

A knowledge management framework for effective integration of national archives resources in China

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Abstract

Purpose – The purpose of this paper is to explore the relationship between different mechanisms for integrating national archival resources, leading to the development of a knowledge management-based framework for facilitating the optimal utilization of national archives resources in China.

Design/methodology/approach – The study adopts a mixed-methods approach consisting of a review of existing mechanisms for integrating national archival resources and site visits and interviews for investigating the effectiveness of these mechanisms in real world practices for managing and utilizing national archives resources in China.

Findings – The knowledge management-based framework is shown to be useful for building interdependence, interconnections and interactions between diversified integration mechanisms to meet national, societal and public needs in China. The framework is significant for rearranging the role of knowledge management in collaboration to protect the value of national archives resources as the knowledge asset of a state. It can reengineer the knowledge management activities in communication to share the value of national archives resources as the knowledge asset of a society. Furthermore, the framework can reconfigure knowledge management artifacts in connectivity to increase the value of national archives resources as the knowledge asset of the public.

Research limitations/implications – The review of the related literature is selective rather than comprehensive, and the interviews are based on a self-selected convenience sample, which is rather skewed demographically.

Practical implications – The proposed framework can be used to guide the development of a national strategy for the effective integration of national archives resources to promote a better delivery of public-centric knowledge services in a specific society.

Originality/value – This study provides a knowledge management framework for the effective integration of national archives resources toward their optimal utilization. It contributes to the examination of the role of



different integration mechanisms in interactive knowledge management processes and the advancement of academic debate on the effectiveness of these mechanisms for the integration of national archives resources to facilitate their optimal utilization in China.

Keywords China, Knowledge management, Integration mechanisms, Knowledge assets, National archives resources, Resources utilization

Paper type Research paper

Introduction

Archives resources are evidences, memories, identities, and knowledge assets of their creators for safeguarding their lawful rights and interests in a specific environment (Williams, 2002; An *et al.*, 2010, 2014a; Henninger and Scifleet, 2016). They can be used to identify, appraise, preserve, and make available documentary materials of long-term value to the public. Archives resources can also be used for evaluating the accountability of individual institutions by preserving the public records and making them available legally and ethically. Furthermore, archives resources are preserved for public good as well as the memory of institutions for a culture (Michael, 2003; An *et al.*, 2010).

National archives resources are created by various organizations and individuals from their operational and social activities for their legal obligations that have the preserving value for a country (Dai, 2003; Pan, 2011). They make history available as a network of relationships between events in different times which can be reconstructed by their traces and leave them to users as to what they want to know and how they actually accomplish this (Haritz, 2004). The utilization of archives resources from a national perspective is critical for developing collaborative knowledge services in order to realize the value of archival resources as the knowledge asset of a society and to improve the national competitiveness.

There are multiple regimes for managing national archives resources in China including national archives, provincial archives, city archives, and other collecting organizations. Archives resources are often presented in various forms and formats (Fu and Feng, 2005). With the rapid development of information and communication technologies (ICT), archives resources are increasingly becoming digital (Vlatka, 2012; Xie, 2013). This leads to archival resources often being stored in isolated digital archival repositories and separated archival information systems (Foster *et al.*, 2013; An, 2015; Bustelo, 2015; Reed, 2015). It is therefore difficult, if not impossible, to know where the required archival resources are located. Furthermore, connecting these disparate systems for improving the delivery of archives services becomes challenging as such systems are under different administrative regimes using different standards and policies (Song and An, 2016). As a result, the optimal utilization of national archives resources in China becomes difficult.

Effectively integrating national archives resources is critical for providing the public with knowledge-based services in a specific situation (Note, 2009; Hofman, 2011; Reed, 2015). It provides a foundation for the optimal utilization of archives resources as the knowledge asset of a specific nation. It can maintain the integrity of the memory of a nation and exploit the value of national archives resources to support collaborative innovation. Furthermore, integrating national archives resources is important for exploiting the value of archival resources as evidence, memory, and identity while promoting access to public information, transparency, accountability, open government, open data and big data applications to enhance collaborative innovation and social governance (Litte, 2015; Espino and Alcazar, 2015; Todd, 2015).

