of public administration (PA). Based on the pioneering work by Simon in 1969, Shangraw and Crow set forth an approach to intellectual activity about public administration that they presented as a design science approach in 1989. This article explores the reasons for the faltering development of this revolutionary approach, proposes a new bounded and incremental design approach to public administration, and analyses the approach's basic characteristics and six relevant ideas as well as the main research content and courses of public administration and some recommendations for PA practitioners under this new approach.

Keywords: design, design science, public administration, bounded design, incremental design.

* **Acknowledgements.** This study was supported by the National Natural Science Foundation of China (72174006) and the Key Projects of the National Social Science Fund of China (18VZL001 and 14ZDB143). I would also like to thank Professor Qi Ma for her valuable comments on and suggestions for this study. In addition, I thank Teng Zhang, Zhigang Li, and Duofeng Chang for their excellent research assistance.



1. Introduction

Although a desire to ‘scientise’ design can be traced back to ideas in the early twentieth century modern movement of design (Cross, 2001, p. 49) and the term ‘design science (DS)’ is perhaps first used by Fuller (1950, 1963) and adapted by Gregory (1966), there is ‘a good consensus’ (Baskerville, 2008, p. 441) that Simon is the pioneer of sciences of the artificial and DS because of his definition of artificial science and his groundbreaking research ‘The Sciences of the Artificial’ (Simon, 1996), in which Simon calls for the development of ‘a science of design’ and defines the science of design as a body of intellectually tough, analytic, partly formalizable, partly empirical, teachable doctrine about the design process. Although Cross (2001, p. 53) argues that a science of design is not same as a DS, he also notes that ‘a ‘science of design’ seems to imply (or, for some people, has the goal of) the development of a ‘design science’ and defines DS as ‘an explicitly organized, rational, and wholly systematic approach to design’. Furthermore, DS ‘ranges across many academic disciplines’, ‘is not a separate academic discipline’ (Baskerville, 2008, p. 442), and can be found in various fields, such as computer science and information systems (e.g., Hevner *et al.*, 2004), organization and management studies (van Aken and Romme, 2009), and education (Kelly, 2003). Thus, Iivari (2007) argues that DS seems to be more of a research paradigm than a research methodology.

Diverse approaches have enriched the study of public administration. Raadschelders (2008) identifies four main intellectual PA traditions: practical wisdom, practical experience, scientific knowledge, and relativist perspectives. He notes that the DS approach of PA that was first advocated by Simon (1996) and articulated by Shangraw and Crow (1989) approximately 30 years ago is an important feature of American PA. Miller (1984, pp. 251–268) also argues that a DS approach would be more ‘useful’ to public management than a natural science approach. Thus, the approach discussed by Shangraw and Crow (1989) has been considered ‘great headway in public administration’ (Overman, 1989, p. 159) and a method that ‘may impart some academic cachet’ (Frederickson, 2000, p. 48). Raadschelders (2008, p. 934) claims, ‘Like the case study approach, the design science approach (...) appears to continue to hold the attention of scholars in public administration’, although he also notes many doubts and critiques about this approach. That is, PA is also one possible problem arena of many possible arenas of DS.

Although Simon’s ideas have had a strong influence on DS research by many PA scholars, such as Miller (1984), Bobrow and Dryzek (1987), Daneke (1990), and Ostrom (1990), it is Shangraw and Crow (1989) who first proclaimed the DS approach of PA. Their recent study states the potential of public administration as a design science (Crow and Shangraw, 2016). Furthermore, the DS approach as a new perspective and new theory is clearly included in the history of the academic development of PA (Shangraw and Crow, 1989). Thus, studying the influence of the work by Shangraw and Crow (1989) and the subsequent development of the DS approach provides a good foundation to improve the development of this approach.

The main objective of this study is to examine academic echoes of ‘the revolutionary approach of PA as a DS proposed by Shangraw and Crow (1989)’ (abbreviated as SCA),

analyze the reasons for the faltering development of SCA, and develop a new design approach of PA. The structure of the rest of the paper is organized as follows. Section 2 summarizes SCA and its fundamental characteristics. Section 3 examines academic echoes of SCA based on a systematic literature review and analyzes the reasons for the faltering development of this approach. Section 4 proposes a new bounded and incremental design approach (BIA) as a new development of the DS approach of PA and analyzes its basic characteristics, and six relevant ideas. This is an attempt to reconcile the relationship between PA as a DS and the alternative political theory (Overman, 1989, p. 160) as a middle way to respond to doubts about this approach, to improve its situation and its many ‘implications and problems’ (Overman, 1989, p. 150), and to discuss its possible development. Section 5 explores the main research content and courses of PA and some policy recommendations for PA practitioners under BIA. Finally, section 6 concludes.

2. Shangraw and Crow’s Revolutionary Approach (SCA)

In the 1989 Minnowbrook forum, Shangraw and Crow examined Simon’s notion of a ‘design’ science and discussed its applicability to the field of PA. In this way, they provided a third approach — PA as a DS — to compete with a middle-range theory approach and a phenomenological and interpretive technique approach. In their original research, they discussed several important aspects of this approach (see Table 1), however, they did not emphasize the bounded rationality of designers, limitations and possible negative results of this DS approach. Therefore, we can consider this original design approach of PA a revolutionary approach (relatively speaking).

This revolutionary approach suggests that (1) public administrators can design all the systems, institutions, and instruments they want; (2) the role of PA is only or at least mainly to ‘design and evaluate institutions, mechanisms, and process’ (Shangraw and Crow, 1989, p. 156); (3) the process of considering design alternatives follows a formative path of goal setting, debate over predesign, and, finally, design improvement or redesign; (4) designers and designs can obtain almost all of the knowledge they need, although they are ‘a function of a learning process where cumulative knowledge is essential’ (Shangraw and Crow, 1989, p. 156); (5) if the academic community can accept the role of designer and evaluator, PA as a DS in academia and practice can be realized; (6) PA design scientists can know all 18 kinds of knowledge and only these 18 kinds of knowledge; and (7) there are some clear standards for the evaluation of designs, and they can be accurately and effectively measured. In summary, the original SCA is a relatively ideal and revolutionary framework.

