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of Glasgow

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Introduction

For a great many of us our base commodity is information. We work to find it, create it, transform it, convey it, and trade it, and its utility and transference has been enhanced, perhaps even revolutionised, by the invention of the microprocessor and memory chips. It is now no longer possible to measure the real value of an organisation's assets by taking an inventory of plant, buildings, objects and financial reserves. This presents a challenge for conservative accounting principles, with their historic roots in an economic world dominated by physical capital with companies like Walmart, eBay, Dell and Amazon having relatively small amounts of their massive assets in tangible form. What they have in abundance is intangible assets such as reputation, know-how, human capital skills, knowledge, organisational characteristics, business routines and customer and supplier relationships. It is these things that make them what they are and give them competitive advantages over their rivals. The problem with this type of asset is that it is extremely difficult to define in hard value terms and thus accountants are generally obliged to exclude intangibles from the corporate balance sheet.

It is clear that if information is the raw material for the activities of your organisation (good examples being universities, colleges, research facilities, libraries, archives and museums), the maintenance and preservation of those assets will be important. Preservation of information has associated costs and risks associated with both preservation and failure to preserve. These costs can be assessed and appear on the expenditure side of the balance sheet, or perhaps more importantly, explicitly considered in strategic planning. What is much more difficult is to assign value to those assets, to make a business case for a particular course of action. These difficulties are the same as those faced by accountants trying to give a fair value to a company, so as not to mislead investors as to the likely future value of its assets.

In this paper we explore these issues, examine how they relate to appraisal in the archival and records management domains and outline the approach that we are taking in the *espida* project funded by the Joint Information Systems Committee (JISC) and the University of Glasgow in the UK.

Information as Thing

Buckland (1991) argues that there are three distinct meanings of information:¹

- Information as Process - the act of informing ... communication of knowledge
- Information as Knowledge - that which is communicated concerning some fact, subject, event, etc.
- Information as Thing - objects that contain representation of knowledge (books, computer files, etc.)

¹ Michael Buckland, *Information as Thing*, JASIS 1991 vol 45:5, pp351-360

The first two are generally accepted as valid meanings of Information, but the third is more contentious with a number of authors arguing strongly that Information as Thing is not a valid meaning of information (Machlup, Fairthorne). Buckland argues that a manifestation/representation of information - 'Information as Thing' is tangible, whilst knowledge itself can be represented in a tangible form (however poorly or incompletely) through Information as Thing.

Information systems cannot process knowledge, but can process Information as Thing. Libraries process books and periodicals, computers process bytes, museums process objects, archives process records, etc. Buckland therefore adds Information Processing to his three meanings of information and summarises that situation in this diagram:

	INTANGIBLE	TANGIBLE
ENTITY	Information as Knowledge	Information as Thing
	<i>knowledge</i>	<i>data, documents, etc.</i>
PROCESS	Information as Process	Information Processing
	<i>becoming informed</i>	<i>data processing</i>

Our purpose in drawing attention to Buckland's distinction is not to argue for or against his position. We are concerned with the preservation of Information as Knowledge, but preservation is more certain and controllable if there are representations of that information (Information as Thing) as opposed to the information simply being in the minds of individuals. Our focus is on the longevity of digital information representations (computer files coded onto a variety of paper based, magnetic or optical media) not physical representations (rendered directly onto a physical substrate, such as paper, canvas, clay, etc.). In both these contexts, Information as Thing is a useful vehicle because the preservation of information achieves its aims primarily through the preservation of Information as Thing rather than through Information as Knowledge or Information as Process. The effectiveness of the manifestation depends on how well it captures the intellectual ideas that it represents, an important issue but beyond the scope of our present paper.

The Digital World

Understanding not shared

Currently in the digital world most people are chasing a technological dream. Hardware producers are striving to get greater digital 'space' into smaller physical volumes; software producers are trying to create more functional programs; and users are wanting hardware and software that can help them represent information, store it, find it and analyse it. Organisations have invested heavily in new technologies, but have yet to address the problem of what happens if this information is not managed properly from creation to destruction or preservation for a length of time for which it might be of value.

