

Analysis of the Transformation and Innovation of Public Libraries in the Post-Emergency Era

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Abstract: In recent years, global public emergencies have profoundly impacted library service models, operational mechanisms, and professional ethics. Such events have driven the transformation and upgrading of traditional library services, forcing libraries to adapt their working models to new circumstances. This paper explores service innovations and response strategies adopted by libraries during special periods and analyzes how libraries can adapt to and lead the “new normal.” The study argues that libraries need to construct new service systems to enhance their visibility and sustainability in cyberspace. To this end, this paper constructs a “Triangular Management Model” for libraries in the post-emergency era and, based on this model, designs overall strategies and specific measures aimed at continuously improving internal work efficiency and upgrading external service levels to address new challenges and opportunities.

Keywords: Post-emergency era; Triangular management model; Digital library; Reader services; Content providers

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1. Introduction

Global public emergencies in recent years have presented a significant societal test, causing massive impacts on almost all areas of human society ^[1]. The education sector was similarly deeply affected, with most educational institutions forced to shift from offline to online teaching. As a core component of the educational, cultural, and information service system, libraries have also undergone profound changes in their working models and service paradigms ^[2].

During special periods, libraries widely faced challenges of closure or limited operations, with most staff adopting remote work models ^[2]. In this context, the global library community actively sought ways to maintain operations and continue fulfilling their educational, information, and cultural service functions under conditions where physical services could not be provided ^[3]. This crisis highlighted long-standing challenges faced by libraries that had not been fully resolved, such as the digital divide, which was exacerbated by unequal information infrastructure. The special period accelerated the migration of most library services online, creating a new service

environment where physical contact between staff and users is unnecessary^[3]. This has become a “new normal” that libraries must adapt to and develop within.

2. Impact of public emergencies on libraries and response measures

Under normal circumstances, libraries are public places densely visited and used by readers for exchange. After the outbreak of a public emergency, libraries pose potential safety risks due to their public nature^[4]. Consequently, a primary measure in the initial stages is strictly limiting the number of people entering the library^[4]. Although the number of visitors decreased, the demand for academic information and other services did not weaken; instead, it placed higher demands on libraries’ online consultation and digital services^[5].

Based on summarizing the impact of the event and assessing new challenges in the post-emergency era, and to ensure the safety of staff and relevant parties, this paper proposes a “Library Triangular Management Model” (**Figure 1**) as a benchmark framework for library management and services.

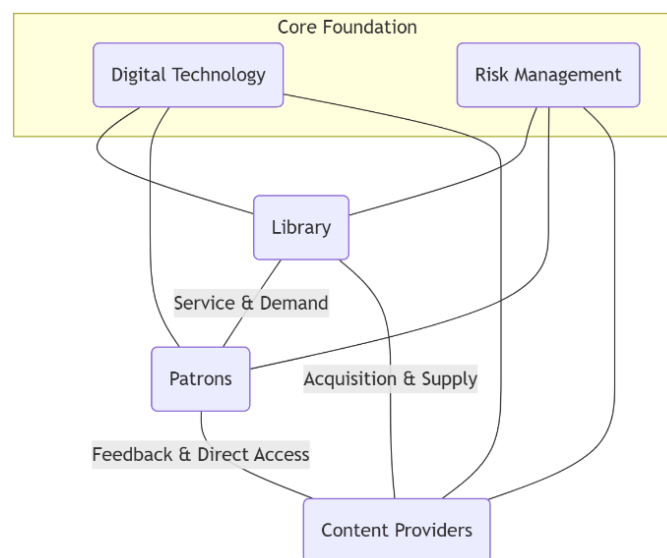


Figure 1. Library Triangular Management Model

To implement this model framework, the study proposes and has implemented the following nine specific measures:

- (1) Emergency response and decision-making mechanism: After a public emergency occurs, the library needs to quickly convene a full-staff video conference to develop safety plans and emergency measures^[6]. Plans should be submitted to superior departments for review, and relevant experts invited for guidance to ensure scientific validity and effectiveness.
- (2) Pre-entry safety supplies: Provide adequate cleaning supplies and other safety materials at the library entrance, recommending that all individuals clean their hands before entering^[7].
- (3) Strict entry management: Security personnel verify the identity information of entrants and register key details such as name, contact information, and entry time to achieve traceable management^[8].
- (4) Upgraded safety in circulation services: Set up physical barriers at loan and return counters to ensure appropriate distance between staff and readers, reducing the risk of cross-infection^[9].

- (5) Construction of a contactless loan system: Establish a loan management information system integrating barcode readers, computer networks, and server clients ^[10]. Books returned by readers are placed on designated shelves, uniformly cleaned, and isolated for a specified period before being available for circulation again.
- (6) Reconfiguration of reading spaces: Adjust the seating layout in reading areas to ensure spacing meets safety requirements, reducing personnel density. Enhance indoor ventilation and provide cleaning supplies in reading areas, reminding readers to pay attention to personal hygiene ^[11].
- (7) Staff office and resource handling safety: Optimize the layout of back-office work areas to meet safe distancing requirements. Staff must take basic protective measures when handling books. Implement staggered and dispersed meal times. Newly arrived physical resources also require corresponding handling. Vigorously promote remote work, utilizing networks for consultations, data processing, meetings, etc. ^[12–13].
- (8) Accelerated digital resource development and access optimization: The special period greatly accelerated the digital transformation process of libraries ^[14]. Libraries have significantly enhanced the visibility and usability of electronic resources by redesigning official websites, enabling readers to access various digital resources remotely more easily, including free textbooks and academic resources ^[15].
- (9) Promotion of open educational resources (OER): Systematically build OER collections and encourage widespread use by teachers and students ^[16]. Simultaneously, increase the budget for purchasing electronic resources, upgrade digital resource access platforms, and provide readers with services for remote access to journal databases to ensure the continuity of off-campus research ^[17].