3. Academic echoes and reasons for the flattering development of SCA

On December 29, 2016 (rechecked on January 8, 2017), I used Google Scholar and Web of Science to find 45 pieces that have cited the study by Shangraw and Crow (1989). After excluding four Spanish studies, four Chinese studies, and one English study that

Table 1: Shangraw and Crow's revolutionary approach of PA as a DS

1. Proposals on the nature of PA	2. Historical roots	3. What characterizes a DS	4. Research methods	5. Framework for categorizing Public Administration research	6. Answers to six relevant questions
<p>PA as a DS (Shangraw and Crow, 1989) is a third proposal, different from a middle-range theory approach with a focus on empirical, positivist methods (Perry, 1987) and a phenomenology and interpretive technique approach (White, 1987).</p>	<p>Hamilton (2009) and Federalist 1; Wilson (1887); White (1926); Waldo (1948).</p>	<p>The inner and outer environments of PA</p>	<p>The integration of descriptive and prescriptive research</p>	<p>DS scholarship in PA occurs at the system, the institutional, and the instrumental levels.</p>	<p>(1) The role of PA is to 'design and evaluate institutions, mechanisms, and process that concert collective will and public resources into social profit' (Shangraw and Crow, 1989, p. 156). (2) The process of considering design alternatives 'apparently follow the path of goal setting, debate over pre-design, definition of design parameters, developments of design alternatives, evaluation of design alternatives, design selection, design evaluation, and design improvement or redesign' (Shangraw and Crow, 1989, p. 156). (3) 'All designs, except the most revolutionary, are a function of a learning process where cumulative knowledge is essential' (Shangraw and Crow, 1989, p. 156). (4) 'The field has not accepted its role of designer and evaluator out of fear that it will not be accepted in the academic community' (Shangraw and Crow, 1989, p. 157). (5) PA design scientists should know 18 kinds of knowledge (Shangraw and Crow, 1989, p. 157). (6) Standards of evaluation of design are those 'that meet public demand for policy output in an effective and efficient manner' and 'those systems, institutions, or instruments that address environmental demand in ways that permit the life of the individual citizen to be improved' (Shangraw and Crow, 1989, p. 157).</p>

Source: Author's own contribution

were not officially published as well as reprinted articles such as Overman (1989) and Daneke (1990), 35 English studies were obtained. Most of these studies were journal articles (Table 2). Citations emphasizing design or DS appeared almost five times more than those that emphasized only science. Furthermore, among the 14 citations with comments, eight were positive, three were negative, one was both positive and negative, and only one (Walker, 2011) included a new development of the work. Furthermore, there are some researchers who accept the ideas of PA as a DS but do not cite the 1989 work (e.g., Barzelay and Thompson, 2010). These indicate that after approximately 30 years, although the academic study of PA has realized the approach of PA as a DS, the academic community of PA has not fully accepted its role in PA design as well as the approach of PA as a DS. The citation distribution from 1989 to 2017 also indicates that although academic attention to this approach continues after 1989, it has been maintained at a relatively stable and low level (Figure 1).

Table 2: The statistics of the studies citing Shangraw and Crow (1989)

	Types					Evaluation and Comments					
	Book	Journal articles	Book chapter	Conference proceedings	Dissertation	General citation (stressing science)	General citation (stressing design or DS)	Positive comments	Negative comments	Both positive and negative	Development and supplement
Numbers	8	23	2	1	1	4	20	8	3	1	1
Total	35					24		14			

Source: Author’s own contribution

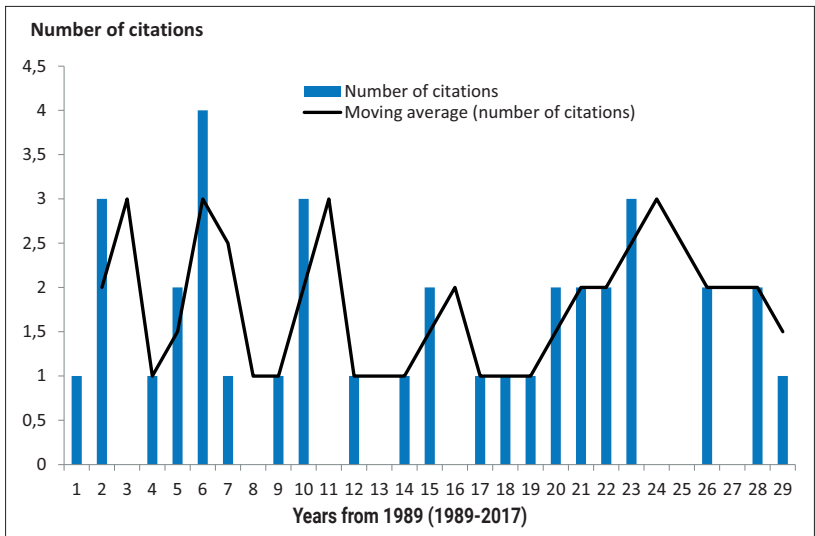


Figure 1: The citation distributions across the years (1989–2017)

Source: Author’s own contribution

The reasons for the faltering development of SCA may be complex, but the following three are likely the most important.

First, the fear of universal design and the Soviet system has led to an instinctive suspicion of this approach. The revolutionary characteristics of SCA further increased people's concerns about the tyranny of design and DS. Because of the undesirable practices by the Soviet Union and the fear of communism as well as the influence of the literature (Hayek, 1944, 1988; Popper, 1966), many modern researchers instinctively associate the design with the Soviet system, communism, and an authoritarian system. By drawing on an 'anti-rationalist' or 'empiricist evolutionary tradition' (Miller, 2010, p. 43), Hayek (1960) insists that advances in knowledge, institutions (or orders), and civilization are not the products of design and often emerge undirected and spontaneously. Hayek claims that the idea that institutions and civilizations can be designed is a fatal conceit (Hayek, 1988) that will lead to slavery (Hayek, 1944). Popper (1966) develops a critique of the theories of teleological historicism by Plato, Hegel and Marx. He claims that all of them believe that history unfolds inexorably according to universal laws and that they support 'Utopian social engineering', which argues that we can rationally design our ultimate political aim and find the best ways to realize it. In contrast to 'Utopian social engineering', Popper (1966) proposes his 'piecemeal social engineering', which claims that no one can have a blueprint for an ideal society and for social engineering on a grand scale. Blueprints for piecemeal engineering must be comparatively simple, for a single purpose, do little damage, be easily re-adjusted, and be less risky and controversial.

