

Embedding Digital Preservation across the Organisation: A Case Study of Internal Collaboration in the National Library of New Zealand

Cynthia Wu; National Digital Heritage Archive, National Library of New Zealand; Wellington, New Zealand

Abstract

Successful implementation of a digital preservation programme relies on many well known factors, including strong management support, adequate funding, appropriate technology and motivated staff possessing the required skill sets. Naturally, very few organisations would cite disinterest in collaborating externally to pursue such initiatives. However, one noticeable pitfall that can ensnare organisations is the delay in engaging the wider organisation in the software development lifecycle. As a result, the digital preservation programme runs the risk of reducing its effectiveness when integrating digital preservation management throughout the organisation.

Using the National Library of New Zealand (NLNZ) as an example, this case study illustrates how its digital preservation programme, the National Digital Heritage Archive (NDHA):

- used internal collaboration to prepare its integration with the Library's infrastructure.
- laid the foundation for the programme as it moved from project mode into business as usual.
- provided the basis of the ongoing relationship between the organisation and the digital preservation programme.

The National Library of New Zealand's experience offers a unique insight into the use of internal collaboration strategies within a digital preservation programme. It is hoped that this study will be beneficial to other organisations in the process of implementing their own digital preservation programmes and encourage strong internal collaboration practices.

Background

The National Library of New Zealand, Te Puna Mātauranga o Aotearoa (NLNZ), was established in 1965 under the National Library Act. The National Library was charged with the mandate to enrich the cultural and economic life of New Zealand by collecting, preserving, and protecting documents, particularly those relating to New Zealand, and making them accessible for all the people of New Zealand, in a manner consistent with their status as documentary heritage and taonga (treasure) [1].

With the explosion of digital data and information in the last two decades, the National Library Act was subsequently revised in 2003, providing the Library with the legislative mandate to collect and preserve digital content [2]. This enabled the Library to begin its search for a digital preservation solution. The National Library received 24 million dollars of Government funding in 2004, allowing the Library to formally launch its Digital Preservation Programme, the National Digital Heritage Archive (NDHA).

The National Digital Heritage Archive programme spent 18 months gathering extensive business and functional requirements, and reviewing existing digital preservation solutions at the time. In 2005, the Library formed a development partnership with ExLibris and Sun to build a digital archive and preservation management system, Rosetta, in consultation with preservation experts from peer organisations around the world.

The National Digital Heritage Archive formally launched the first phase of Rosetta system utilisation in October 2008 and moved into business as usual mode. The second phase of the system was launched in 2010. To date, digital material accepted by the Library into the archive encompasses a wide range of material. The archive currently holds around 5.5 million objects, spanning across 90 different formats and consisting of approximately 50TB.

The Challenge

How much information 2003; a Berkeley University study charted the extensive increase in electronic publishing. They noted that print, film, magnetic, and optical storage media produced about 5 exabytes of new information in 2002. Whilst information stored on paper still continued to increase, printed documents of all kinds comprised only .01% of the 2002 total. The study noted that 92% of the 2002 output was stored on magnetic media, mostly in hard disks and that there had been an 87% growth since 1999 of worldwide production of new information recorded on magnetic storage media (Figure 1). Clearly, the challenge for the Library was how to respond to this exponential growth in digital and how to refresh the business in order to meet this challenge.

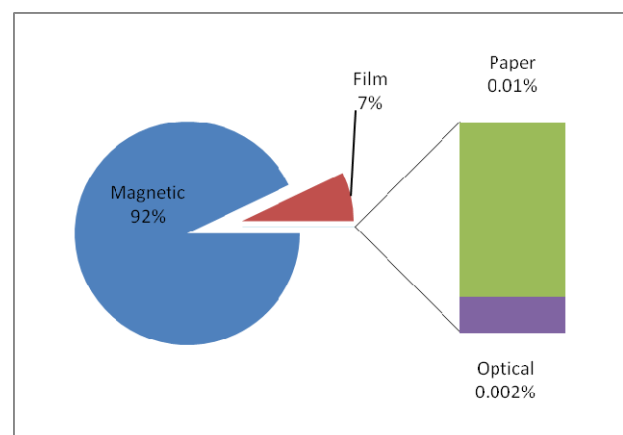


Figure 1. How much information 2003 [3].