Digital Preservation (with intentional capitals) has come to symbolise a community; a need; a desire to stop a projected disaster of loss. It has also come to signify the process of putting in place measures at the creation stage to aid the use, access and storage of digital materials. It is important to recognise that 'digital preservation' is an outcome: data is preserved. Unsurprisingly, this community is composed primarily of those with both a high interest in and understanding of the issues. This community has, so far, failed to engage with the 'real' key players. Whilst digital obsolescence is perhaps understood outwith the Digital Preservation community, the complexity of the issue and its

resolution is not.² Our experience suggests that many people know something of digital obsolescence but little about digital preservation. The community does not speak in a language that senior management or asset creators can readily engage with or understand. Within organisations, this has two effects. Firstly, asset creators are not aware of the good practices required in creation and management to aid digital preservation or that they have responsibilities in this area. Secondly, the longevity of digital assets is not embedded within strategic planning and therefore there is no sustained funding.

Discussion not strategic

Work has been and is being done on costing digital preservation.³ This includes the financial cost of the actions needed to a) put in place a system that can provide longevity for digital assets⁴; and, b) upgrade technology, run the service(s), train staff in new practices, and assess the processes over the long-term.⁵ However, the methods employed do not take into account the actual assets that need to be preserved (managed). The work has also concentrated on cost models not business cases. The assumption is generally that the assets must be preserved, or that the case has already been made elsewhere that the assets are valuable. Business models must answer not only the question ‘how much does it cost?’, but also, ‘why do we need this?’ and ‘why should we spend money to this, rather than on the primary business of the organisation?’ These questions require very different answers than cost models can deliver.

Strategic thinking is not driven by cost and financial issues alone. It is driven by vision and insight. The *espida* project is seeking to ensure that our University recognises the value of its information assets and has the foresight to see that their persistence should be a matter of decision rather than technological determination. This requires an explicit recognition of the value of information assets and the relationship between this and the strategic plan and mission of the institution. The challenge is in expressing value in terms that senior managers understand. If digital assets can be shown to contribute multifaceted strategic value then there is a greater chance of resource for their retention, so as to capitalise on that value.

Funding only short-term

It is not an exaggeration to suggest that most work exploring the issue of digital longevity has been undertaken with either external grants or with internal project funding. Common to both is the short-term nature of the funding. This is at variance with the nature of the problem. While funding bodies see the need for work to be carried out, they can provide funding only for ‘pump-priming’, not for the long-term.

Limited funding leads to a focus on particular issues in different parts of the community although occasional projects have focussed only on dissemination and community-building to avoid

² There has been advocacy work done by a couple of projects, most notable is the work of the Digital Preservation Coalition in the UK which has brought articles on digital preservation into the mainstream press.

³ Most work has looked at the elements of cost that must be accounted for (ERPANET 2003, Granger, Russell & Weinberger 2000; Hendley 1998), with little practical examples of actual costs. Many have signalled that the complexity of singling out costs of preservation from other costs such as creation and management clouds the issue, but this is perhaps a complexity that is false: all the costs are relevant to the longevity of digital materials. Work is being done in great detail at the Cornell Institute (see most recently Kenney 2005). Lavoie (2004) explores preservation as an economic activity and begins to look at making practices sustainable.

⁴ The word ‘system’ does not necessarily mean one unified technological system for holding and managing the assets. Rather, it is taken to be the processes, actions AND technological infrastructure(s) needed to be put in place.

⁵ Oltmans has compared the cost implications of choosing one method of preservation over another (emulation and migration) and finds that the cost pattern differs. However, there is still a cost in the future which must be taken into account. Erik Oltmans & Nanda Kol, ‘A Comparison Between Migration and Emulation in Terms of Costs’, *RLG DigiNews*, 9:2 April 15 2005 http://www.rlg.org/en/page.php?Page_ID=20571.

duplication. ERPANET is one of the best examples.⁶ Work has tended to focus on technical issues – including costing technical solutions and addressing questions of authenticity. Now that many of the technological problems have been, or can be, solved, the focus has to be on creating an environment where digital longevity is an organisational goal.

Our work centres on engagement with asset creators and senior management in a two-way flow of information and knowledge, and has as its outcome a new understanding and way of thinking – a cultural shift. This means that these key players need to understand and be convinced of three things:

- 1) the value of the assets,
- 2) the technological danger to digital assets, and
- 3) the need for sustained support to ensure that the asset can be preserved.