The importance of integrating national archives resources for their optimal utilization in China has been well recognized in the Chinese literature (Dai, 2003, 2010; Li *et al.*, 2014). Numerous initiatives have been taken through enriching holdings of archives repositories to cover comprehensive categories of archival resources (Dai, 2003, 2010; Li, 2010), bringing

disparate information systems together for better access (He and Jiang, 2005; Wu and Fang, 2009), and adopting a collaborative approach for delivering better knowledge-based services (An *et al.*, 2014b). The overall performance of the integration of national archives resources in China, however, is still unsatisfactory (Dai, 2010; Pan, 2011; An *et al.*, 2014c). There is lack of studies on the development of appropriate frameworks for supporting the integration of national archives resources that could build the relationship to connect archives resources for the delivery of value-added knowledge services in China (Li *et al.*, 2014; An, 2015; Bai, 2015).

This paper proposes a knowledge management-based framework for facilitating the optimal utilization of national archives resources through their effective integration in China. The framework takes the advantages of existed mechanisms on the integration of national archives resources to facilitate their optimal utilization. Such a framework can rearrange the role of knowledge management in collaboration to protect the value of national archives resources as the knowledge asset of a state. It can reengineer the knowledge management activities in communication to share the value of national archives resources as the knowledge asset of a society. Furthermore, the framework can reconfigure knowledge management artefacts in connectivity to increase the value of national archives resources as the knowledge asset of the public. It can be used to guide the development of a national strategy for the integration of national archives resources to ensure the provision of public-centric knowledge services.

The paper proceeds as follows. It first reviews the related literature about the integration of national archives resources for their optimal utilization, leading to the identification of the common mechanisms for integrating national archives resources in China. It then proposes a knowledge management-based framework for facilitating the optimal utilization of archives resources through their effective integration in China. The effectiveness of such a framework for integrating national archival resources toward their optimal utilization is then discussed.

A review of the relevant literature on the integration of national archives resources

There are three perspectives in the integration of national archives resources in China with a specific focus, respectively, on rearranging the holdings of archives repositories (Dai, 2003; Li, 2010), reconfiguring archival information systems (He and Jiang, 2005; Wu and Fang, 2009), and reengineering archives services (An *et al.*, 2014c). The first perspective is related to the accumulation of knowledge from archival resources. The second is concerned about sharing knowledge from archival resources. The third is related to the utilization of knowledge from archival resources. To optimize the utilization of national archival resources, these three perspectives need to be integrated as an organic whole for a continuum regime of knowledge from archival resources collection to archival knowledge management (An, 2015; Foster *et al.*, 2013; Reed, 2015). In this context, the integration of national archival resources is referred to as the process of reforming archives processes, reengineering archive activities, and reconfiguring archives artifacts for improving collaboration, communication and connectivity to better manage national archives resources toward their value-added reuse (An, 2015; Foster *et al.*, 2013; Reed, 2015).

The integration of national archives resources in China can be divided into three stages (An *et al.*, 2014a). The first stage (1949-1980) focuses on designing a physical construct for protecting the integrity of national archives resources. In this situation, national archives resources are limited to all the archives that are state owned in a planning economy (Dai, 2003; Chen and Liang, 2010; Pan, 2011). Archives repositories play a key role in safeguarding national archival resources as national properties. Such archives resources, however, are only limited to state ownership provenance. The memories of private ownership and individuals are excluded. As a result, the national memory is incomplete.

The second stage (1980-2007) concentrates on the development of a unified administration for the effective management of national archives resources to ensure the integrity and safety of archives resources for facilitating their optimal use in a marketing economy. The boundary of national archives resources is extended in this stage to include all the archives with diverse ownerships (Dai, 2010; Chen and Liang, 2010; Pan, 2011). This stage witnesses an increasing awareness of safeguarding national archival resources as societal memories exemplified by the implementation of the Archives Law of People's Republic of China. The focus of this stage is on the knowledge accumulation through effective archives resources management.

The third stage (2007-present) focuses on developing an intellectual construct for providing the public with people-centric knowledge services to improve the utilization of archives resources in a knowledge-based economy (The State Archives Administration of China, 2007; Chen and Liang, 2010; Pan, 2011; The General Office of CCCPC and General Office of the State Council, 2014). In this stage, archives repositories play a key role in safeguarding national archival resources as national resources, societal memories, and public assets and providing the public with knowledge-based archives services. This leads to the development of archival resources networks across different departments, various industries and regions in China (Zhang and Cao, 2014; Fu, 2015). There are, however, various issues and concerns related to collaboration with e-governance to ensure the accessibility of archival resources and the sharing of knowledge, communications with e-public services to ensure traceability and trustworthy of archival resources, connections with e-resources sharing platforms to ensure usability and linkability of archival resources and knowledge discovery (An *et al.*, 2016b). This shows that there is a need to develop an integrated framework for the accumulation, sharing and use of knowledge in archival resources from the knowledge management perspective (An *et al.*, 2016b; Song and An, 2016).

