



# Review of selected organisational IDs and development of use cases for the Jisc CASRAI-UK Organisational Identifiers Working Group

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*reporting to Christopher Brown*

**on behalf of the**

**Jisc CASRAI-UK working group on Organisational IDs**

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# Organisation IDs, use cases and recommendations:

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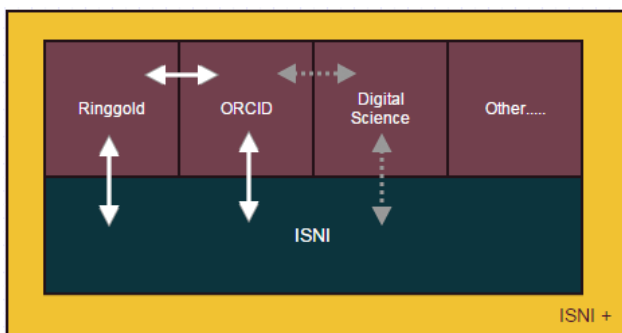
1. Membership of the working group: see the [c-ommons website](#)
2. Use cases: see: [Shared document](#)

# 1 Executive Summary

This project aimed to investigate and review candidates for providing an authoritative, widely used unique identifier for organisations involved in research in the UK. Specifically, we undertook to:

- clarify a representative but not comprehensive set of use cases for the UK research community to use organisational identifiers (orgIDs);
- survey and interview a small number of well-informed people in the field in order to create and prioritise a list of desirable features for the provision of orgIDs and potential services built around them;
- check the use cases and these required features against four possible candidate orgIDs and their providers;
- inform the Working Group of our conclusions and, if appropriate, make recommendations for adoption by the UK research community.

We concluded that, while one single candidate would not fulfil all the criteria, it would be useful to separate the infrastructure element (the provision and maintenance of the orgID itself) and the service element (the services offered both to registrants and to end users of the services). The



most desirable vision for the future would be for ISNI to emerge as a strong, sustainable and internationally well supported baseline or in their own words “bridging” ID with a few commercial players, and perhaps some non-commercial ones such as the BL and HEFCE, acting as registration agencies and holding crosswalks or equivalence tables to their own IDs. Achieving this is some way off but we hope that the Working Group’s recommendations will spell out the desirability of this vision and contribute towards its fulfilment. We recommend that:

1. The Working Group should consider recommending a hybrid approach with ISNI as the backbone. Institutions and others needing to register and use orgIDs should use a solution which relies on and feeds the minimum data set curated by ISNI. Jisc is in an excellent position to request assurances from ISNI on sustainability and responsiveness; and to negotiate with registration agencies on the most effective strategy for bulk registrations for the UK research sector.
2. In considering registration solutions and value-added services, organisations should bear in mind that, in the short term, Ringgold is the most developed agency conforming to recommendation 1. The Working Group should ask Ringgold to confirm that any organisations involved in research receiving Ringgold IDs will automatically have an ISNI created (or checked for pre-existence).
3. However, we very much hope that soon there will be other service providers working to deliver value added services on top of ISNI and the Working Group should do what they can to encourage such competition by, for example, Digital Science, who should consider the possibility of acting as a registration agency for ISNIs in a similar way to Ringgold.
4. Jisc should investigate the possibilities and costs of a bulk deal for UK academic institutions for value added services with Ringgold and (in time) with other service providers.
5. We understand that the Bibliothèque nationale de France (BnF) has recently become a registration agency for ISNI and we recommend that HEFCE and the British Library discuss whether it would be appropriate for there to be a UK-based registration agency and how bulk creation/checking of ISNIs might take place for UK academic institutions and other UK organisations involved in research.

## 2 Acknowledgements

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The experts named above contributed their advice, knowledge and opinions. However, the content of the report, including the conclusions and recommendations, are the authors' responsibility alone.

## 3 Introduction

Jisc and CASRAI<sup>1</sup> (Consortia Advancing Standards in Research Administration Information) are strategic partners and are collaborating to trial the 'CASRAI approach'<sup>2</sup> in the UK. CASRAI engages national constituencies in a collaborative curation of an international dictionary (vocabularies, record structures and unique identifiers) to enable research management metadata to be reused and shared in order to enhance the management and flow of information within and between organisations.

Three pilot working groups have been convened by CASRAI-UK, including the group focussing on organisational lists. The objectives for the Organisational Lists Working Group are as follows:

- Explore possible sources of authoritative lists of organisations involved in UK research, including research performing organisations, charities, industry, etc.
- Develop a sustainable process for maintaining authoritative lists of organisations in the CASRAI dictionary.

The membership of this working group includes representatives from ARMA, Research Councils, HEDIIP, BL, CrossRef, Wellcome Trust, CRIS system vendors and UK HEIs.

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<sup>1</sup> <http://casrai.org/>

<sup>2</sup> <http://infteam.jiscinvolve.org/wp/2013/04/18/how-you-can-help-us-to-make-research-administration-more-efficient/>

To better understand the current use of organisational identifiers, the working group funded a landscape review of organisational lists<sup>3</sup> by external consultants. The landscape report was discussed by the working group in a face-to-face workshop and a plan was developed for the successful delivery of this project. Two key items of work were identified:

- Further investigate and review existing lists of organisational identifiers. (This list was based on those described in the landscape study but was narrowed down by the working group to a candidate list of three<sup>4</sup>).
- Identify the use cases that define the scope of the work required.

