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# Managing Primary Research Data and Records for Research in Research Institutions and Related Organizations: Examples from the TEAM Malaysia Case Studies

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## Abstract

*This paper discusses the existing national data archives in the developed countries, the main objective of which is to preserve primary research data and records for research in electronic format. Such archives encompass a range of service models, e.g., centralized collections, geographically distributed collections, and descriptive catalogues or gateways. The existence of data archives makes the task of retaining and preserving primary research data and records for research for re-use far more manageable and achievable. In Malaysia, currently the primary research data and records for research are managed by individual creating agencies. This has resulted in difficulties in gaining access to these records by external users. Some of these records may no longer be accessible or readable. On this basis, a data archives for social sciences research in Malaysia should be developed to safeguard the accuracy and authenticity of electronic records created by various research institutions. However, before such a data archives is developed, a study must be carried out to identify the existing practice in managing these types of records and, at the same time, identify the type of research data and records that need to be archived for long-term storage and re-purposing. Within the context of the InterPARES 3 Project, this paper reports the preliminary results of a study carried out by the TEAM Malaysia on primary research data and research materials available in the various research institutions of Malaysia.*

## Introduction

JISC (Joint Information Systems Committee) Guidance on Managing Research Records<sup>1</sup> describes research records as records associated with the research process, which can be organized into four categories: (1) records documenting the research process; (2) records documenting research outcomes or products; (3) records documenting the management of the research process/project(s); and (4) research data in both 'raw' and 'analyzed' form. Thus, the creation and maintenance of records is integral to the research process. Complete, authentic and reliable records are required to demonstrate good research practice and to strengthen the reliability of research evidence; safeguard researchers and institutions from allegations of research misconduct; demonstrate effective stewardship of resources to auditors and research sponsors; protect individual and institutional intellectual property rights; and demonstrate compliance with legislation, regulations and other requirements. Most importantly, these records need to be managed and preserved to benefit further research. Increasingly, these records, and the systems that generate, manipulate, manage and preserve them, are electronic in nature. One of the most significant problems facing organizations that create and use electronic information is that electronic systems are seldom designed to keep records.

The following are spectacular examples of failures in recordkeeping because of the technical challenges of managing electronic records:

- The USA Census Bureau could not gain access to its raw data from the 1960 Federal census as there were only two machines in the entire world capable of reading those tapes: one in Japan and the other deposited as a relic in the Smithsonian Institute.<sup>2</sup>
- Many electronic records of the former East German government are inaccessible to the citizens and present government of Germany because the relevant computer systems are wanting in the requisite documentation, and the records are held on obsolete media whose condition has deteriorated.<sup>3</sup>

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<sup>1</sup> Joint Information Systems Committee, "Managing Primary Research Data and Records," JISC.

[http://online.unn.ac.uk/faculties/art/information\\_studies/imri/rarea/rm/rm\\_primary\\_res\\_data.html](http://online.unn.ac.uk/faculties/art/information_studies/imri/rarea/rm/rm_primary_res_data.html) (accessed 6 April 2009).

<sup>2</sup> United States Census Bureau (1993), "Levels of access and use of computers: 1984, 1989, current population survey report."

<http://www.census.gov/ftp/pub/population/socdemo/computer/compusea.txt> (accessed 1 July 1997).

<sup>3</sup> Rusnah Johare, "Education and Training in Electronic Records Management (ERM): The Need for Partnership Building," in C. Khoo, D. Singh and A. S. Chaudhry, eds., *Proceedings of the Asia-Pacific Conference on Library & Information Education & Practice 2006 (A-LIEP 2006)*, Singapore, 3-6 April 2006 (Singapore: School of Communication & Information, Nanyang Technological University, 2006), 542. [http://dlist.sir.arizona.edu/1433/01/77.Rusnah\\_Johare\\_pp541-549.long.pdf](http://dlist.sir.arizona.edu/1433/01/77.Rusnah_Johare_pp541-549.long.pdf) (accessed 27 April 27).