The NDHA recognised early that its implementation would have significant impact for staff across the Library, and that organisational readiness and internal collaboration were crucial to the success of this programme. To fully support the NDHA project and to ensure the delivery of a relevant and sustainable digital preservation programme, it required the programme to interact with all business processes and procedures within the National Library, with appropriate resources, services and infrastructure. Initial assessment showed that staff with existing skills and knowledge in collection building, donors liaison, arrangement and descriptions, and cataloguing for physical collection could apply the same skills for digital material with additional training.

As a result, a distributed model for digital material ingest management and digital preservation was chosen. To effectively implement this model, the NDHA identified the following areas that would require internal collaboration within the organisation during the project lifecycle:

- Business processes – Existing workflows, procedures, and policies should be modified in order to embed digital preservation at the centre of the organisation.
- Capacity and capability – Sufficient dedicated staff are required to process digital collection within the Library. Staff working closely with the digital preservation system will also need to be up-skilled.
- Producer management – With the introduction of electronic material and changing business workflows, the Library’s future interactions with publishers is also changing. New services, marketing, training are required for the Library to properly engage external publishers when dealing with digital material.
- Performance measures – A sound performance management framework must be in place to support digital preservation decision-making across all relevant business units.

- Internal training – Appropriate training should be rolled out across the Library, especially for staff that will be working closely with the system.
- Business and technical supports both within and across departments should be in place to ensure smooth transition into new business processes.
- Communication – Keeping the wider organisation informed throughout the programme development can better prepare the organisation for the change ahead. A high level of staff buy-in would be needed to ensure staff across the Library understand the concept of digital preservation and its importance to cultural heritage.

Implementation

The NDHA project incorporated an extensive business change element at its inception. This section of the programme was divided into seven discrete work streams (Figure 2), each developing and implementing the elements previously identified to ready the organisation for end to end digital preservation management, including the introduction of the NDHA system in late 2008.

The importance of business change and internal collaboration can be seen in Figure 3. The NDHA business change programme spanned the entire project timeline. It continued on past the launch of phase one of the preservation system in which the released functionalities had the biggest impact for staff across the organisation. Only with comprehensive prior development and implementation of organisational change on this scale, could the National Library successfully integrate all aspects of digital preservation management into the business.

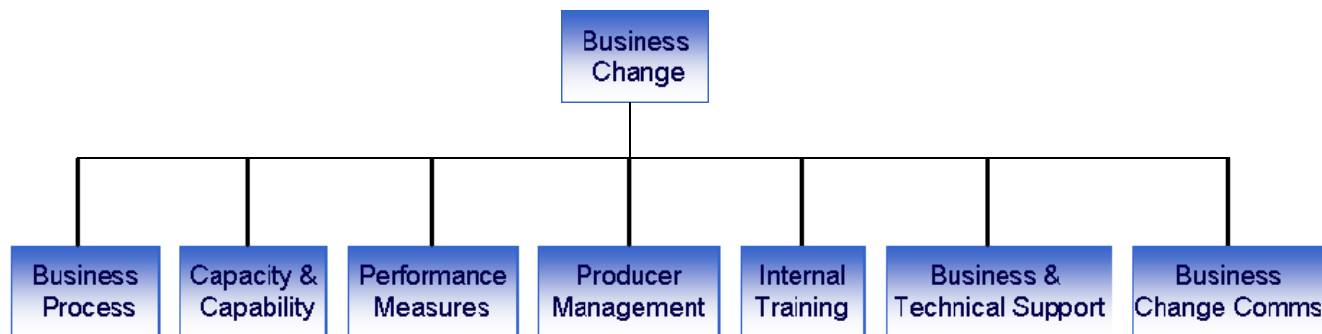


Figure 2. Seven streams of business change [4]