Second, the purely scientific nature and objectivity stressed by SCA ignore the complexity of administrative problems and have aroused concern. As Raadschelders (2008, p. 934) noted, 'To be sure, Simon's design science is a pure science based on facts and tested propositions'. Many designers and design theorists have also realized that 'the act of designing itself is not and will not ever be a scientific activity' (Grant, 1979, p. 46). For instance, Gregory (1966) notes, 'Science is analytic; design is constructive'. Simon (1996) also argues 'The natural sciences are concerned with how things are; (...) design on the other hand is concerned with how things ought to be'. The SCA is also considered a pure science approach. For example, after claiming, 'The quest for 'objective' solutions was understandable, of course – if naive' (Durant, 2014, p. 13), Durant (2014, p. 14) cites their work and argues, 'Was it a sincere (if naive) belief that social conflict would end when statistical analysis revealed an 'objective' reality? Are we really much different from them in our quest today in some circles for a 'design science' (Shangraw and Crow, 1989) or a 'logic of governance' (Lynn, Heinrich and Hill, 2000)? Are we much different when we seek 'best practices' without embracing Selznick's (1957) insight that a reciprocal relationship exists between administration and agency context?' However, Overman (1989, p. 160) notes 'The history of public administration can be told by such meaningless, polarized debate'. Raadschelders (2008, p. 944) also argues 'None can stand by itself. Public administration ought not to be limited to 'scientific knowledge' but, should, instead be *Wissenschaft*. But it does require that scholars not only say what needs to be done — that is, work together across traditions — but actually do it.'

Third, the lack of clarity in the main research content under the approach of PA as a DS has hindered follow-up studies. By listing 18 kinds of knowledge, the work by Shangraw and Crow (1989) presents an ‘inter-disciplinary curriculum’ for a DS of PA that differs from Simon’s ‘clearly disciplinary’ curriculum (Raadschelders, 2008, p. 934). However, of these 18 kinds of knowledge, most are already taught to students by almost all PA schools or departments in universities. Only five courses, ‘design science systems’, ‘macro engineering systems’, ‘advanced design of public institutions and mechanisms’, ‘substantive policy analysis and design’, and ‘public administration tool design’ (Shangraw and Crow 1989, p. 157), are related to a DS of PA. However, these courses cannot provide a clear and full picture of DS and cannot clearly distinguish the DS approach from the existing context and research perspectives of PA. Thus, these courses fail to provide a clear map to direct subsequent studies from the DS approach of PA and lead to misunderstandings of this approach by other researchers. Thus, the unclear context of SCA can easily lead to people’s prejudice about SCA and confusion of this approach with other research areas or approaches. These situations are obviously not conducive to the further development of this approach and hinder subsequent concrete and in-depth studies using this approach.

4. Toward a new bounded and incremental approach (BIA)

The phenomenon of design in PA not only exists but is also very common. It is common knowledge that ‘piecemeal social engineering’ (Popper, 1966), political engineering, and planning behavior have been studied since the 1960s (e.g., Chisholm, 1995; Elkin and Soltan, 1993; Friedmann, 1967). Thompson (1956) also defines the field of administrative science as a DS, explicitly comparing it with engineering, although he does not use the term DS. Furthermore, public organization designs (Bozeman, 1981; Levine *et al.*, 1975; Mintzberg, 1980) and policy designs (Bobrow and Dryzek, 1987; Schneider and Ingram, 1997) have been studied systematically since the 1970s. Jun (1986) introduces four types of administrative design (rational, crisis, incremental, and social designs) and suggests the term ‘social design’ as ‘a conceptual metaphor for public administration, with its emphasis on proactive and sensitivity to participant values’ (Laudicina, 1987, p. 274). Ostrom (1990) used an implicit DS approach and developed ‘a range of design principles to help practitioners with the construction and maintenance of self-governing organizations or common pool resource management institutions’, and this is considered a ‘good example of public administration as a practical design science’ by Raadschelders (2008, p. 933). Furthermore, through the theory of design principles by Ostrom, Yang and his colleagues further studied the design principles of successful scholar-participation or knowledge-driven governance (Yang, 2009; Yang and Wu, 2010), knowledge-driven institutional change (Yang and Wu, 2012), and a successful knowledge-driven society (Yang, 2012). Cook (2010) highlights the role of public servants in the design and redesign of public law. Boin and Lodge (2016) argue that designing institutions lies at the heart of PA and it is time for PA to design resilience (Comfort *et al.*, 2010) for transboundary crisis management. Ansell and Gash (2008) include institutional design in their model of collaborative gover-

nance. Some PA scholars also study design problems in risk management (e.g., Hood and Jones, 1996; Power, 2007). Walker (2011) even calls for the development of a global interdisciplinary DS. Thus, it is necessary to develop a new approach of PA as a DS that is more easily accepted, can respond to people's main concerns, and can provide clear guidance for follow-up studies.

4.1. Basic characteristics of BIA

I present BIA as an alternative approach to revolutionary SCA. Based on our understanding of the complexity of social and public management, BIA emphasizes that public administrators cannot design all systems, institutions, and instruments; design is not the only role of PA; design cannot be completed at once; and design is often wrong and produces harm and must be constantly revised. That is, by embracing ideas such as the 'uniquely pluralistic solutions, the anti-methods of disjointed incrementalism, and minimal meliorative adjustment' suggested by the alternative political theory, which is not satisfied with design scientists (Overman, 1989, p. 160), I attempt to provide a bounded, piecemeal, and incremental approach as a middle way to reconcile the relationship between PA as a DS and the alternative political theory.

Corresponding to the basic characteristics of SCA, BIA stresses the following ideas (Table 3). (1) Public administrators can only incrementally and gradually design some systems, institutions, and instruments, and their designs might be wrong and should be revised constantly. This is reminiscent of Hayek and Lindblom's trial and error (Hayek, 1960; Lindblom, 1959, 1979), and design in this approach is constantly under construction, adapting to changing environmental circumstances. Lindblom (1979, p. 517 and p. 520) argues, 'A sequence of trials, errors, and revised trials' is also an analysis 'marked by a mutually supporting set of simplifying and focusing stratagem', and incremental politics 'is intelligently exploratory when linked with sequences of trial and error'. Furthermore, this reminds of Morçöl's definition of public policy as an emergent and self-organizational complex system that is constantly in the making (Morçöl, 2013). (2) Designing and evaluating institutions, mechanisms, and process is only one of the roles of PA, and not all the roles of PA can be considered design and evaluation and can be studied from the approach of design and evaluation. (3) The process considering design alternatives cannot always follow a formative path from goal setting to redesign or be linear and formative; this process might be very complex and fragmented. (4) Designers cannot obtain all of the knowledge they need, and their knowledge is always limited, fragmented, conflicting, and cumulative. (5) No matter whether the academic community accepts it, design is an important content of practices of public management and is a useful approach for PA students to academically understand and study PA. However, the design of PA can only be studied from a soft science rather than a hard science perspective because as a social science in the narrower sense, it is 'concerned with man's conscious or reflected action' (Hayek, 1979, pp. 42-43) and the aim is to explain the unintended and undesigned results of the actions of many men (Hayek, 1979, p. 41). (6) Generally, PA design scientists cannot know all 18 kinds of knowledge, and sometimes they also need knowledge other than the 18 kinds of

knowledge. (7) There are no clear standards for the evaluation of designs, in many cases designs can only be roughly measured, and the choice among different designs is based on satisfaction and bounded rationality (Simon, 1945) as well as uncertainty, ambiguity, and irrationality or at least incompliance with the total or global rationality of economic man in the decision-making process from a systemic-anarchic perspective (Cohen *et al.*, 1972; Kingdon, 2003).