- In 1964, the first electronic mail message was sent from the Massachusetts Institute of Technology, the Carnegie Institute of Technology or Cambridge University. The message did not survive, however, and so there is no documentary record to determine the actual source of the path-breaking message.<sup>4</sup>
- Satellite observations of Brazil in the 1970s, critical for establishing a time-line of changes in the Amazon basin, were recorded on the now obsolete tapes.<sup>5</sup>
- The 1986 Domesday Project in the UK, has acted as a reminder that preserving the medium (e.g., floppy/hard disc or tape) does not automatically assure access to the message.<sup>6</sup>

## Research on Primary Data and Records for Research

In 2003, the University of Northumbria, United Kingdom, conducted a research on these specialized records. It studied the management of research records comprising records of the process and its management, the outcomes or products as well as the primary and analyzed research data, in one higher education institution (HEI). A particular emphasis was on electronic records. The project involved the different stakeholders in the research community, i.e., researchers, research directors, IT/systems staff and administrators. The results highlighted the complexity of the research functions. In summary, the project resulted in a number of practical lessons:

- records management guidelines and training, placed within an institutional framework of records management strategies and policies, are needed for all stakeholders and would be welcome;
- digital preservation can and needs to be addressed;
- it is possible to establish a virtual records centre/archives and, if it were to contain research outputs and management data, would constitute a rewarding learning tool for all stakeholders; and
- at the case study site, the undertaking of this research has increased awareness of the need for good records management practice and digital preservation strategies for research amongst the stakeholders staff involved in the project.

The National Archives survey on electronic records in the Malaysian public sector revealed that a large portion of their records resided on tapes that the various Ministries could no longer gain access to, due to technological obsolescence.<sup>7</sup> These may include primary research data and records in the various research institutions and related organizations.

Research on education and training needs in the field of electronic records management in the Federal ministries and departments, including various research institutions and related organizations, reveals that administrators, archivists, IT personnel and records managers have failed in their responsibilities in regard to electronic records due to their lack of knowledge and skills. The Malaysian government may have already lost records of its activities, which may well include primary research data and records. Therefore, there is strong indication for the centralized collection and storage of records in the custody of a virtual records centre that would efficiently and effectively assist in the retention, preservation and sharing of these primary data and records for use as evidence material for various other studies, other than what it was originally intended for.

## Centralized Data Archives

In many developed countries, research data and records appropriate for archiving had been identified, whereby the idea of the virtual records centre had been extended to the virtual archives, giving birth to the national and institutional social science data archives. The following section of this paper discusses the various examples of Social Science Data Archives in some developed countries.

## European Data Archives

The Council of European Social Science Data Archives (CESSDA) promotes the acquisition, archiving and distribution of electronic data for social science teaching and research in Europe. It encourages the exchange of data and technology and fosters the development of new organizations in sympathy with its aims. It associates and cooperates with other international organizations sharing similar objectives. The CESSDA home pages allow easy access to the catalogues of member organizations and provides a central news forum about its activities and other relevant information. Users can be helped to locate and acquire data from other archives within Europe and worldwide. Data for several key international series can be found and requested via a Data Catalogue search. At the same time, users can also search for data at other archives via the clickable maps provided in the webpage. Additionally users are able to search seamlessly via the CESSDA Data Portal to locate data and variables within a selection of datasets stored at a number of European social science data archives. In this case, research data are made available

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<sup>4</sup> Ibid.

<sup>5</sup> Kathleen M. Eisenbeis, *Privatizing Government Information: The Effects of Policy on Access to Landsat Satellite Data* (Metuchen, New Jersey: The Scarecrow Press, 1995).

<sup>6</sup> The BBC Domesday Project. <http://www.atsf.co.uk/dottext/domesday.html> (accessed 2 July 2008).