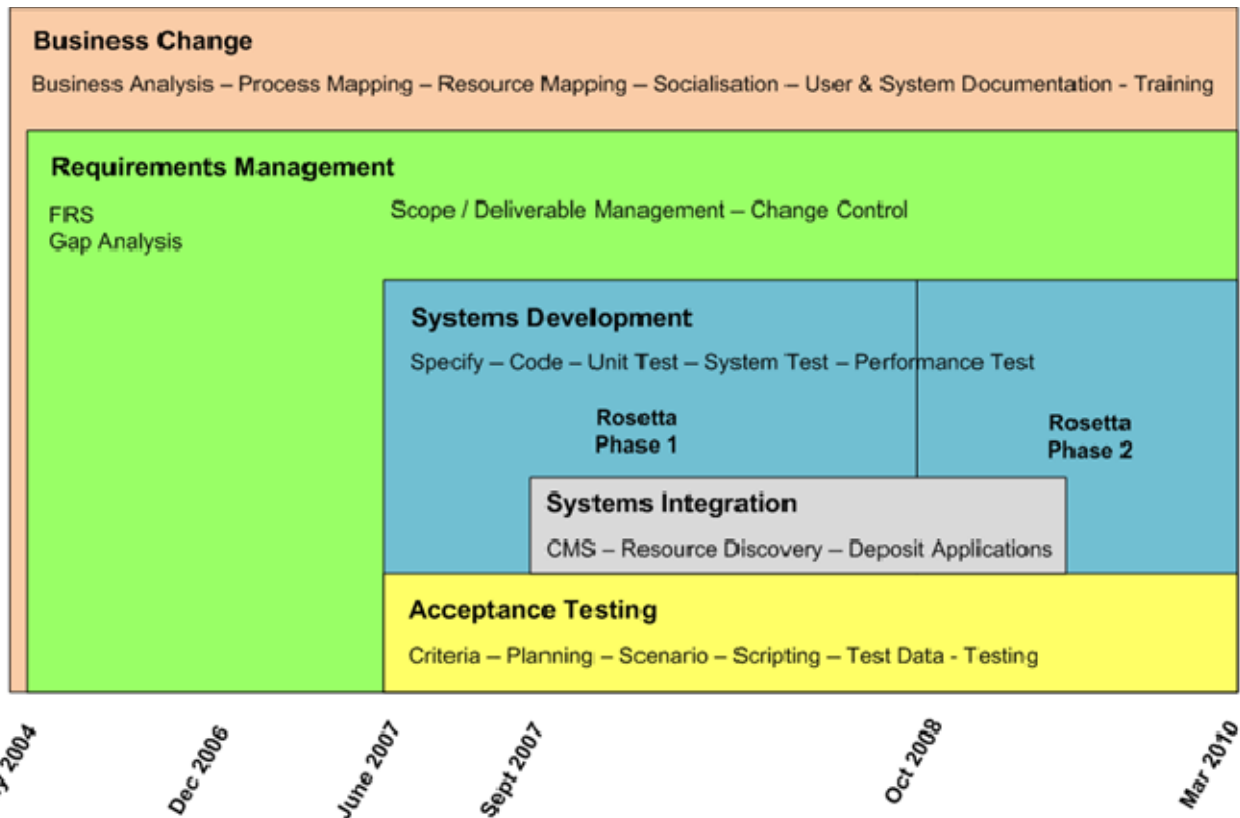


Figure 3. Span of business change activities

Business Change

The business change section was intended to connect the wider Library and the NDHA project through selected staff from various Library business units (Figure 4).