Table 3: Comparison between SCA and BIA

Comparative items	SCA	BIA
Design objectives	All systems, institutions, and instruments	Only some systems, institutions, and instruments
The role of designs in PA	The only or at least main role of PA	Only one of the roles of PA
The process of designs	A formative path	Complex and fragmented
Knowledge of designers	Can obtain almost all of the knowledge they need	Limited, fragmented, conflicting, and cumulative
DS of PA	Can be realized	Can only be studied from a soft science perspective
Knowledge of design scientists	Can know all 18 kinds of knowledge	Cannot know all 18 kinds of knowledge and sometimes knowledge other than the 18 kinds is needed.
Evaluation of designs	Clear standards	No clear standards

Source: Author’s own contribution

4.2. Six relevant ideas

To dispel the aforementioned doubts about revolutionary SCA, BIA also stresses the following six relevant ideas.

(1) Both the designs and designers of PA are diverse and have many different types. PA designs can have different purposes, forms, and content; can be in different fields, different departments, and different problem areas; can be designed using different types, methods, and techniques; and can be at different levels. Traditionally, people may think that government officials might be the only major designers of PA, and the public or citizens can only participate in their designing activities. Thus, these PA designs are essentially dominated by politicians and bureaucrats as well as their upper-class minority biases (Schattschneider, 1960) and top-down biases (Sabatier, 2007). However, according to the theory of governance (Ansell and Gash, 2008; Emerson *et al.*, 2012), almost all types of social actors, such as government, citizens, households, communities, NGOs, experts and scholars, firms, religious groups, and international organizations (Yang, 2009) as well as different interest groups (Dahl, 1961), advocacy coalitions (Sabatier and Jenkins-Smith, 1993), governmental departments, politicians, bureaucrats, and administrators can participate in PA designs and can interact and collaborate with each other (Ansell and Gash, 2008; Emerson *et al.*, 2012). Nevertheless, different social actors with diverse interests and different degrees of power often have different participatory opportunities, roles, and functions. This phenomenon reminds us of the complexity of the problem as well as the multiple possibilities to solve the problem and the variety of design innovations. PA designs can also have different types. According to the scope of designs, they can be divided into partial and whole; according to the integrity of designs, they can be divided into systematic and scattered or

fragmented; according to the formality of designs, they can be divided into formative and informative; according to the autonomy of designs, they can be divided into self-organized and externally directed; according to the democratization of the design process, they can be divided into democratic and non-democratic; and according to the initiating methods of designs, they can be divided into top-down and bottom-up methods. All of these types are only Weberian ideal types and should be further studied in a design approach to PA.

(2) Democratic, decentralized, and plural designs are the best way to prevent authoritarian designs and autocracy of designs. Overman (1989, p. 160) noted 'If it is to be successful, design science must develop a political theory to deal with both the bureaucratic and democratic dimensions of public administration'. This idea is correct and is reminiscent of Sayre's remark that a good administrative theory needs a political theory as well (Sayre, 1958). Because design is often seen as linked to the Soviet system of planning and autocracy (Hayek, 1944, 1988; Popper, 1966) and because extreme and autocratic designs (or externally directed designs) can easily lead to tyranny, if we want to make the best use of the advantages of design and avoid its disadvantages, we must choose democratic, decentralized, and plural designs (or self-organized designs) to prevent authoritarian designs and the autocracy of designs. Diamond (2008, p. 22) listed ten attributes of a democracy such as 'substantial individual freedom' and 'real pluralism'. These attributes can also be considered fundamental rules to build a democracy, and all PA designs should be arranged under the framework of these rules.

(3) All designs of PA are bounded rational, piecemeal or incomplete, and incremental and should be continuously improved. The approach of the complete rationality model has been widely used to provide a theoretical underpinning for cost-benefit analysis in PA by heuristic stages (Sabatier and Jenkins-Smith, 1993) or the textbook approach (Nakamura, 1987). It often assumes that designers can fully understand design issues, completely explore all possible options for solving problems, accurately weigh the costs and benefits of each, and make a completely rational choice about the best option (Simon, 1945, 1983). However, due to inevitable limits, no PA designs can simply achieve these. Thus, non-bounded or complete rationality is only 'utopian and ideological thought' (Friedmann, 1967, p. 237), and all PA designs can be only 'bounded rational'. Thus, as Popper (1966, p. 239) noted, the designs can only be accomplished by 'that Socratic reason which is aware of its limitations, and which therefore respects the other man and does not aspire to coerce him – not even into happiness'. Lindblom (1959) also noted that, in practice, a PA design is often non-linear, incremental, and evolutionary rather than revolutionary process by taking 'baby-steps' and 'muddling through'. Furthermore, the incremental design in this article does not exclude 'alternatives implied by analysis, expert opinion, experience, and scientific exploration as well as sufficient sensitivity to the less powerful and less articulate voices in the power field' and rational design as stressed by Jun and Storm (1990, p. 23), because design in real life is always 'incremental'. Moreover, to overcome the shortcoming of Lindblom's theory, which focuses on one specific aspect and cannot explain large changes of designs, we can consider PA designs as a process characterized by long periods of incremental design change punctuated by brief periods of major design change

(Baumgartner and Jones, 1993). Amid the seeming stability of the design process there is continual change, and both long periods of design incrementalism and spasms of design change are part of the same equation of issue definition and institutional bias.