Based on the aforementioned Triangular Management Model, **Table 1** systematically summarizes the specific management measures taken for different risk pathways.

Table 1. Comparison table of library safety management measures based on the Triangular Management Model

Potential risk pathway	Measures taken
Books & Readers	• Book cleaning treatment (for returned and newly purchased books) • Provision of facilities for using cleaning supplies after handling books • Encouraging users to minimize the use of physical books and promoting e-book use • Promoting e-books and e-resources by redesigning the library website • Advancing online book reservation services • Increasing the collection scale of Open Educational Resources (OER)
Staff & Readers	• Basic protective measures for readers and staff inside the library • Necessary registration of entry information • Use of self-service loan/return machines and management information systems • Encouraging use of cleaning supplies and maintaining appropriate social distance
Staff & Books	• Hand cleaning before handling books • Basic protection when handling books • Encouraging all staff to work from home whenever possible
Books & Content Providers	• On-site cleaning at physical book fairs, safe transportation of books • Minimizing or canceling non-essential offline gatherings • Content providers offering digital resource services and online material access
Staff & Content Providers	• Book procurement staff increasing participation in online fairs • Basic protection and safe distancing for necessary offline activities • Electronification and paperless transactions between staff and suppliers
Readers & Content Providers	• Collecting data on readers' loan history, web browsing traces, etc. • Using big data technology to analyze readers' reading preferences • Content providers introducing new books and pushing journals to readers online

3. Libraries in the post-emergency era

The executive director of the Association of Research Libraries (ARL) pointed out in a discussion that even before the special period, two major trends existed in research libraries: first, the acceleration of resource and service digitization; second, the increasingly important role of the library as a public space connecting people and ideas. The public emergency stretched these two trends in distinctly different ways: regarding “digitization”, the event greatly accelerated this process; regarding “place”, the event temporarily affected the library’s function as a community space, a function that will undoubtedly be re-examined and redefined in the future ^[18].

Emergency management for libraries in the digital age faces multiple challenges, including technical failures, management complexity, and diversified reader needs, necessitating the construction of an emergency management model integrating system, technology, service, and personnel in a coordinated manner ^[19]. Public emergencies causing large-scale library closures forced them to provide broader remote services and apply online tools more deeply to meet user needs ^[20]. The reopening of libraries does not mean a simple return to the old model but signifies the establishment of a completely new, normalized service paradigm. In this process, libraries need to actively explore new paths for transformational development while adhering to the core values of cultural heritage and knowledge service ^[21]. Libraries must prioritize the safety of employees and users, placing high importance on the safe handling of resources and facilities.

Furthermore, users have gradually adapted to and become accustomed to convenient online information services, making a complete return to traditional service models highly unlikely. Research on the construction of university library service systems based on user trust indicates that establishing psychological identity and behavioral loyalty through focusing on user perception is an important way to promote service system innovation ^[22]. Therefore, libraries must formulate long-term strategies to achieve transformation through innovative management and services. Against the backdrop of global major changes, libraries need even more to reposition their roles by serving national innovation-driven development strategies, supporting high-end think tank construction, building platforms for exchange and cooperation, and participating in cultural governance, thereby forging new prospects within the changing landscape ^[23]. Librarians and management must gain a deep understanding of changes in user needs through regular surveys and dialogue.

As social network application models continuously evolve, library services must also develop dynamically. Understanding readers’ content preferences and deeper needs to provide them with more accurate and cutting-edge information becomes crucial. In the post-emergency era, libraries can sustainably update research data services and offer more digitally accessible resources and services. Notably, a multi-agent participatory library emergency alliance intelligence system built on blockchain technology can effectively improve the efficiency and safety of crisis response, offering a new technical path for future library emergency management ^[24].

4. Summary and outlook

Before the special period, many libraries (especially in developing countries) primarily focused on offline services, with the depth and breadth of digital services needing expansion. Today’s readers are digital natives, technologically savvy, and accustomed to remotely accessing information and services through ubiquitous networks and technological devices. Emergency management for libraries in the digital age needs to shift from passive response to active prevention, building a more intelligent and forward-looking management system.

It is worth noting that in responding to public emergencies, libraries can not only take passive defensive

measures but also proactively leverage their unique advantages as knowledge and information hubs: for example, by promoting public safety knowledge, disseminating event prevention measures, tracking relevant research progress, and guiding the public to enhance safety awareness, thereby improving society's sustainable development capacity and public safety literacy. Amid global major changes, libraries should actively contribute by building more open and collaborative service systems, playing a more important role in knowledge dissemination and cultural heritage.

Addressing transformation and innovation in the post-emergency era, this paper proposes a "Triangular Management" theoretical model and elaborates on the active role of libraries during public safety incidents. The future development of libraries requires finding a balance between adhering to core values and promoting transformational innovation, maintaining commitment to traditional cultural heritage, while actively embracing opportunities brought by digital transformation. In summary, libraries in the post-emergency era must continuously enhance their capabilities in optimal resource allocation, data-driven knowledge services, ecological synergy, and technology application and mastery, responding to future challenges and development opportunities through constant self-innovation.

Disclosure statement

The authors declare no conflict of interest.

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