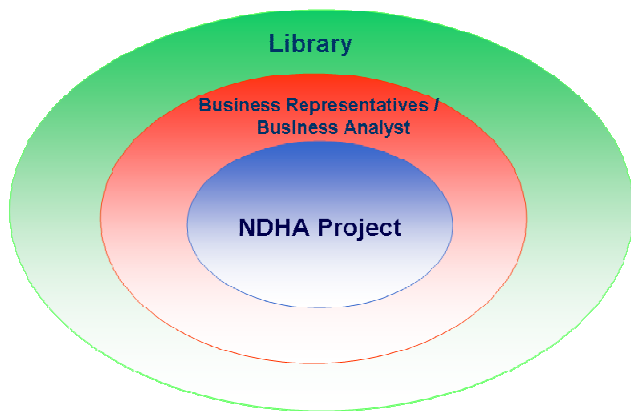


Figure 4. Linking the Library with the project

Selected business representatives included:

- ‘Subject matter experts’ (SMEs) from various parts of the Library, who were seconded to the project for its entire duration. This allowed NDHA programme to leverage their

specialist knowledge for various business change work streams

- Managers, curators and team leaders of SMEs. They were able to assess the level of organisational buy-in
- Library Review Group set up to manage the overall business impacts of the project on the wider organisation

Collaboration Activities and Deliverables

Seconded SMEs were heavily involved in all stages of the digital preservation programme with specific deliverables. Their engagement and deliverables spanned all seven business change work streams. In addition to these work streams, the NDHA programme also involved the SMEs during its 18-months long business and functional requirements gathering phase. Four Subject Matter Experts were seconded with 80% of their time preparing use cases together with NDHA requirements manager and business analyst. These use cases eventually fed back into NDHA’s Request for Information (RFI) process. One staff member from the NLNZ Technology Services team was also seconded full time to work on data modelling in conjunction with ExLibris.

When functional specifications were made available to NLNZ, all seconded SMEs took part in specifications review, with each specification revised up to 3 times. They also provided significant input into the UI design and testing phases of the project. Prior to the launch of the Rosetta system, seconded SMEs carried out extensive testing against each iteration of system prototypes. To date, basic workflow testing are still carried out by

some seconded SMEs before each version releases. Table 1 below shows the main collaboration activities and deliverables developed jointly by SMEs and NDHA project team prior to system launch.

Table 1. Business Change Deliverables

| Business processes: Current & Future Process Design | SMEs | NDHA Business Analysts |
|--|--|---|
| | Develop Use Cases | |
| | Map and review current processes | |
| | Design and develop future processes | |
| | Identify implications of processes on policies and procedures | Update existing policies and procedures |
| | Output: Implementation plan for business processes, policies and procedures. | |
| Capacity & Capability | SMEs | NDHA Business Analysts |
| | Map current capacity and capability to future processes | |
| | Map future capacity and capability to future processes | |
| | Identify capacity and capability gaps | |
| | Identify future skills and roles requirements | |
| | Output: Role descriptions for future positions | |
| Producer Management | SMEs | NDHA Business Analysts |
| | Analyse current producers | |
| | Identify future producers | |
| | Develop producer strategies | Develop generic and individual producer workflows |
| | Develop producer training material and exercises | Develop producer training plans |
| | Output: Producer trainings and usability reviews | |
| Performance Measures | SMEs | NDHA Business Analysts |
| | Review current performance measures and framework | Identify current performance measures and framework |
| | Develop NDHA performance measures and framework | |

| | Output: Approximately 60 key performance measures, covering reporting, audit, and internal ingest workflows. | |
|---|---|---|
| Internal Training | SMEs | NDHA Business Analysts |
| | Review training needs analysis | |
| | Develop training material | Adapt training materials and exercises for target audiences |
| | Support training | Provide NDHA expertise to support training |
| | Output: Training documentation design and delivery | |
| Business & Technical Support | SMEs | NDHA Business Analysts |
| | Review current business and technical support provision | Analyse current business and technical support provision |
| | Review future business and technical support requirements for NDHA | Analyse future business and technical support requirements for NDHA |
| | Output: Support plan, Service Level Agreements, client support and escalation arrangements, transitional arrangements | |
| Communication | SMEs | NDHA Business Analysts |
| | Communicate SMEs activities and outcome within individual business units | Deliver organisation-wide updates on project development |
| | Prepare communication with external producers | Market NDHA programme to relevant external parties and prepare appropriate marketing material |
| | Output: Communication plan, marketing material | |