(4) All designs of PA have problems and should have corresponding error correction mechanisms. Because of the complexity of issues and the limits of knowledge, rationality, and human capability (Hayek, 1944, 1988; Popper, 1966), all PA designs may have problems, and no designs can be perfect. It suggests that the method of trial and error (Hayek, 1960; Lindblom, 1959, 1979; Popper, 1966) and the successive-and-incremental-step improvement (Lindblom, 1959) should be fundamental methods of PA designs. According to Lindblom's theory of the science of 'muddling through', we can say that PA designers do not 'yet know enough about the social world to avoid repeated error in predicting the consequences' of design moves. A wise designer consequently expects that his designs 'will achieve only part of what he hopes and at the same time will produce unanticipated consequences he would have preferred to avoid'. Furthermore, designers 'often can remedy past errors fairly quickly — more quickly than' if a design 'proceeded through more distinct steps widely spaced in time' (Lindblom, 1959, p. 86). Meanwhile, all researchers of PA designs should remember that there are no universal and simple panaceas to design problems; and PA designs 'requires serious study of the complex, multivariable, nonlinear, cross scale, and changing' systems (Ostrom, 2007, p. 15181).

(5) PA designs exist in any society and political regime. Designs and designers of PA in a society are diverse; likewise, different societies and their political regimes, cultures, and other related factors all influence PA designs. Thus, there is no one type of PA design as a panacea to be used in all societies. Even in just one society and one political regime, PA designs can be diverse and different from each other. Thus, comprehensively comparative and cross-cultural studies on PA designs should be conducted to further improve the development of PA designs, as noted by Walker (2011). For example, a systematic analysis of all the Reports to the National Congress of the Communist Party of China by the General Secretary of the Communist Party of China and their Communiqué of Plenary Sessions, the annual reports and bulletins of the National Congress of the Communist Party of China, annual Reports on the Work of the Government by the Premier of the State Council, and the guidelines of Five-Year planning reports for national economic and social development (these are the most important policy documents in China) since 1949, the year of the foundation of the People's Republic of China, shows that the concept of design has been used many times. In particular, innovative design at the grass-roots level has been strongly encouraged since the reform of Deng Xiaoping, and top-level institutional design has been a popular term due to President Xi Jinping's great emphasis and his deepening reform since 2012. These designs possibly have the advantages of high efficiency and concentrating forces on major tasks (Mao, 1960), but also have many disadvantages such as lack of civic participation, poor communication, and government corruption. Furthermore, the PA designs from 1949 to 1978 in China were relatively more non-democratic, revolutionary, utopian, and ideological (Friedmann, 1967, p. 237), and they caused great damage to Chinese society (for example, the 10 years of

the Great Cultural Revolution). The PA designs after 1978, however, are more bounded and incremental, and they have helped China realize its economic miracle. Ostrom (1997, p. 264) stated ‘I presume that a meeting of East and West is possible. But those efforts depend much more on what Soyinka (1988) has referred to as ‘culture producers’ than on heads of State’. This argument is also true vis-à-vis the development of PA design theories and practice in the current mainstream PA.

(6) Future studies using multiple methods, especially empirical methods, should be conducted to further develop this approach. Rittel and Webber (1973) also characterize design and planning problems as ‘wicked’ problems, fundamentally unamenable to the techniques of science and engineering, which deal with ‘tame’ problems (Cross, 2001, p. 50). In their pioneering research, Shangraw and Crow (1989) argued that PA as a DS can be deemed a third proposal in contrast to the existing approaches; it is ‘a middle-range theory approach’ (Perry, 1987) and ‘a phenomenology and interpretive technique approach’ (White, 1987). In this study, however, I consider the design approach a more high-level theory that provides a new perspective on the study of PA with regard to ‘design’ or ‘DS’. Thus, methodological pluralism (Raadschelders, 2008) and various modern research methods of the social sciences, including normative and formal, quantitative, qualitative, and mixed methods (Perry, 2012) as well as explanatory, interpretive, and critical methods as identified by postpositivist philosophers of science (White, 2007), should be used to ultimately build an extensive, systematic, and thoughtful approach to studying PA. In particular, more scientific and empirical studies should be conducted to scientifically explore many concrete problems of PA designs and PA as a DS. Good empirical research can further confirm and refine the design theory of PA and can develop and create new theories with stronger reliability. However, we must note that BIA only stresses that PA should be studied from a perspective of design and sometimes even DS to complement the development of PA; it does not claim that PA should be developed completely to be a ‘natural science’, ‘purely scientific’, and ‘objective’. Complexity, values, uncertainty, flexibility, and formative evaluation should also be considered under BIA. Thus, if PA as a DS under BIA can be developed into a science, it can only be a soft science (Hayek, 1979). Scientific and non-scientific methods should be deemed two complementary rather than exclusive perspectives to study PA as a DS under BIA.

5. Policy recommendations

5.1. The main research content and possible courses of PA under BIA

The main research content of PA under BIA includes five sections and 24 major problems (Figure 2), which can also be understood as five sections and 24 chapters of a textbook of PA design as well as some corresponding courses designed in our PA education in universities. The first section, ‘the foundations of PA designs,’ includes two major problems: possibility and preconditions as well as the main influencing factors and environments of PA design. Possibility and preconditions consider why PA designs should be conducted, what the possibility of PA designs is, and what the preconditions of PA design are. The

main influencing factors and environments consider the main factors that influence PA designs as well as the inner and outer environments of PA designs.