To improve the integration of national archives resources in China, four common mechanisms are identified through a review of the related literature and practices (An *et al.*, 2014c). These four mechanisms include networked sharing of archives resources to support historical research, centralized administration with unified standards and policies and integrated systems to improve the performance of archival services, the development of a digital continuity plan to enhance the capacity of archives services to support the social transformation, and risk control-based cyber-infrastructure building to support the digital transformation of public organizations.

Networked sharing of archives resources focuses on a collaborative use of archives resources through technology-enabled integration of national archives resources (Xie, 2013). Such integration facilitates connections and interactions between stakeholders for the provision of archives services (Kretzschmar, 2012). It is significant for effectively dealing with the problems of resources being cut and shortage of funds in the provision of archives services. There are numerous examples in this regard worldwide for improving the performance of archival services (Kretzschmar, 2012). The State Archives of Baden-Württemberg in Germany, for example, has built a partnership with 16 states archives and thousands of independent local archives so that available archives resources can be better utilized through networked sharing of archives resources (Kretzschmar, 2012). Such a mechanism leads to better sharing of knowledge from archival resources via the improved connectivity between archives systems.

Centralized archives administration is used for improving the performance of archival services through the adoption of unified standards and policies and integrated archives systems in the management of national archives resources (Vlatka, 2012). It is widely used to connect archives services for avoiding information-isolated islands in archives systems and achieving shared visions and goals in delivering archival services. The development of

an integrated national archival system in Croatia is an example of adopting a centralized archives administration for improving the utilization of archives resources (Vlatka, 2012). Such a practice is effective for supporting public access to archives resources for improving their utilization (Vlatka, 2012). It results in better accumulation, sharing and utilization of knowledge from archival resources via improving the communication between archives organizations.

Digital continuity is the ability to maintain digital information in a manner so that such information is available when needed and the ability to make digital information continuously accessible, trustworthy and usable for as long as required (An *et al.*, 2016b). It is a holistic approach to ensure that digital archival resources are traceable and trustworthy to support e-discovery, digital identity, digital life and an online culture for communication with archives knowledge dissemination departments in e-public services (An *et al.*, 2016a, b). Digital continuity is a digital service to ensure the effective utilization of digital archives for connection with archives utilization departments in e-resources sharing platforms to improve public services, provide better decision support, and ensure the accountability and transparency of public decision making. The Digital Continuity Action Plan of New Zealand (Archives New Zealand, 2009), the Digital Continuity Plan of Australia (National Archives of Australia, 2011) and its Digital Continuity 2020 Policy (The National Archives of Australia, 2014) show the usefulness of this mechanism for optimizing the use of archives resources. Such a mechanism is effective when the rearrangement of the role of knowledge management to accumulate, share, and use knowledge assets from archival resources is embedded in e-governance, e-public services, and e-resources sharing platforms to enable continuous access and sustainable reuse of trusted and complete digital information in archives resources.

Building risk control-based cyber-infrastructure facilitates the digital transformation of the provision of archival services in a specific society (Vlatka, 2012). With the rapid ICT development, digital recordkeeping and archiving capacity building are becoming the safeguard measures that are embedded into the risk control-based enterprise information architecture to support the daily operations of individual organizations for ensuring that digital information is created, captured, and used in a responsible manner. Building risk control-based cyber-infrastructure involves reforming archives administrative regimes, developing digital recordkeeping policies and standards, improving archives personnel capacity, and changing the focus of archival services from the construction of digital archives resources to the provision of digital archival services. The initiative of e-government going cloud computing in the Netherlands (Hofman, 2011) and the digital transition of e-government going to paperless offices in the USA (The Office of Management and Budget, 2012) are the examples of this mechanism toward improving the performance of digital services (The National Archives of UK, 2014; The White House Office of Management and Budget, 2015). Such a mechanism can lead to the effective protection of knowledge assets during the digital transition of a nation (Archives New Zealand, 2009).