The strategy is two-fold: the engagement of creators and managers to obtain information on the value of objects and requirements for their retention; and the engagement of the decision-makers to convey what is at stake and make a lucid business case involving cost, value and risk and bring the longevity of digital assets to the strategic planning of the University.

We are not selling ‘digital preservation’ to senior management and asset creators, we are selling them the motivation to manage, reuse and preserve assets that are of value to them and the University. Once on the strategic radar, it is easier to get sustained funding to make it happen, and thanks to the engagement of the creators and managers also an understanding of the cultural changes needed.

Appraisal and Value

Information is created by organisations for facilitative and substantive business purposes and, at a simple level, appraisal is the process of evaluating the evidence of organisational activity (i.e. records) to determine what records need to be captured and how long the records need to be kept to meet particular business needs and those of its stakeholders and to provide accountability (to internal and external parties) for its actions.

This definition is based on that provided by ISO 15489-1:2001 (Information and documentation -- Records management)⁷

Maintaining records is costly and identification of when it is appropriate for specific record series to be destroyed is very important. Appraisal seeks to assess the intrinsic value of records as information, and as a consequence identify the appropriate retention period for a given purpose or set of uses⁸. It provides a framework for making decisions on the retention and disposition of records. This scheduling activity provides one of the key means to implement appraisal decisions.

The ‘metrics’ used in assessment are varied but seek to establish a means of systematic analysis of the organisation’s aims and activities, criteria to provide the basis for identifying which record series are needed and identify their appropriate retention. For some types of information the point of destruction will be reached only when the organisation that created them no longer exists, but for the majority the criteria for appraisal are specified by (legal) external regulatory requirements and active administrative use. The primary (initial use) and secondary (re-use) value of information are also recognised as providing a logical basis for making accountable appraisal decisions. This needs to be communicated to the record creator and senior management decision-makers in order for them to understand the tangible benefits of the information assets as evidence of business process, and not just the associated costs.

⁶ ERPANET was funded by the European Commission. See <http://www.erpanet.org>.

⁷ ISO 15489-2001 (Information and documentation -- Records management) Part 1: General, Part 2: Guidelines

⁸ This is explored further in: Barbara L. Craig “The acts of the appraisers: The context, the plan and the record”. *Archivaria* 34 (summer 1992), pp.175-180

The records retention schedule is the means by which this process is codified and it can provide a link to the archival collecting policy. The schedule identifies routine destruction procedures, identifies the value of information to the organisation and enables the identification of vital records as part of business continuity and resumption planning⁹. Output from a risk assessment of processes can also be included in the appraisal and scheduling as some risks (e.g. of retaining information for too long or short a period) affects regulatory compliance.

Traditional appraisal begins with a records survey in the business area. The records created and held are documented in terms of how they are used and who has responsibility for their care. Information about volumes, growth, usage, storage and handling are collected and the point of transfer to archival status (after a period of time or at a specific event) or destruction is incorporated into the retention schedule.

Increasingly this approach is either combined with or replaced by a functional approach (recommended by and outlined in ISO 15489) which analyses business functions, and the records that arise from those activities and transactions. It is based on a belief that records exist to provide evidence of the functions and activities of the organisation and do not necessarily represent its organisational structure.

The objectives of a functional approach are:

- to achieve a high level of understanding of the relationship between the business and its records,
- to establish record values based on their relationship to business functions by examining the legal and organisational requirements governing them,
- to meet the challenge of scheduling digital records.

The appropriate destruction of information is the companion activity to providing appropriate access to information. In the digital world the intellectual processes that support consistent record keeping and appropriate retention need to be made explicit **before the point of information creation** and incorporated into system design and management. This requires the development of a closer and more clearly defined relationship between records managers, records creators and those who develop, support and manage corporate information systems.

Archival uses of appraisal...

“No theoretical question is more perplexing for the archivist than what should be the basis of appraisal or evaluation of the archives. For all the thinking, there is as yet no generally accepted theory of appraisal that could inform methodology and practice.”

Theories of Appraisal, Elizabeth Shepherd <http://www.ucl.ac.uk/~uczcw09/appraisal/level1.htm>

An archival collection policy which identifies which information should be retained permanently to document the corporate memory works alongside a records retention policy. Archivists have traditionally defined four main types of record value, namely: administrative/informational, legal/evidential, compliance/regulatory, historical. Records from substantive or “unique” functions of an organisation (for a University these are teaching, relations with students and external stakeholders and academic research) will generally have a higher place in the archival collection than those from facilitative or support functions such as personnel management and finance. The main approaches to appraisal are:

- Creator appraisal as proposed by Jenkinson.¹⁰

⁹ This is explored further in: Ian Wilson “The fine art of destruction revisited” *Archivaria* 49 (Spring 2000), pp. 124-139.