<sup>7</sup> National Archives of Malaysia (2003), *Survey of Electronic Records in the Malaysian Public Sector* (unpublished report of the e-SPARK Project).

for reuse and re-purposing by third parties, accessible either from the institution that carried out the research, from the Council's own archives or from the national archives.<sup>8</sup>

CESSDA is made up of 20 data archives in 17 partner countries, which include the national data archives in Australia, Denmark, France, Germany, the Netherlands, Norway, Sweden and the United Kingdom. The 20 European data archives are: Sociological Data Archives (SDA), Prague; Wiener Institut für Sozialwissenschaftliche Dokumentation und Methodik (WISDOM), Vienna; Romanian Social Data Archive (RODA), Bucharest; Social Research Informatics Centre (TARKI), Budapest; Greek Social Data Bank (GSDB-EKKE), Athens; Archiv Družboslovnih Podatkov (ADP) Ljubljana; Sociodata (ADPSS), Milan; Swiss Foundation for Research in Social Sciences (FORS), Lausanne; Réseau Quetelet, Paris; Archivo de Estudios Sociales (ARCES), Madrid; CEPS/INSTEAD, Luxembourg; German Social Science Infrastructure Services (GESIS); Irish Social Science Data Archive (ISSDA), Dublin; UK Data Archive (UKDA), Essex; Data Archiving and Networked Services (DANS), The Hague; Danish Data Archives (DDA), Odense; Norwegian Social Science Data Services (NSD), Bergen; Swedish National Data Service (SND), Goteborg; Finish Social Science Data Services (FSD), Tampere; and Estonian Social Science Data Archive (ESSDA), Tartu.<sup>9</sup>

In the United Kingdom, the Economic and Social Data Service (ESDS), which came into operation in January 2003, provides a national data archiving and dissemination service. The service is a jointly-funded initiative sponsored by the Economic and Social Research Council (ESRC) and the Joint Information Systems Committee (JISC). The ESDS is a distributed service, based on collaboration between four key centers of expertise, which are: UK Data Archive (UKDA), University of Essex; Institute for Social and Economic Research (ISER), University of Essex; Manchester Information and Associated Services (MIMAS), University of Manchester; and Cathie Marsh centre for Census and Survey Research (CCSR), University of Manchester. These centers work collaboratively to provide preservation, dissemination, user support and training for an extensive range of key economic and social data, both quantitative and qualitative, spanning many disciplines and themes. The ESDS provides an integrated service offering enhanced support for the secondary use of data across the research, learning and teaching communities. The Economic and Social Research Council (ESRC) has a Datasets Policy that aims to preserve and share high quality social science data generated as a result of ESRC-funded research. All ESRC award holders are under contractual obligation to offer their research data for archiving.<sup>10</sup>

## North American Data Archives

Similar to the European Data Archives, the North American Data Archives encompasses a range of service models, which include centralized collections, geographically distributed collections, and descriptive catalogues or gateways. Grid technology offers a mechanism for providing access to such research archives. It provides seamless access to large datasets. The software is able to analyze the data irrespective of the location of the computer holding the information. With the use of Web resources the data archives can be connected worldwide. North American Data Archives are made up of 14 institutional data archives: Harvard Data Center, Massachusetts; Roper Center, Connecticut; Princeton University Data Library, New Jersey; Columbia University Electronic Data Services, New York; Geospatial and Statistical (Geostat) Data center, Virginia; the Inter-University Consortium for Political and Social Science Research (ICPSR); San Diego Social Science Data Center, California; Social Science Data Archives UC, Irvine, California; Data and Program Library Service (DPLS) Wisconsin; The University of British Columbia (UBC) Data Library, Vancouver; University of Alberta Data Library, Edmonton; Data Resource Center University of Guelph, Guelph; Social Science Network and Data Services University of West Ontario, London, Canada; and Carlton University Data Centre, Ottawa.<sup>11</sup>

## Other Data Archives Worldwide

Other data archives worldwide that are reachable via the UK Data Archives portal are: Banco de Datos (UISDP) Montevideo; South African Data Archives (SADA), Pretoria; Israel Social Science Data Archive (SSDA), Jerusalem; Social Science Data Archives (SSDA), Canberra; and New Zealand Social Science Data Service (NZSSDS), Auckland.

Therefore, the literature suggests that, within the Asia and Southeast Asian region, centralized data archives are yet to be established. Through the UK Data Archives web portal it is clearly suggested that the primary research data and records for research in the various Asian and Southeast Asian countries are being kept by the individual creating agencies.