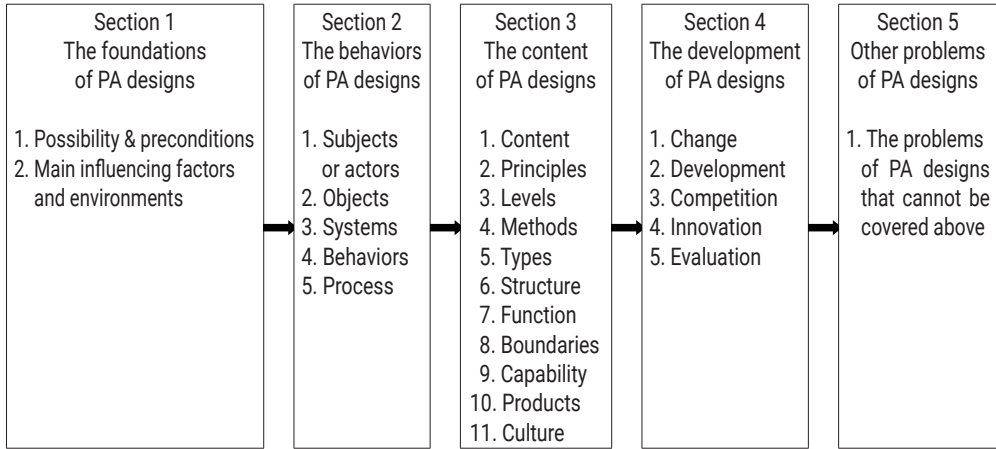


Figure 2: The research content of PA designs

Source: Author's own contribution

The second section, ‘the behaviors of PA designs’, includes five major problems: subjects, objects, systems, behaviors, and process of PA designs. Subjects involve who PA designers are or who the major social actors are who participate in PA designs. Objects are the target people, groups, or things toward which PA designs are directed. As people, they might be all the citizens in a country, or only the citizens in a city, or only some particular cohort of people. As things, they might be property rights, natural resources, or social activities. Systems study the system of the subjects and objects of PA designs as well as the organizations, institutional arrangements, and other support resources. Behaviors involve different behaviors, actions, and their conditions as well as their results of PA designers and designs. Processes involve various paths of design alternatives. As stated above, there might be a formative path and various non-formative paths.

The third section, ‘the content of PA designs’, includes eleven major problems: the content, principles, levels, methods, types, structure, function, boundaries, capability, products, and culture of PA designs. The contents involve different things that are included in concrete PA designs. Principles involve the fundamental guiding and value rules for different concrete PA designs. They include general beliefs that PA designs must follow to achieve better designs. Methods involve different techniques used in PA designs. Types involve the classification and subdivisions of PA designs and the differences, comparative advantages and disadvantages, and applicable conditions of different subdivisions of PA designs. Structures include the complex composition and construction of different elements and their combinations of PA designs. Functions involve the results, values, and consequences of different PA designs. Boundaries involve the possible greatest degree or limits of PA designs and their limitations. Capability reflects the quality of being capable

of PA designs. It might be determined by the content as well as the structure and function of PA designs, the characteristics and behaviors of PA designers, their resources and environments of PA designs, and so on. Products involve the results, consequences, influences, and service of PA designs. Finally, culture involves the attitudes and behaviors of designers as a particular social group as well as the knowledge, traditions, values, customs, conventions, and taboos shared by all people.

The fourth section, 'the development of PA designs,' includes five major problems: the change, development, competition, innovation, and evaluation of PA designs. Change involves why, when, and how one PA design passes from one state or phase to another. Development involves the purposes, methods, characteristics, and results of expanding, enlarging, refining, and improving PA designs. Competition involves the competing actions among different PA designs. Innovation involves how the new ideas, creations, and findings of PA designs are formed and conducted. Evaluation involves how to compare different PA designs and appraise the value and results of PA designs.

The fifth section, 'other problems', considers other problems of PA designs that cannot be covered above. These problems might be problems we have not realized, new problems derived from the above problems, or specific problems that arise in different situations, societies, and times.

The aforementioned contents are a possible example of the content of PA under BIA. Different scholars or societies can have their own specific ideas about the content, but they include some main elements of the main content of PA under BIA, which should be further studied by PA academics in different societies.

5.2. Recommendations for PA practitioners

Based on BIA, there are also six fundamental recommendations for PA practitioners.

(1) All PA practitioners should not try to design all the systems, institutions, and instruments they want. On the contrary, they must realize that they can only design some.

(2) All PA practitioners should not believe that they can obtain or have obtained all of the knowledge they need. On the contrary, they must realize that they can only obtain part of the knowledge, and the knowledge itself is always limited, fragmented, conflicting, and cumulative.

(3) All PA practitioners should not believe or insist that they can make perfect designs. On the contrary, they must realize that all designs are bounded rational, piecemeal or incomplete, and incremental; might be wrong; should be revised and improved constantly; and should have corresponding error correction mechanisms.

(4) All PA practitioners should not hope that the process of designs can follow a formative path from goal setting to redesign or be linear and formative. On the contrary, they must realize that the process of designs might be very complex and fragmented.

(5) All PA practitioners should not hope to find or have some clear standards for the evaluation of designs and hope that the designs can be accurately and effectively measured. On the contrary, they must realize that there are no clear standards to evaluate the designs, and the designs can only be roughly measured in many cases.

(6) All PA practitioners should not believe that they are the only designers and the designs are the only ones they do. On the contrary, they must realize that both designs and designers are diverse and have many different types, and democratic decentralized, and plural designs are the best way to prevent authoritarian designs and autocracy of designs.

6. Conclusion

Like management and education, PA is also one possible problem arena of many possible arenas of DS. Meanwhile, since design is the core content of PA in both democratic and non-democratic societies, PA that does not research design is not complete PA. Thus, it is time for us to improve the development of the design approach of PA. In contrast to the revolutionary SCA, I propose BIA as a more bounded, piecemeal, and incremental approach and as a middle way. However, as the first major step in studying this new approach, this study is limited in scope, and the statements as well as an actual design approach need to be further tested with more applied evidence and examples.

Design can provide a new research perspective for PA. It can drive us to develop more creative ideas on PA and can help us to find new problems of PA as well as new solutions for known problems. Finally, it can significantly improve the further development of PA. However, as an important living phenomenon of PA, something that is constantly under construction, adapting to changing environmental circumstances, design is not entirely positive or negative. On the one hand, we cannot fully deny the design of PA because some of the designs might be harmful. This is not only unworthy of the practice but also undesirable; we cannot throw the baby out with the bathwater. Meanwhile, we cannot simply refuse the design approach of PA because it still involves problems. This is not only unfair to the pioneering studies of this approach but also is not conducive to the overall development of PA. On the other hand, we cannot hope to rely on the study of PA to solve all PA problems. This is also unrealistic. The main task of the study of PA designs is not only to enjoy the benefit of good designs but also to avoid serious consequences of bad designs. Certainly, the development of the PA design approach has just begun, and there are many problems that are still not understood. These problems require future joint efforts of global scholars to solve. From now on, let us work together.

References:

1. Ansell, C. and Gash, A., 'Collaborative Governance in Theory and Practice', 2008, *Journal of Public Administration Research and Theory*, vol. 18, no. 4, pp. 543–571.
2. Barzelay, M. and Thompson, F., 'Back to the Future: Making Public Administration a Design Science', 2010, *Public Administration Review*, vol. 70, suppl. 1, pp. s295–s297.
3. Baskerville, R., 'What Design Science is Not', 2008, *European Journal of Information Systems*, vol. 17, no. 5, pp. 441–443.
4. Baumgartner, F.R. and Jones, B.D., *Agendas and Instability in American Politics*, Chicago: The University of Chicago Press, 1993.