Overall existing research on the integration of national archive resources has three limitations including the focus of the integration on the control of national archive resources rather than on their utilization; the lack of comprehensive studies of different integration mechanisms and their interrelationships; and the lack of a knowledge management-based framework to optimize the utilization of national archives resources. This shows that there is a demand for a top-level design about the integration of national archive resources to map the relationships between different mechanisms for the integration of national archives resources from the knowledge management perspective in order to optimize their utilization in China.

Research methodology

This study aims to investigate how to effectively integrate national archives resources in China for optimizing their utilization. To achieve this aim, specific questions are formulated:

- RQ1.* What are the mechanisms that have been used for the integration of national archival resources toward their optimal utilization in Chinese archives organizations?
- RQ2.* How effective are these mechanisms to the optimal utilization of national archives resources?
- RQ3.* What are the specific roles that each mechanism plays for the optimal utilization of archival resources from the knowledge management perspective?

A mix-methods approach consisting of literature review, site visits, document analysis, and interviews is used in order to adequately answer the research questions above. Literature review is used for a systematic analysis of previous studies on the mechanisms for integrating national archival resources in China. Such a review leads to the identification of the demand for a knowledge management-based framework toward the optimal utilization of archival resources. Document analysis is adopted to rationalize this study from the demand of national policies and regulatory requirements for integrating national archival resources in China. It is also used to prepare for site visits and interviews. Site visits are used to investigate the mechanisms that have been used in the real practice. Interviews are used to examine the effectiveness of the mechanisms identified. The use of a mixed-methods approach in this study provides a meta-synthesis methodology to connect multiple data sources and build evidence chains for developing integrated understanding and insight to the effective integration of archival resources in their optimal utilization processes.

Data were collected on why and how the integration of national archival resources happens during April, 2014–November 2015 in China. Over 200 persons are interviewed including information chief officers, senior archivists, chief information infrastructure developers, and executive service holders and providers. In all, 68 institutions were selected for investigating their integration mechanisms, among which 35 are archives institutions, and 33 are government resources centers. The selected institutions cover six provinces, 14 cities and five districts in China. Among the 35 archives institutions investigated, there are three business archives, nine urban development archives, five district archives, six provincial archives and 13 municipal archives.

Mechanisms for the integration of national archival resources in China

A critical analysis of the process of integrating archival resources and their advantages and limitations in various institutions from the interview transcripts leads to the identification of 13 mechanisms for integrating national archival resources toward their optimal utilization in China. These mechanisms include legal control, stakeholder collaboration, ICT adoption, standardization control, management innovation, a power shift from state ownership and control to social benefits and utilization, accountability systems, administrative control, information resources management, people-centric services, treatment of complains, user feedback, and risk control. Table I shows an overview of the use of these mechanisms in the institutions investigated.

Legal control

There is an increasing focus in China on developing a regulatory environment for providing a legal ground to enable a rational allocation of national archives resources for their effective utilization (An *et al.*, 2014a). Due to the transformation of the Chinese economy, the provenances of national archives resources are changing from the state ownership to multiple ownerships. As a result, the integration of national archives resources faces various difficulties. To meet the

Table I.
Diversified
mechanisms of
integration of national
archival resources
in China

Integration mechanisms	Provincial archives	City archives	District archives	Urban development archives	Business archives	Information resource center
Legal control	✓	✓	✓	✓	✓	
Collaborations				✓	✓	✓
ICT adoption	✓	✓	✓	✓	✓	✓
Standardization control	✓	✓	✓	✓	✓	✓
Management innovation				✓	✓	✓
A power shift	✓	✓	✓	✓		✓
Accountability systems				✓	✓	✓
Administrative control	✓	✓	✓	✓	✓	✓
Information resources management				✓	✓	✓
People-centric services	✓	✓	✓			✓
Treatment of complains				✓		✓
User feedback						✓
Risk control				✓	✓	✓

diverse interests of various stakeholders, the establishment of regulatory requirements for the integration of archives resources is getting increasingly important. This means that archives resources should be treated as valuable knowledge assets of a state no matter whom they belong to in order to protect the knowledge of a society (Dai, 2010; An *et al.*, 2010). As pointed out by one interviewee from a government resources center, “without legal control and protection, the effective utilization of archives resources through the implementation of public ‘information-benefit projects’ cannot be realized.” The investigated 35 archival institutions have all adopted the legal control integration mechanism based on the Archives Law of People’s Republic of China shown as in Table I.