## The Malaysian Case Study

In Malaysia, we need to follow the lead of these developed countries so that through the establishment of the centralized national data archives, the data may be used and re-used for one or more research uses. At the moment, each research institute keeps its own data and records in any way it likes; there is no control over the records. The researcher enjoys monopoly of access

<sup>8</sup> Council of European Social Science Data Archives (CESSDA). <http://www.cessda.org/> (accessed 30 April 2009).

<sup>9</sup> Rein Murakas and Andu Rämmer (2002), "Estonian Social Science Data Archive (ESSDA)," *Empirical Social Research in Estonia, ESSDA: Data Archive Report 1*. <http://www.cee-socialscience.net/archive/empirical/essda/report1.html> (accessed 3 April 2009).

<sup>10</sup> Economic and Social Research Council (ESRC). <http://www.esrc.ac.uk/ESRCInfoCentre/> (accessed 20 April 2009).

<sup>11</sup> Social Science Data Archives – North America. <http://cndls.georgetown.edu/gussda/archivenorthamerica.html> (accessed 5 April 2009).

to the data, and a good example is of researchers from the various ministries, who have in their personal collection, a vast plethora not only of data but also documents purchased through funding by government or sponsoring agencies.

Research institutes such as Palm Oil Research Institute of Malaysia (PORIM); Forest Research Institute of Malaysia (FRIM); Institute of Integrity Malaysia; Institute of Medical Research (IMR); Department of Energy; Ministry of Science, Technology and Innovations (MOSTI); and Statistic Department and ministries have carried out extensive research, resulting in the collection of primary data and records that may not be fully utilized or be made known to the public. Lack of access to these data results in duplication of research efforts, waste of government funds and personnel, and lack of benefit for further research.

The TEAM Malaysia project studied the management of primary research data and records for research in the research institutions and related organizations in Malaysia, with particular emphasis on electronic records.

The proposed research project is part of the InterPARES 3 Project (IP3). IP3 hopes to translate the theory and method of digital preservation drawn from InterPARES 1 (IP1) and InterPARES 2 (IP2) into concrete action plans for existing bodies of records, including those pertaining to research, that are to be kept over the long term. In the process, detailed knowledge will be developed on:

- how general theory and methods may be implemented in the archives unit of research institutions, and become effective practices;
- what factors determine the type of implementation that is appropriate for each body of records in each context; and
- what skills professionals will require to conduct such operations.

On this basis, a proto-type system of digital Data Archives for Social Sciences research will be developed by TEAM Malaysia for the protection of the accuracy and authenticity of the primary research data and records in electronic forms generated by the various research institutions in Malaysia.

### **The study embarks on the following objectives:**

- To investigate the nature and characteristics of primary research data and records for research in the surveyed research institutions and how they are being managed.
- To assess the most urgent issues and problems associated with the creation, management and preservation of these records.
- To investigate “most-at-risk” materials, such as date created, date last accessed, carrier, operating systems, software used, equipment required and its availability.
- To determine what research data needs to be archived for long-term storage and re-purposing.
- To study the practice of preserving digital archival materials in the United Kingdom since their commencement in practicing electronic government.
- To create a framework of preserving the digital archival materials through an intensive study of the InterPARES Project theory and method as a benchmark of standards for preserving digital records that can be learned, followed and consequently implemented by the Malaysian electronic government.
- To develop a proto-type Data Archives for social sciences research in Malaysia based on the findings of the research for the purpose of preservation and re-purposing.
- To make recommendation to the Ministry of Science, Technology and Innovation to provide facilities for the full implementation of Data Archives for social sciences research in Malaysia.