¹⁰ Jenkinson, H. *A Manual of Archive Administration* Lund Humphries London, 1965, 2nd ed.

- User needs (actual or anticipated) appraisal advocated by Schellenberg.¹¹ (This broadens the organisational bias of Jenkinson by considering the value of the records as influenced by the needs of a wider range of users (for evidential or informational value)).
- Societal model of appraisal, as developed from Schellenberg's taxonomy of values from a "dialogue with the state to a dialogue with society", (North America archives in the late 20th century).¹²
- Functional appraisal (from ISO 15489 and used widely, for example National Archives of Canada, UK National Archives etc).¹³
- Macro-appraisal (National Archives of Australia).¹⁴

Appraisal and *espida*

The *espida* project is exploring the value of information, and specifically, information as it is represented. Appraisal explores the value of information in order to ensure appropriate retention of important organisational records. This value is explored through: the aims and goals of the organisation, the legislation that governs the retention and use of the information and its use for effective operation. These three purposes are all relevant to *espida*, given that we aim to ensure that value is relevant to the organisation, that it takes account of legislation through minimising risk, and that it reflects the needs and attitudes of the staff and the process of effective administration.

However, appraisal is too limited because it:

- 1) looks only at records detailing the activities (transactions) of the organisation. This does not include lecture notes, research papers, datasets, library holdings and other information assets.
- 2) does not put explicit value on information assets
- 3) has a scope that is too limited in relation to value in areas such as the enrichment of staff, process potential and customer needs.

The discussion on appraisal has highlighted that methods for discussing, conveying and convincing others of value are needed in order that information which is valuable can be managed and retained.

Information and Value

Placing value on information is clearly very complex. We have seen that appraisal is 'the process of establishing the value of documents made or received in the course of the conduct of affairs',¹⁵ and qualifying that value and attaching a time-scale to it are pertinent to a wider view of information value. It is not a simple matter to assess all the ways in which an organisation's information assets provide value to it, let alone discover ways of measuring how that value changes over time. Our focus is not simply on records, but on the entire panoply of information assets, published, unpublished, raw or processed that characterise an information-rich business. Furthermore we wish to express the value of these assets in clear business terms.

¹¹ Schellenberg, T.R. *Modern archives: principles and techniques* Melbourne: Cheshire, 1956

¹² Cook, T. "Mind over matter: Towards a new theory of archival appraisal". In Barbara L.Craig, ed. *The Archival Imagination: Essays in honour of Hugh A. Taylor*. Ottawa: ACA, pp.38-70.

¹³ Cook, T. "Macro-appraisal and Functional Analysis" *Journal of the Society of Archivists* April 2004, vol.25, issue 1.

¹⁴ Bailey, C. "From the top down: the practice of macro-appraisal" *Archivaria* 43 (Spring 1997) p.89-128.

Beaven, B. "Macro-appraisal from theory to practice" *Archivaria* 48 (Fall 99) p.154-189.