Collaboration

Stakeholder interests have to be considered in building a participatory archives resources management regime for facilitating collaboration between archives resources providers and seekers (Dai, 2010). There is a need for respecting the diverse interests of various stakeholders while taking multiple forms of collaborative measures for co-constructing and sharing archives resources for mutual benefits (Gilliland, 2014). Such a need is clearly recognized by an interviewee from a government resources center in his statement: “to improve the utilization of archives resources through collaboration, a “win-win approach to collaborate with various stakeholders has to be adopted through the use of various measures.” The archives catalogue centers at different levels of various regions are the examples of such collaborative measures (Tan and Wang, 2006). This mechanism promotes archives resources as knowledge assets of a community in order to accumulate the knowledge from archives resources for a specific society. The investigated urban development archives, business archives and government information resources centers have adopted this integration mechanism effectively.

ICT adoption

ICT have been used for building digital archiving information systems, comprehensive archives resources management systems and the public access platforms for centralized control and effective exploitation of archives resources (Feinberg, 2011). Such a mechanism is effective under the condition that a set of policies, standards and tools to enable the integration and sharing of various national archives resources are already established (Fu and Feng, 2005; Tan and Wang, 2006; Fu, 2015). This mechanism improves the connectivity between archives knowledge participants such as archives holders of

various types of archives repositories at different levels and the artefacts. It has been adopted by all the institutions investigated. The effectiveness of such a mechanism for the integration of national archives resources is clearly demonstrated by the statement of one interviewee from a city archives institution: “the application of ICT in archives management has improved the connectivity between various stakeholders in archives collection, management and service provision, therefore leading to better utilization of national archives resources.”

Standardization control

Standardization for informatization is about the development of standards and systems for connecting national archives resources toward information sharing and business collaboration (He and Jiang, 2005). To improve the performance of the integration of national archives resources, there is a need for developing appropriate standards and systems for sharing archives resources and creating business synergy for better archives resources management and effective archives services delivery. Such a mechanism has the advantage of sharing archives resources across time and space (Dai, 2010; Xie, 2013; Reed, 2015). It has been adopted by all the institutions investigated.

Management innovation

Management innovations in the utilization of archives resources are about the adoption of novel ways to archives management and services. To be adaptable to the transformation discussed above, there is a need for innovative archival research and practice with a focus on innovative ways of effectively managing archives resources and adequately providing the public with archives services (Gilliland, 2014; An *et al.*, 2014a). Such an integration mechanism has been mainly adopted by business archives and government information resources centers, due to their organizational goals to achieve better governance and effective provision of public services. The implementation of an “archives in the hand” project in a city archives resources center is an example of such innovations through which archives resources can easily be accessed by individual users via their mobile devices.

Power shift

The provision of people-centric archival services in China represents a power shift from state benefits to social benefits through utilizing state-owned archives resources (An *et al.*, 2016b; Song and An, 2016). To face the demand of the social transformation, the integration of national archives resources is being changed from the internal construction of national archives resources to the external utilization of such valuable resources. Such a change focuses on the delivery of the public value through promoting people-centric knowledge services in archives management.

Accountability systems

Accountability systems are about the definition of the responsibilities and functions according to the laws and regulations that archives organizations should have and the consequence if nonconformity with (ISO 30300, 2011). This mechanism has both pros and cons. For the integration of archival resources, the development of appropriate accountability systems is beneficial to monitor the recordkeeping, archiving, and acquisition of holdings. It is however worthwhile to note that the Archives Law of People's Republic of China has conflict with the Secrecy Laws of People's Republic of China and the Regulation of Government Information Disclosure. There are different interpretations on who is responsible for open access to archives resources. To avoid making mistakes, many organizations do not like to take their responsibilities in their

daily operations. The urban development archives, the business archives and the government information resources centers have adopted this mechanism in conformity with their duties and functions.

Administrative control

The administrative control mechanism is commonly used in practices in China. The integration of archives resources for their optimal utilization works mostly effectively and efficiently when the integration participants are under the same administrative jurisdiction with unified standards and procedures for managing archives resources. Since archives resources are often from different provenance, such a mechanism has caused many management walls and isolated archives resources islands (Liu and An, 2009). The adoption of this mechanism by all the institutions investigated has improved the integration of archives resources for facilitating their optimal utilization. As pointed out by an interviewee from a public archives resources center, “the adoption of various administrative controls such as the one-stop service and the public collaboration platform greatly improves the utilization of archives resources and increases the quality of the delivery of public services.”