5. Bobrow, D.B. and Dryzek, J.S., *Policy Analysis by Design*, Pittsburgh, PA: University of Pittsburgh Press, 1987.
6. Boin, A. and Lodge, M., 'Designing Resilient Institutions for Transboundary Crisis Management: A Time for Public Administration', 2016, *Public Administration*, vol. 94, no. 2, pp. 289–298.
7. Bozeman, B., 'Organization Design in the Public Bureaucracy', 1981, *American Review of Public Administration*, vol. 15, no. 2, pp. 107–118.
8. Chisholm, D., 'Problem Solving and Institutional Design', 1995, *Journal of Public Administration Research and Theory*, vol. 5, no. 4, pp. 451–491.
9. Cohen, M.D., March, J.G. and Olsen, J.P., 'A Garbage Can Model of Organizational Choice', 1972, *Administrative Science Quarterly*, vol. 17, no. 1, pp. 1–25.
10. Comfort, L.K., Boin, A. and Demchak, C.C. (eds), *Designing Resilience: Preparing for Extreme Events*, Pittsburgh, PA: Pittsburgh University Press, 2010.
11. Cook, B.J., 'The Organ of Experience: A Defense of the Primacy of Public Administrators in the Design and Reform of Policy and Law', 2010, *Administration and Society*, vol. 42, no. 3, pp. 263–286.
12. Cross, N., 'Designerly Ways of Knowing: Design Discipline versus Design Science', 2001, *Design Issues*, vol. 17, no. 3, pp. 49–55.
13. Crow, M.M. and Shangraw, R.F., Jr., 'Revisiting 'Public Administration as a Design Science' for the Twenty-First Century Public University', 2016, *Public Administration Review*, vol. 76, no. 5, pp. 762–763.
14. Dahl, R.A., *Who Governs?: Democracy and Power in the American City*, New Haven: Yale University Press, 1961.
15. Daneke, G.A., 'A Science of Public Administration?', 1990, *Public Administration Review*, vol. 50, no. 3, pp. 383–392.
16. Diamond, L., *The Spirit of Democracy: The Struggle to Build Free Societies throughout the World*, New York: Times Books, 2008.
17. Durant, R.F., 'Taking Time Seriously: Progressivism, the Business–Social Science Nexus, and the Paradox of American Administrative Reform', 2014, *PS: Political Science & Politics*, vol. 47, no. 1, pp. 8–18.
18. Elkin, S.L. and Soltan, K.E., *A New Constitutionalism: Designing Political Institutions for a Good Society*, Chicago: University of Chicago Press, 1993.
19. Emerson, K., Nabatchi, T. and Balogh, S., 'An Integrative Framework for Collaborative Governance', 2012, *Journal of Public Administration Research and Theory*, vol. 22, no. 1, pp. 1–29.
20. Frederickson, H.G., 'Can Bureaucracy Be Beautiful?', 2000, *Public Administration Review*, vol. 60, no. 1, pp. 47–53.
21. Friedmann, J., 'A Conceptual Model for the Analysis of Planning Behavior', 1967, *Administrative Science Quarterly*, vol. 12, no. 2, pp. 225–252.
22. Fuller, R.B., 'A Comprehensive Anticipatory Design Science', in Fuller, R.B. (ed.), *No More Secondhand God and Other Writings*, London: Feffer & Simons, 1963, pp. 84–117.
23. Fuller, R.B., 'Comprehensive Designing', 1950, *Transformation: Arts, Communication, Environment*, vol. 1, no. 1, pp. 18–19, 22–23.
24. Grant, D., 'Design Methodology and Design Methods', 1979, *Design Methods and Theories*, vol. 13, no. 1, pp. 46–47.

25. Gregory, S., 'A Design Science', in Gregory, S.A. (ed.), *The Design Method*, London: Butterworth, 1966, pp. 323–330.
26. Hamilton, A., 'Federalist No. 1', in Hamilton, A., Madison, J., and Jay, J., *The Federalist Papers*, New York: Palgrave Macmillan, 2009, pp. 33–36.
27. Hayek, F.A., *The Constitution of Liberty*, Chicago: University of Chicago Press, 1960.
28. Hayek, F.A., *The Counter-Revolution of Science: Studies on the Abuse of Reason*, 2nd edition, Indianapolis: Liberty Press, 1979.
29. Hayek, F.A., *The Fatal Conceit: The Errors of Socialism*, Chicago: University of Chicago Press, 1988.
30. Hayek, F.A., *The Road to Serfdom*, Chicago: University of Chicago Press, 1944.
31. Hevner, A.R., March, S.T., Park, J. and Ram, S., 'Design Science in Information System Research', 2004, *MIS Quarterly*, vol. 28, no. 1, pp. 75–105.
32. Hood, C. and Jones, D. (eds.), *Accident and Design*, London: UCL Press, 1996.
33. Iivari, J., 'A Paradigmatic Analysis of Information Systems as a Design Science', 2007, *Scandinavian Journal of Information Systems*, vol. 19, no. 2, pp. 39–64.
34. Jun, J.S. and Storm, W.B., 'Social Design in Public Problem Solving', 1990, *Public Administration Quarterly*, vol. 14, no. 1, pp. 18–30.
35. Jun, J.S., *Public Administration: Design and Problem-solving*, New York: Macmillan, 1986.
36. Kelly, A.E., 'Research as Design', 2003, *Educational Researcher*, vol. 32, no. 1, pp. 3–4.
37. Kingdon, J.W., *Agendas, Alternatives, and Public Policies*, 2nd edition, New York: Longman, 2003.
38. Laudicina, E.V., 'Review: A Thousand Flowers Blooming: Recent Texts in Public Administration', 1987, *Public Administration Review*, vol. 47, no. 3, pp. 272–276.
39. Levine, C.H., Backoff, R.W., Cahoon, A.R. and Siffin, W.J., 'Organizational Design: A Post Minnowbrook Perspective for the 'New' Public Administration', 1975, *Public Administration Review*, vol. 35, no. 4, pp. 425–435.
40. Lindblom, C.E., 'Still Muddling, Not Yet Through', 1979, *Public Administration Review*, vol. 39, no. 6, pp. 517–526.
41. Lindblom, C.E., 'The Science of Muddling Through', 1959, *Public Administration Review*, vol. 19, no. 2, pp. 79–88.
42. Lynn, L.E., Heinrich, C.J. and Hill, C.J., 'Studying Governance and Public Management: Challenges and Prospects', 2000, *Journal of Public Administration Research and Theory*, vol. 10, no. 2, pp. 233–262.
43. Mao, Z., *Selected Works of Mao Tse-tung*, Beijing: People's Publishing House, 1960.
44. Miller, E.F. (ed.), *Hayek's The Constitution of Liberty*, London: The Institute of Economic Affairs, 2010.
45. Miller, T.C., *Public Sector Performance. A Conceptual Turning Point*, Baltimore, MD: The Johns Hopkins University Press, 1984.
46. Mintzberg, H., 'Structure in 5's: A Synthesis of the Research on Organization Design', 1980, *Management Science*, vol. 26, no. 3, pp. 322–341.
47. Morçöl, G., *A Complexity Theory for Public Policy*, New York: Routledge, 2013.
48. Nakamura, R., 'The Textbook Process and Implementation Research', 1987, *Policy Studies Review*, vol. 7, no. 1, pp. 142–154.