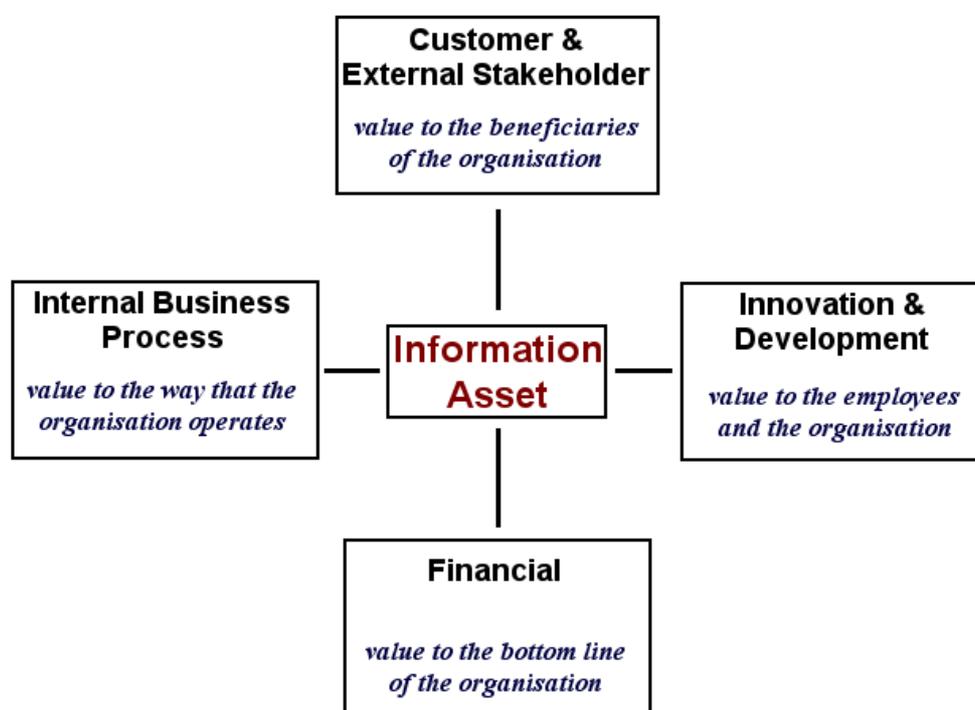
¹⁵ Luciana Duranti, 'The Concept of Appraisal and Archival Theory', *American Archivist*, 57, 1994: 328-344.

Object to asset: the Value Turn?

Digital objects are created every day in organisations. Many objects remain as this, an object, but some become assets. This point of change, or what could perhaps be described as a ‘value turn’ is of interest because if we can discover what makes an object an asset, there is a better chance of making a case for their retention. The value turn is often hidden or simply assumed to be there, for example the minutes of Senior Management meetings are assumed to be valuable to the University, but not all of the areas of value they have are known or understood.¹⁶ Furthermore, there are objects within organisations that are not appreciated as assets until it is too late and they have been lost. Exploring this value turn from object to asset requires an understanding of the areas of value and an appreciation of the value.

A Model of Value

We propose a robust model of value to an organisation of its information resources, in four principle dimensions summarised in the following diagram:



Some might recognise these dimensions as having a passing similarity to the Balanced Scorecard of Kaplan and Norton, used as a tool in business planning. This is no coincidence - in defining value, we are seeking to move the discussion of digital preservation to the domain of decision makers (at whom Kaplan and Norton targeted their ideas), without selling out to the accountants and the audit culture about which Marilyn Strathern and other sociologists have written so much of late.¹⁷ The elements of value within the dimensions are things that ‘Information as Thing’ creators can relate to although they are simply a manifestation of ‘Information as Knowledge’ which is where the real value lies. There is of course resonance between our dimensions of value and those recognised in archival appraisal earlier and this is no accident.

¹⁶ Our work so far has discovered that while the act of recording the meeting is of value to the committee for its work, the overall value to University (communication and accountability) is far from being recognised by the committee.

¹⁷ Marilyn Strathern (ed.) *Audit Cultures – Anthropological studies in accountability, ethics and the academy*, London, 2000.

Understanding value as a whole requires identification of all the elements of value within the four dimensions in the diagram. *Espida* has worked with creators and users within the University to identify the areas of digital objects value. This work is supplemented by the expertise of information professionals. Some common areas of value are the quality of teaching and research, compliance with legislation and the accessibility of resources. Different departments within the University have some unique areas of value as a result of the nature of their work and these prove to be excellent material in relation to building a business case.¹⁸

It is relatively easy to understand the make-up of the value that say, a Constable painting has – we know that there is value to the Art Gallery that owns it (financial returns and growing reputation), there is value to those who come to see it (personal learning, satisfaction), and there is value to the surrounding town or city through association with the piece of art. These different stakeholders would put a different measure on those values. Value is not an absolute and can only be appreciated when it is placed in context.¹⁹ The value of anything depends on the objectives and goals of the individual or organisation – the value of a Constable painting is different for the art collector, the student of art history, the maker of jigsaw puzzles, the purveyor of chocolates or biscuits or the member of the public interested simply in the aesthetics. The value of an information asset is closely related to an organisation's strategy and goals. In defining our lists of value elements under each perspective, we have related focus group results to the University's Strategic Plan. Not all of the areas discovered in our discussions with object creators and information professionals have relevance to the strategy and are not therefore relevant to a current view of asset value to the University.