Information resources management

Information resources management is about how data, information and knowledge can be collected, processed, and stored for their optimal use (Deng, 2010). To facilitate information sharing across organizations, there is a need for developing an information resources management plan to facilitate the optimal allocation of national archival resources and the quality control of archival resources along the life of archives resources. Such a plan has the advantage of enhancing the capacity of archival services and the effectiveness of their operations (He and Jiang, 2005; An *et al.*, 2014a). This mechanism enhances the centralized control of archives resources for facilitating their optimal utilization. The urban development archives, the business archives and the public information resources centers have adopted this mechanism for the digital continuity of their businesses and the delivery of consistent and seamless services.

People-centric services

Providing the public with people-centric services is the direction of the 23 comprehensive archives institutions. The majority of them have established people livelihood subject catalogues. A few have provided online access to the archives resources that they manage. However, this is only limited to a few archives repositories, due to lack of policies for open access to archives resources, lack of standards for sharing archives resources and lack of adequate funding in the majority of archives repositories (Song and An, 2016). This mechanism promotes collaborations among and between archives repositories. The city archives, the district archives and the district government information resources centers seem more successful in adopting this mechanism since their services are more closely related to the need of the public.

Treatment of complains

A redress system is established to deal with complains as part of accountability systems for the government agency, particular in the implementation of the Regulation of Government Information Disclosure. This new mechanism has been used to deal with the utilization of archives resources in government agencies. The urban development archives and the government information resources centers have adopted this integration mechanism due to their accountability for government.

User feedback

A feedback mechanism is used for improving the quality of archival resources and the user satisfaction with the delivery of archives services. Feedbacks from users are helpful to identify the services gap and continually improve the service. As stated by an interviewee from a public archives resources center, “the adoption of the user feedback mechanism is critical for improving the quality of archives resources and therefore leading to better utilization of archives resources.” Only the public information resources centers have adopted this mechanism.

Risk control

A risk control mechanism is used to protect national security, privacy, and business confidentiality when the public asks for non-disclosure information according to the Regulation of Government Information Disclosure. The adoption of such a mechanism in various organizations has a direct impact on the manner in which the archives resources are managed and utilized. An interviewee from a public archives resources center pointed out during the interviewing process, for example, that “all their archives resources related to the underground infrastructure in their city is managed separately away from the cloud computing and big data applications.” The Urban Development Archives, the Business Archives and the Government Information Resources Center have adopted this mechanism due to their accountability for government.

Table I shows that ICT adoption, administrative control and standardization control are the most commonly used mechanisms. Legal control and power shift are often used in comprehensive archives. Collaboration and management innovations are uncommon in comprehensive archives. The development of accountability systems, provision of people-centric service, user feedback, risk control, and treatment of complains are newly discovered mechanisms that have not been discussed in previous studies (He and Jiang, 2005; Tan and Wang, 2006; Xie, 2013). The study indicates that ICT adoption, administrative control, and standardization control are the most effective mechanisms for improving the integration of archives resources in order to optimize the utilization of national archives resources.

There are diversified mechanisms for the integration of national archival resources. To develop people-centric knowledge-based services, there is a need to develop an integrated framework to develop interdependence, interconnections, and interactions between these mechanisms for making them as a complementary and organic whole for a knowledge continuum regime (An, 2015; Foster *et al.*, 2013; Reed, 2015). Adopting such a knowledge management perspective would be effective for the accumulation, sharing and provision of knowledge from archive resources and for better collaboration, communications, and connectivity between stakeholders of archive resources to connect past to present and present to future.

Toward a knowledge management-based framework

Knowledge management is a systematic process of managing knowledge assets, processes, and organizational environments to facilitate the creation, organization, sharing, and utilization and maintenance of knowledge for achieving the strategic aim of an organization (Davenport, 2001; Deng, 2010; An *et al.*, 2013). It is a formal process that engages an organization’s people, processes, and technologies in a solution that captures knowledge and delivers it to the right people at the right time (Duff, 2001; Jashapara, 2011; An *et al.*, 2013).

To meet the increasing demand for people-centric knowledge services in building a knowledge society, the accumulation, sharing, and utilization of national archives resources as knowledge assets is becoming critical (An *et al.*, 2014a). The integration of national archives resources facilitates the development of open government, open data and open access for promoting collaborative innovations and building a collaborative learning culture (An *et al.*, 2014a; Foster *et al.*, 2013; Reed, 2015). Knowledge management plays a key role in

the drive to transform government including the management and utilization of archives resources (McNabb, 2007). It is a knowledge ecosystem with the consideration of the pluralistic values of archives resources for their protection, sharing, use, and reuse and for their functionalities as evidences, memories, identities, and assets across time, space, and contexts (An *et al.*, 2010, 2014c; Foster *et al.*, 2013; Reed, 2015).