Other Areas of Collaboration

Apart from SMEs seconded to the project, the NDHA project team also collaborated extensively with the Library's internal

Technical Services teams, together with the primary vendors, ExLibris and Sun. Two new positions funded by the NDHA project were established to provide NDHA with technical support, as well as liaison with the rest of the Technical services team. Technical collaboration covered the following areas of NDHA implementation:

- NDHA technical hardware and software requirements
- Design of NDHA technical environments
- Development of storage and backup requirements
- Selection of hardware and storage architecture
- Internal development of ingest tools
- Integration with existing infrastructure
- Integration with existing systems
- Service Level Agreements
- Ensuring authenticity and integrity measures are in place and regularly enacted (e.g. fixity checks)

Impacts & Learnings

The NDHA programme's use of business change to collaborate internally had a wide impact across the organisation. In 2009, the NDHA business unit undertook an informal survey to establish the Library staff's attitude towards the programme's implementation of business change [5]. The influences noted from this survey could be generally divided into organisational and individual impacts.

Organisational Impacts

The NDHA programme had generally raised the capability of the wider organisation through business representatives and increased staff interaction with digital material. It also increased the understanding and awareness of different workflows and business objectives among the various business units. During the project's inception, a large proportion of the Library staff felt threatened by the possibility of collections being moved away from physical to being born-digital or digitised.

Following regular communication of development objectives and progress within the organisation, the project ultimately achieved the buy-in that assisted the smooth integration of the digital preservation programme into the wider business. Many of the Library staff now perceive digital material ingest as just another stream of collection building in addition to the existing physical collection.

With the introduction of the digital preservation system and expected increase of digital material ingest, the organisation had made some structural staffing changes. New positions created and funded by the NDHA programme were embedded within the relevant business units to specifically deal with digital ingest. A new NDHA business unit was set up to manage the core applications, handle technical issues with individual files, and perform digital preservation activities. Many other existing staff members also started working with digital material. Current types of Library staff (excluding the NDHA business unit) who deal with digital material include:

- Imaging Technicians
- Arrangement and Description Librarians
- Cataloguers
- Curators
- Music Librarians

- Legal Deposit Librarians
- Sound Conservators and Technicians
- Digital Archivists
- Digital Materials Librarians
- E-publication Librarians

Impact on Individuals

The NDHA programme collaborated closely with business representatives from the organisation throughout various phases of project development. As a result, their participation had made positive impacts on both the individual staff and the wider organisation. Staff input into the requirements gathering, design, and development phase had given them a sense of ownership towards the system and the preservation programme.

The process of reviewing the workflows from each business units allowed them to discover basic flaws in their operating procedures. They felt more confident in providing internal support to other users within their own business unit subsequent to their participation in the testing and training process. Through this process, staff members increased their expertise and gained better understanding of digital preservation.

Ongoing Impacts

The comprehensive collaboration process between the NDHA project and the wider business enabled the National Library of New Zealand's digital preservation programme to transition smoothly from a project into business as usual mode. Through this collaborative process, the NDHA business unit was able to establish close working relationships with all business units within the Library. In turn, this encourages communication between NDHA and the wider business, and helps the NDHA to provide better and more effective digital preservation and system support.

The business change component of the NDHA project was formally transferred to NDHA business unit in December 2008. Building on the foundation of previous collaboration, the NDHA business unit was able to re-use existing training methods and documentation to introduce new system functionalities to relevant staff. Specialists staff who participated in the NDHA project were able to on-train other members from their business unit in using these new functionalities. Such collaboration has transformed a possibly one-off project practice into an effective and sustainable business change process (Figure 5).