### **Research Questions**

The following research questions are aimed at addressing the above objectives:

- What are the nature and characteristics of primary research data and records created and maintained by the records/archival units or programs of the research institutions?
- What kind of digital primary data and records for research, either soon to be preserved by the research institutions or already in the custody of their archival units or programs, are currently most in need of attention, and what are the most urgent issues and problems associated with their creation, management and/or preservation?
- What kind of policy, strategy and procedures should any such research institutions’ archival units or programs have in place to be able to control the digital primary data and records for research for which it will be or already is responsible for from creation to preservation, and on what factors are these administrative devices dependent (e.g., a specific accountability framework and governance structure)?
- What kind of relationship should the research institutions establish with the creators of the records?
- How can we adapt the existing knowledge about digital records preservation of the InterPARES Project and practices of the UK Data Archives to the needs and circumstances of the research institutions’ archival units or programs in Malaysia by developing Data Archives for these records?
- What knowledge and skills are required for those who must devise policies, procedures and action plans for the preservation of digital records for research in the research institutions?

## Methodology

The project methodology will utilise the theory and methods of digital preservation developed by InterPARES and practices of the UK Data Archives. The model will be used to map current practices in managing the records of research across a sample of projects within the research community of the research institutions. These practices will be compared against the theory and methods of digital preservation developed by InterPARES and practices of the UK Data Archives.

The main data collection will comprise questionnaire survey and semi-structured interviews. A number of research projects/activities undertaken within the research institutes and the surveyed universities will be selected to cover a range of characteristics, including:<sup>12</sup>

- nature/type of research – personal scholarly activity / pure research / applied research
- methodology – qualitative / quantitative / mixed
- currency – in progress / completed
- duration – short / medium / long
- management requirements – simple / medium / complex
- size, in terms of project team members – small / medium / large
- staffing – academics / contract researchers
- funding source – internally funded / externally funded
- partnerships – staff only / internal partners / inter-institutional partners / external / international

The project involves the different stakeholders in the research institutions, i.e., researchers, research directors, administrators, IT/systems staff, records practitioners or staff who are given the responsibility to manage records.<sup>13</sup>

## Location of Research

- Institute of research in the public universities in Malaysia (UM, USM, UKM, UPM, UiTM and UTM)
- Institut Penyelidikan Perikanan
- Institut Penyelidikan/Pembangunan Belia
- Jabatan Perangkaan Negara
- Institut Penyelidikan Sains dan Teknologi Pertahanan (STRIDE)
- Institut Penyelidikan Perhutanan Malaysia
- Institut Perkembangan Minda (INMIND)
- Institut Kajian Malaysia dan Antarabangsa (IKMAS)
- Institut Penyelidikan dan Kemajuan Pertanian Malaysia (MARDI)
- Institut Sosial Malaysia
- Institut Kefahaman Islam
- Institut Penyelidikan Keselamatan Jalan Raya
- Institut Penyelidikan Perindustrian dan Standard Malaysian (SIRIM)
- Institut Penyelidikan Ekonomi Malaysia (MIER)
- Perbadanan Kemajuan Kraftangan Malaysia (Bahagian Penyelidikan)
- Institut Tanah dan Ukur Negara
- UK Data Archives

## Preliminary Findings

### ***An overview of the contextual analysis using the InterPARES 3 template for case studies***

Research in Malaysia is largely sponsored and conducted through the medium of universities and specialised departments in the public sector. The subject of research is either specialised or general. The former reflects the specialised function of the research institution concerned. For example, research conducted by the Institute of Social Science Studies of the University Putra Malaysia is naturally inclined to focus on agriculture; and the Institute for Islamic Understanding (IKIM), which is a government department aimed at creating awareness of Islam amongst the people, has naturally brought to bear Islamic perspectives on contemporary issues such as world economy, human rights, scientific controversies and such like.

The vast array of subjects that are useful for policy formulation have been taken up by well-known research centres such as the Institute of Asian Studies (ISEAS), a think tank set up to advise the Malaysian government on policy matters, as well as the Centre for Policy Research, established within the ambit of the University science in Penang to conduct research aimed at achieving innovative changes in Malaysia.

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<sup>12</sup> Joint Information Systems Committee, "Managing Primary Research Data and Records," *ibid*.

<sup>13</sup> Alwi Mohd Yunus, "The Development of Data Archives in Social Sciences Research Institutions in Malaysia," (PhD Dissertation, Universiti Teknologi MARA, 2008), 17-18.