The performance of archival services increasingly depends on the effective integration of national archives resources and the knowledge developed in the integration process (Dai, 2010). A knowledge management-based framework for the integration of national archives resources is, therefore, significant to build relationships between the arrangement of knowledge management rules, activities, and artefacts for protecting, sharing, and increasing the value of national archives resources (Klett, 2015).

An overview of the interrelationship between diversified mechanisms is done by a systematic review of their functions, role of integration, effectiveness of the integration, and their contributions to the optimal utilization of archival resources from the knowledge management perspective. These mechanisms can be classified into three categories according to their roles in the integration process. The three roles are the reformation of knowledge management arrangement, the reengineering of knowledge management activities, and the reconfiguration of knowledge management artefacts. Reformatting knowledge management arrangement is associated with the role of knowledge in protecting the values of archival resources as knowledge assets of a state by adequate legal control, collaborations, accountability systems, a shift from state ownerships, and control to social benefits and utilization. Reengineering knowledge management activities is related to the rule of knowledge sharing and transferring of archival resources as knowledge assets of a society by management innovation, information resources management, administrative control, treatment of complains and user feedback. Reconfiguring knowledge management artifacts is associated with the enablers of knowledge dissemination and the use of archival resources as knowledge assets of the public by means of standardization control, ICT adoption, and people-centric knowledge services.

To facilitate the optimal utilization of national archives resources, a knowledge management-based framework shown as in Figure 1 is proposed for the effective

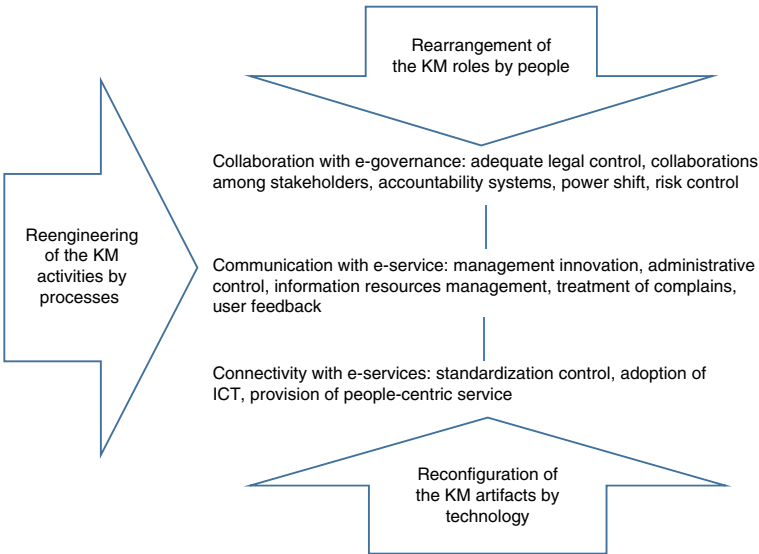


Figure 1.
A knowledge management framework for the optimal utilization of national archive resources

integration of archives resources as a top-level design. The framework can rearrange the role of knowledge management in collaboration with e-governance by people's awareness of the pluralistic values of knowledge assets to protect the value of archives resources as the knowledge asset of a state. It can remediate the knowledge management activities in communication with e-public services by a continuum regime of knowledge flow to share the value of archives resources as the knowledge asset of a society. Furthermore, the framework can help reconfigure the knowledge management artefacts by collaborative innovation of knowledge services in connectivity with e-resources to increase the value of archives resources as the knowledge asset of the public.

The rearrangement of knowledge management roles for the integration of archives resources recognizes the multiple perspectives of archival resources as knowledge holders, knowledge providers, participants of knowledge services, and partners of knowledge infrastructure (An *et al.*, 2010, 2014a; An, 2015). As the holders and provider of knowledge in the digital culture through integration, the pluralist value of archives resources from different provenances is considered through multiple ways of ontology building (Kretzschmar, 2012; Vlatka, 2012; Sköld, 2015). As the participant of knowledge services in the social transformation through convergence, the complexity of use and the continuum regime of knowledge services are evaluated (Archives New Zealand, 2009; The National Archives of Australia, 2011, 2014). As the partner of knowledge infrastructure for the digital transformation through synergy, the uncertainty related to the authenticity, reliability, integrity and usability of archives resources as knowledge assets across time, space, and contexts is taken into account based on the development of the knowledge architecture for risk control (Hofman, 2011; Klett, 2015; Reed, 2015). The arrangement of knowledge management roles in integration involves adequate legal control, collaboration among stakeholders, accountability systems, and a power shift from state ownership and control to social benefits and utilization to an alliance system.