Value Metrics

Having established the components of value that are important, we need to be able to produce suitable metrics for them. These metrics must be:

- Meaningful in strategic terms
- Measurable in some appropriate way
- Controllable in the sense that value can be increased or decreased by management action

These metrics do not have to be:

- All defined in or reducible to financial terms
- On measurement scales – they can be ordinal ($A > B$) or rather fuzzier ($A \equiv B$ or $A \geq B$)

Problematically, value is a concept that is not absolute, and therefore demands flexibility. How exactly do you measure the value that a digital asset brings to the Intellectual Capital within the University (Number of academic papers? Research rating? Financial value of grants and contracts?). This area is the focus of our work over the next few months.

Value over time

Value does not remain constant over time; some types of information have a high initial value which diminishes over time and other types of information exhibit very different patterns. This depends on a number of factors. Asset types have different contexts, requirements and objectives. For example, there are strict regulations regarding the retention of financial records for the first five to ten years of their life when they have high value to the organisation, after this their value drops to a residual level of purely historical interest. Academic papers may start with a lower value, which rises over time before gently trailing off as further research is published which supersedes it. Research data may start

¹⁸ For example, one of the Faculties within the University has commercialised technologies it has developed.

¹⁹ It is said that you only appreciate the value of something when it is gone; this final and absolute context is not the one we require.

off with a moderate value, but increase in value as a result of it being impossible to go back to the situation that it represents. A fuller study of this area will follow our work on value metrics and will result in value profiles for particular types of asset.

A New Approach

Digital preservation is an investment decision, where expenditure in the current period is made in the belief that benefits will accrue in some future period and as such needs to have the benefits weighed against the costs and risks. Viewed in this light there must be, in some sense, a return on that investment. What we are doing in *espida* is looking very carefully at the nature of that return and being very clear that the return (or benefits if you prefer) may take forms other than the directly financial.

We recognise that information assets have costs, value and explicit risks associated with them.

Cost of creation, acquisition, access, management, preservation, destruction, ...

Risk associated with loss, disclosure, retention, ...

Risk of looking after assets that fail to deliver any return

Value as intellectual property, evidence, resource, process, ...

One approach to the assessment of value is encompassed by archival and records management appraisal, but that approach does not put explicit value on information assets and is difficult to translate directly into the sort of cost/benefit framework that decision makers are used to dealing with.

Why are we doing this? So that we have the tools to build business cases for things that are traditionally very hard to build business cases for, such as sustainable preservation of 'Information as Thing' of the digital world. In this way, value of information assets can be balanced against cost and allow decision makers to make rational decisions about them. Recently we have seen a number of reports from: the British Library in the UK²⁰ and from the State library services in both Florida²¹ and South Carolina²² in the US which have started to develop ideas around measuring how much what they do is worth to the communities that they serve and thus to their paymasters.²³ This work has all been based around financial value, but it shows that organisations are starting to wake up to the need.

Why Should You be Interested?

There are many reasons why work on the value of information assets might be interesting and useful to delegates at the DLM forum:

Organisations

- Enable better stewardship of information assets
- Provide tools to rationalise expenditure on representations of intangible assets - knowledge

²⁰ The BL study *Measuring our Value* is available at: <http://www.bl.uk/pdf/measuring.pdf>

²¹ The Florida study report is available at: <http://dlis.dos.state.fl.us/bld/roi/index.cfm>

²² The South Carolina study report is available at: <http://www.libsci.sc.edu/SCEIS/home.htm>

²³ The method used by the libraries is that of contingent valuation. Very simply this uses questionnaires and other tools to ask 'how much would you pay to use this service if it was not there?'. For further examples of this see Duberstein & Steiguer (2003) and Arrow et al (1993).

- Give information creators ways to see more clearly the value of their efforts

Technology Providers

- Define a context for innovation in products that can be demonstrated to maximise information value for customers
- Provide new ways to market information management products
- Help potential customers to make business cases from information management solution investment

Records Managers and Archivists

- Provide new ways to make appraisal more transparent
- Provide tools to build arguments from necessary courses of action
- Produce a better prospect of the retention of our heritage in a rapidly changing digital world
- Provide robust core sources of information to meet the organisational transparency agenda