49. Ostrom V., *The Meaning of Democracy and the Vulnerability of Democracies. A Response to Tocqueville's Challenge*, Ann Arbor: The University of Michigan Press, 1997.
50. Ostrom, E., 'A Diagnostic Approach for Going beyond Panaceas', 2007, *Proceedings of the National Academy of Sciences of the United States of America*, vol. 104, no. 39, pp. 15181–15187
51. Ostrom, E., *Governing the Commons: the Evolution of Institutions for Collective Action*. Cambridge, NY: Cambridge University Press, 1990.
52. Overman, E.S., 'Response to R.F. Shangraw and M.M. Crow', 1989, *Public Administration Review*, vol. 49, no. 2, pp. 159–160.
53. Perry, J., 'How Can We Improve Our Science to Generate More Usable Knowledge for Public Professionals?', 2012, *Public Administration Review*, vol. 72, no. 4, pp. 479–482.
54. Perry, J., 'Strategies for Building Public Administration Theory', paper presented at the *Annual Meeting of the American Political Science Association*, Chicago: September, 1987.
55. Popper, K.R., *The Open Society and Its Enemies* (Complete: Volumes I and II), 5th edition, London: Routledge and Kegan Paul, 1966.
56. Power, M., *Organized Uncertainty: Designing a World of Risk Management*, Oxford: Oxford University Press, 2007.
57. Raadschelders, J.C.N., 'Understanding Government: Four Intellectual Traditions in the Study of Public Administration', 2008, *Public Administration*, vol. 86, no. 4, pp. 925–949.
58. Rittel, H. and Webber, M., 'Dilemmas in a General Theory of Planning', 1973, *Policy Sciences*, vol. 4, pp. 155–169.
59. Sabatier, P.A. (ed.), *The Theories of the Policy Process*, 2nd edition, Boulder, CO: Westview Press, 2007.
60. Sabatier, P.A. and Jenkins-Smith, H.C. (eds.), *Policy Change and Learning: An Advocacy Coalition Approach*, Boulder, CO: Westview Press, 1993.
61. Sayre, W.S., 'Premises of Public Administration: Past and Emerging', 1958, *Public Administration Review*, vol. 18, no. 2, pp. 102-105.
62. Schattschneider, E.E., *The Semisovereign People: A Realistic View of Democracy in America*, Belmont, CA: Wadsworth/Thompson Learning, 1960.
63. Schneider, A.L. and Ingram, H.M., *Policy Design for Democracy*, Lawrence: University Press of Kansas, 1997.
64. Selznick, P., *Leadership in Administration. A Sociological Interpretation*, Berkeley: University of California Press, 1957.
65. Shangraw, R.F. and Crow, M.M., 'Public Administration as a Design Science', 1989, *Public Administration Review*, vol. 49, no. 2, pp. 153–158.
66. Simon, H.A., *Reason in Human Affairs*, Oxford: Blackwell, 1983.
67. Simon, H.A., *Administration Behavior: A Study of Decision-making Processes in Administrative Organizations*, New York: The Free Press, 1945.
68. Simon, H.A., *The Sciences of the Artificial*, 3rd edition, Cambridge, MA: MIT Press, 1996 [1969].
69. Soyinka, W., 'Twice Bitten: The Fate of Africa's Culture Producers', in Soyinka, W. and Kawada, J. (eds.), *Development and Culture*, New York: Africa Leadership Forum, 1988, pp. 1–24.
70. Thompson, J.D., 'On Building an Administrative Science', 1956, *Administrative Science Quarterly*, vol. 1, no. 1, pp. 102–111.

71. van Aken, J.E. and Romme, G., 'Reinventing the Future: Adding Design Science to the Repertoire of Organization and Management Studies', 2009, *Organization Management Journal*, vol. 6, no. 1, pp. 5–12.
72. Waldo, D., *The Administrative State*, New York: Ronald Press Company, 1948.
73. Walker, R.M., 'Globalized Public Management: An Interdisciplinary Design Science', 2011, *Journal of Public Administration Research and Theory*, vol. 21, suppl. 1, pp. i51–i59.
74. White, J.D., 'The Interpretive Framework: Prospects for Theory Development in Public Administration', paper presented at the *Annual Meeting of the American Political Science Association*, Chicago: September 1987.
75. White, J.D., *Taking Language Seriously: The Narrative Foundations of Public Administration Research*, Washington, DC: Georgetown University Press, 2007.
76. White, L.D., *Introduction to the Study of Administration*, New York: Macmillan Company, 1926.
77. Wilson, W., 'The Study of Administration', 1887, *Political Science Quarterly*, vol. 2, pp. 197–222.
78. Yang, L. and Wu, J., 'Knowledge-Driven Institutional Change: An Empirical Study on Combating Desertification from 1949 to 2004 in Northern China', 2012, *Journal of Environmental Management*, vol. 110, pp. 254–266.
79. Yang, L. and Wu, J., 'Seven Design Principles for Promoting Scholars' Participation in Combating Desertification', 2010, *International Journal of Sustainable Development and World Ecology*, vol. 17, no. 2, pp. 109–119.
80. Yang, L., 'Building a Knowledge-driven Society: Scholar Participation and Governance in Large Public Works Projects', 2012, *Management and Organization Review*, vol. 8, no. 3, pp. 585–607.
81. Yang, L., *Scholar-participated Governance: Combating Desertification and Other Dilemmas of Collective Action* (Dissertation), Phoenix, AZ: Arizona State University, 2009.