The reengineering of the knowledge management activities in communication is to build the link between different integration mechanisms for improving the interaction between different activities and processes. This is important to safeguard the reusability of archives resources as the knowledge asset of a society and at the same time to ensure consistent and seamless access to archives resources as the knowledge asset of the public in the Internet of Things, cloud computing and mobile computing (Hofman, 2011; The Office of Management and Budget, 2012; The White House Office of Management and Budget, 2015). It involves in the adoption of management innovation, administrative control, information resources management, treatment of complaints, and user feedbacks to build a knowledge continuum regime and a digital continuity plan.

The reconfiguration of knowledge management artefacts in connectivity is to provide different knowledge seekers with opportunities to participate in collaborative innovation and experience of various kinds of services for the integration of archives resources and to improve the performance of archival services through knowledge portals, networks and infrastructure (Foster *et al.*, 2013). The arrangement of knowledge management artefacts in the integration of archives resources is important for enhancing the performance of open access, open data, open government, and big data applications (Archives New Zealand, 2009; The National Archives of Australia, 2011; Lemieux *et al.*, 2014). This involves in standardization control, ICT adoption, and provision of people-centric services with adequate risk control.

The proposed knowledge management framework for integrating national archives resources in China has following implications for the optimal utilization of national archives resources:

- The perception of archival work is changing from the self-development of the archival discipline to the pursuit of a sustainable knowledge society. This change aims at providing stakeholders with knowledge-based services through changing archival management practices.

- The direction of the research on the integration of archives resources is changing from the adoption of latest technologies to the satisfaction of users. Such a change is being guided by the demands, behaviors and experiences of users. The focus is moved from the construction of archives resources to the provision of knowledge-based services.
- The integration of archives resources is linked to the digital transition of public services. Digital recordkeeping and archiving is embedded into knowledge infrastructure building to ensure authenticity, reliability, integrity, and usability of digital archives and to safeguard the digital continuity of e-public services.
- The integration of archives resources is connected to the social transition of public services. Archives are regarded as the knowledge asset of a state for building a knowledge society. The integration of archives resources is part of the capacity building process in the delivery of public services to support open access to public information for protecting public rights and interests, for supporting the transparency and accountability of the government, and for promoting the reuse of public information resources.
- The integration of archives resources is being used for the provision of people-centric knowledge services through personalization.

Conclusion

Integrating national archives resources for providing people-centric knowledge services demands for a top-level design on such integration. To adequately address this demand, this paper presents a knowledge management-based framework for the optimal utilization of national archives resources through their effective integration in China. Such a framework is significant for protecting the value of national archives resources as knowledge assets of a state through arranging knowledge management roles embedded in e-governance, for sharing the value of national archives resources as knowledge assets in a society through reengineering knowledge management activities embedded in e-public service, and for increasing the value of national archives resources as knowledge assets of the public through developing knowledge management artefacts embedded in e-resources.

The proposed framework has reinvented the concept of state archives resources as an intellectual construct of knowledge assets of the state, society and people (An *et al.*, 2014a). It provides a way to better understand incommensurable ontologies and epistemologies between communities that surface in differing culture expressions and notions of cultural property and work within reality (Gilliland, 2014). The proposed framework improves the community's understanding of the relationships between different integration mechanisms and their interactions in the social transformation, digital transition, and archival transformation in Chinese practices with respect to the management and utilization of archives resources. It offers a holistic structure to take the advantages of existed mechanisms as a complementary new whole for the effective integration of archives resources to facilitate their optimal utilization. Furthermore, the framework can be used to guide the development of a national strategy for the integration of archives resources to ensure the provision of public-centric knowledge services.

This paper is limited to the conceptual framework building for integrating national archival resources at the top level. Empirical studies will be done in future to verify the effectiveness and potential applications of such a framework. Specific indicators and metrics would be developed to measure the significance of such a framework in real situations.

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Further reading

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