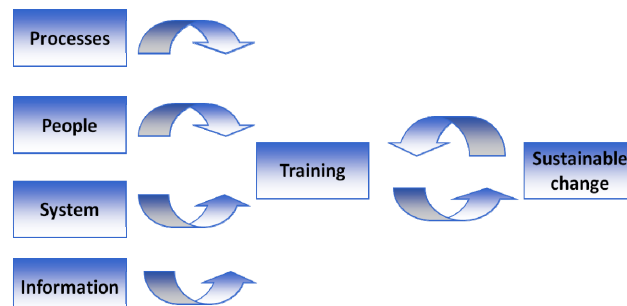


Figure 5. Sustainable change

Internal collaboration increased the Library's business units understanding of the system and enabled them to manage their

own ingest processes and workflows with minimal intervention by the NDHA. Figures 6 and 7 below show the distribution of ingest materials by business unit. The first chart (Figure 6) shows a breakdown of materials ingested into the NDHA by business area, with the Image Digitisation ingest stream including the digitisation which had been outsourced as well as that carried out in-house. The second chart (Figure 7) extrapolates out the internal business programme of ingest into the repository by business area.

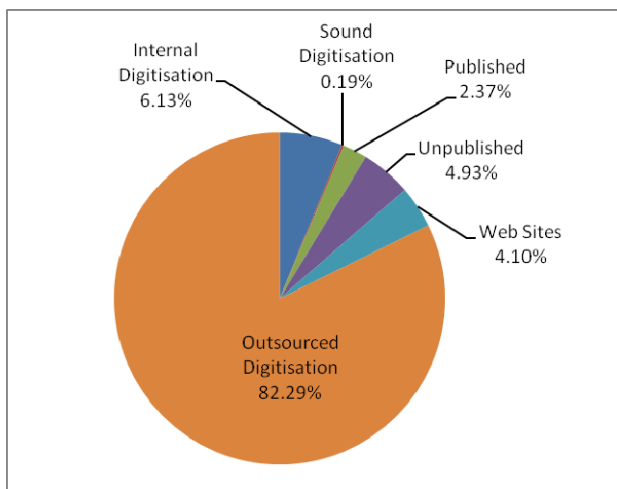


Figure 6. Distribution of ingested material from all sources including outsourced digitisation.

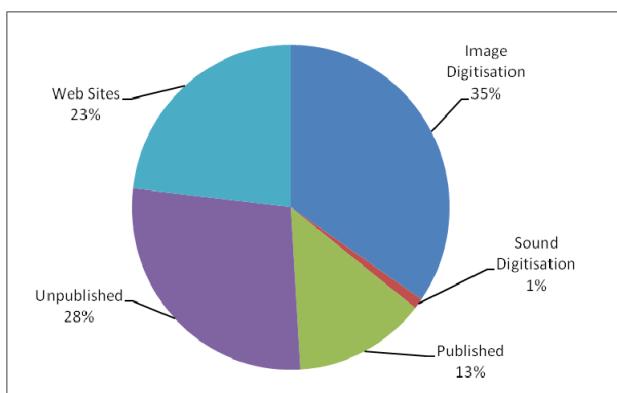


Figure 7. Distribution of ingested material from various business units

Learnings

While the NDHA digital preservation programme was implemented successfully across the organisation through substantial internal collaboration and business change, this process was not without flaws. A further survey with relevant staff indicated that some of the work streams were found to be too detailed. For example, the business process work stream included in-depth examination of existing business processes. However, processes not relevant to the digital preservation programme were also examined. This took up significant staff time and reduced available resources to the individual business unit. It is suggested that prior evaluation should be made to determine an effective and suitable scope for the work stream.

Not all of the output from the seven business change work streams made significant impact to the organisation. During the project implementation, performance measures were developed with the view to ensure business process efficiency and to inform business reporting requirements. As the wider Library business units using the Rosetta system moved into business as usual, these performance measures were found to be impractical. There is still ongoing discussion regarding performance measures, e.g. the value of counting widgets versus our ability to measure qualitative outcomes of a digital preservation programme.