The existence of information on the data available points the way towards new possible areas for further research. The data that are available can be used as teaching aids in support of a particular proposition. The data, therefore, play an important role in enhancing research in the critical areas that the government should take into account when making plans for the future of the nation. These data also ensure that the government is on the right track. The old data are important for showing the government whether the people are better or worse off than before. Data relating to incidences of poverty measured in absolute terms will indicate whether Malaysia, despite unprecedented wealth, was able to maintain, for the benefit of its citizens, a standard of living already enjoyed by the community even when the national wealth was very much lower.

The data gathered thus far suggests that the surveyed research institutions have carried out extensive research, resulting in the collection of primary data, which are not fully utilized or made known to the public. These data and records are very often lost and do not find their way into published sources or findings. The lack of access to such data results in duplication of research efforts, waste of government funds and personnel, and a lack of benefit for further research.

The data exist in various forms: as handwritten documents, typed reports, register books, or in the form of database or unstructured forms. The software applications used for the same research design were different and could cause confusion to the users. The same software applications have different versions and the software applications themselves have been replaced by other more user friendly ones. The data are considered important because they have been collected at a particular point in time and a particular population and provide access to various other variables. The variables may be non-existent today, rendering replication of research impossible.

If data on paper records have all of the above problems, electronic media has its own problems (e.g., is easily erased, is prone to damage, obsolescence and the lack of reading equipment, and suffers from the lack of preservation facilities and copyright control). The data suggest that the problems faced by electronic records also include the use of media that are unstable or unproven for long-term storage; risk of loss of critical records due to the use of software facilities and poor backup practices; the risk of tampering, which compromises the integrity of electronic records as evidence; technological changes in hardware and software environments; and the fact that electronic information systems are generally not designed for the purpose of preserving records.

## Conclusion

In summary, the existence of European Data Archives, North American Data Archives and other Data Archives worldwide provides excellent examples for developing countries such as Malaysia to establish their own data archives. Such archives encompass a range of service models in the form of centralized collections and geographically distributed collections, which at the same time would efficiently and effectively assist in the preservation of primary data and records as part of the memory of the nation. This is in fact a vision of how the related bodies could share their research findings and consequently improve the objectives and the way that they manage and use the information created. As quoted from John McDonald, "In arriving at a vision of recordkeeping, however, it is important to build a vision of how the organization can be more effective in carrying out its mandate."<sup>14</sup>

In an effort to develop a national data archives for social science research, within the InterPARES 3 Project, the preliminary findings of TEAM Malaysia's case study thus far highlight the concerns over the security and the preservation of the primary research data created by the research institutions. However, the emphasis is not solely on electronic records, as paper records and other media still play an important role in these institutions, resulting in a hybrid environment. More data will be gathered from the research institutions as the project progresses into the next phase, eventually culminating in the development of a proto-type data archives for social science research for Malaysia. The effort in developing the data archives will assist in fertilizing the sharing of knowledge among researchers in Malaysia particularly and with its counterparts around the world generally. Therefore, the data archives would be looked at as a significant component in nurturing the awareness of preserving primary data and records as current and future references and at the same time enriching the nation with a vast amount of a valuable commodity in the form of records.

## Author Biographies

*Rusnah Johare received her MA in archival studies from the University College London (1991) and her PhD in records management from the Northumbria University, Newcastle, UK (2006) She has many years of professional and academic experience in the records and archives management field, ranging from job as an archivist at the National Archives of Malaysia to her current position as an Associate Professor in the Faculty of Information Management, Universiti Teknologi MARA (UiTM), Malaysia. Her major areas of research are in electronic records management and long-term preservation of corporate memory. She is currently the Director of TEAM Malaysia of the InterPARES 3 Project and a member of the Technical Committee of the Malaysian Standards Development.*

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<sup>14</sup> John McDonald, "The Wild Frontier Ten Years On," in J. McLeod and C. Hare, eds. *Managing Electronic Records* (London: Facet Publishing, 2005), 8.

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