Separate reporting requirements were subsequently defined after liaising with the core NDHA business unit. These new reports were deemed to be a better indicator of individual business unit performance and became an integral part of supporting business workflows.

Current and Future Challenges

Internal and external challenges continue to drive internal collaboration at the National Library of New Zealand. The exponential increase of digital data and information, and rapidly changing technology and file formats create ongoing dialogues between the National Library's business units and the NDHA on issues of access and preservation. The continual growth of digital collection increases infrastructural collaboration between the National Library and its internal technology services provider, the Government Technology Services.

Recent economic downturn has led to reduced funding. The NDHA and National Library of New Zealand are facing larger staff turnover and the loss of business and infrastructure knowledge. As a result, it is crucial that the NDHA maintain its collaboration and communication with the wider organisation to ensure ongoing development of digital preservation practices at the National Library.

The National Library of New Zealand has begun sharing the ExLibris Rosetta system with Archives New Zealand, which recently merged under the Department of Internal Affairs along with the Library. Extensive collaboration was carried out to share not only the infrastructure, but also digital preservation concepts and management practices. Ongoing collaboration is needed to enable Archives New Zealand to transit from project into business as usual mode with the appropriate infrastructure and common digital preservation strategy [6].

Finally, digital preservation will become increasingly important as the need to ensure sustainability of digital assets becomes a national issue, and the volume of digital information output continues to grow. Consequently, digital preservation knowledge and its profile must be raised both internally and external to the National Library. Strong internal collaboration can enable digital preservation to become one of the core organisation strategies going forward, thus forming a strong foundation along with collections management and access to fulfill the Library's mandate of enriching the cultural and economic life of New Zealand.

Conclusion

The extensive use of internal collaboration has helped the National Library of New Zealand to prepare, well in advance, for the integration of its digital preservation management into existing

processes and practices across the organisation. It allowed the business units to examine their workflows carefully and contribute to the development of these workflows in the digital context.

During this process, many Library staff were up-skilled, and gained increased knowledge and understanding of digital preservation. The programme attained positive business buy-in across the wider organisation. Ongoing internal collaboration embedded within NDHA's daily business practices and system development processes ensures the NDHA remains a robust, coherent, relevant and sustainable digital preservation programme.

While the NDHA programme was fortunate to be funded by government through its project phase, it is hoped that the above clearly articulates the values and principles of a whole of organisation approach to the implementation of a digital preservation programme.

References

- [1] National Library Act 1965.
- [2] National Library Act 2003.
- [3] Lyman, P., Varian, H.R.. (2003). *How much information 2003*. Retrieved from <http://www2.sims.berkeley.edu/research/projects/how-much-info-2003/>

- [4] Knight, S. (2008, August). *From theory to practice: digital preservation at the National Library of New Zealand*. Paper presented at World Library and Information Congress: 74th IFLA General Conference and Council, Quebec, Canada. Retrieved from: <http://archive.ifla.org/IV/ifla74/Programme2008.htm>
- [5] Knight, S. (2009, June) *Early learnings from the National Library of New Zealand's national digital heritage archive project*. Paper presented at World Library and Information Congress: 75th IFLA General Conference and Council, Milan, Italy. Retrieved from <http://www.ifla.org/files/hq/papers/ifla75/146-knight-en.pdf>
- [6] National Library of New Zealand, Archives New Zealand (2011, June). *Digital Preservation Strategy*. Retrieved from http://ndha-wiki.natlib.govt.nz/ndha/attach/News/Digital_Preservation_Strategy.pdf

Author Biography

Cynthia Wu is the Digital Preservation System Administrator for the National Digital Heritage Archive at the National Library of New Zealand. She received her B.Sc in Computer Science, Information Systems from the University of Auckland, and her Master of Library and Information Studies from the Victoria University of Wellington. She is currently responsible for system configuration, maintenance, and liaison with internal business and external vendor