This report describes the work undertaken by the authors to clarify the use cases, review the candidates and check the candidates against the use cases and requirements gathered from the working group members using a questionnaire and interviews.

## 4 National and international background

The landscape study mentioned above looks in detail at other initiatives in this field. Another important contextual development has been the advent of ORCID and Jisc's various reviews and studies leading to a recommendation that ORCID should be adopted as a researcher identifier by the UK academic research community. This has contributed to a widespread view that use of unique identifiers for individuals **and** for organisations is not only desirable but may now be organisationally and technically feasible.

The use cases outlined below give an idea of the places where orgIDs will make a difference to a variety of process within the research lifecycle. But, in looking at small parts of the landscape, it is important also to recognise the enormous challenges that a research intensive organisation currently faces in marshalling, using and maintaining the wide variety and large amount of data they hold on organisational relationships; and the great potential for efficiency gains if a widely used and easily usable, unique orgID system were established. To put this in context, we understand that the number of organisations with which a typical research intensive organisation might have relations, including a wide variety of funders, UK based SMEs and also organisations involved in research in other countries, can easily run into tens of thousands. Any large multi-partner, multinational bid for funding (even if unsuccessful) will currently require a large amount of manual effort just to correctly identify the partner organisations, the past and present affiliations of investigators and staff and the potential beneficiary organisations. The work of identifying scenarios where an orgID will bring great benefits is not complete and the use cases presented in this report are doubtless just the start.

## 5 Methodology

### 5.1 Use cases

The use cases were built on a short summary form (bullet-points and lots of blank fields) which was created by the working group before we started our work. After some discussion, the initial CASRAI template was felt to be over complex by working group members so David Baker created a simple template and a document was shared and edited on the web by the group, with members taking responsibility for different sections. A teleconference with live editing of the document helped the group to clarify the structure and the use cases were subsequently completed by members of the group and the project team. The use cases were then checked against the data and interviews provided by the candidates. The final use cases are summarised in section 6 and given in full in Annex 2.

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<sup>3</sup> <http://repository.jisc.ac.uk/5381/>

<sup>4</sup> The original brief specified three candidates - with ISNI/Ringgold being treated as one. It quickly became clear to us that ISNI and Ringgold are very different organisations and we agreed with the client to treat them separately, giving us four candidates in total.

## 5.2 Data, opinion and requirements gathering

The main instrument for collecting and recording the views of the working group was a questionnaire whose results can be seen in section 8. This was supplemented by interviews and conversations where necessary, particularly following up issues where it seemed that merely using questionnaire data might mask an important piece of specialist knowledge or a significant opinion or minority view. The questionnaire included statements by and links to each candidate.<sup>5</sup> Interviews were also held with each provider, recorded and transcribed. By providing each of the candidates with the draft use cases and the data plus both general and specific comments from the questionnaire, we were able to get detailed feedback from each provider on concerns and requirements collected from the working group. We were then able to use the transcriptions and any links to further information provided by the candidates to check the use cases and the questionnaire data against each candidate. The resulting tables appear later in the report. At the final draft stage, each candidate was given the opportunity to amend their own summaries and comment on our conclusions.

## 6 Use Cases

Summaries of each use case appear below. The full use cases are set out in Annex 2. The use cases are not meant to be comprehensive but varied and indicative of likely requirements.

### ***OrgID-UC1 - Researcher applying for funding***

As a Researcher applying for funding, I need to list multiple organisations related to my proposal in order to enable the target funder to uniquely identify previous employers and other funders, collaborators or industry partners and beneficiaries.

### ***OrgID-UC2 - Funder: minimising conflicts of interest***

As a funder preparing to find referees or reviewers, I need to be able to identify suitable people in order to minimize conflicts of interest (through potential co-location at host institution).

### ***OrgID-UC3 - Funder - tracking published outputs***

As a Funder, collating outputs in end-of-research reports, I need to be able to track published outputs in order to understand our contribution & successful collaborations.

*[Org-ID- UC4 deleted, previous numbering preserved to prevent confusion]*

### ***OrgID-UC5 - Researcher or research manager - reporting academic impacts to funders***

As a research producer, I need to report academic impacts to different funders with different requirements.

### ***OrgID-UC6 - Researcher - tracking organisations across time***

As a researcher I need to preserve the historical integrity of organisational names at the time of data creation, collection or deposit (and other, specified times); it is similarly important, however, to record and retain the links between these differing names, so that any user can see which data came from which organisation, even if the organisation name has changed.

### ***OrgID-UC7 - Repository manager - populating repositories, managing automation***

As a repository manager I need to be able to uniquely identify my repository, whether or not its location or URL changes; this will enable me to control semi-automated population of repository records.

### ***OrgID-UC8 - Developer - directory services***

As a developer for research funders, I need to link an OrgID within my application to a directory service. This will allow an end user or a machine to verify identity and contact details.

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<sup>5</sup> For its own staff and logistical reasons, Digital Science did not participate in this part of the work but were interviewed later.

## 7 The candidates - brief summaries

To inform the questionnaire respondents and interviews, the provider of each candidate was asked to supply a short summary of their identifier plus any identifier and related information they held on three UK organisations: The Open University, The Oxford Internet Institute and The Medical Research Council (MRC). This information is reproduced below, with subsequent changes and additions made to the summaries by the providers. In the case of Digital Science, staff changes meant that it was unable to supply the information for the questionnaire, however Digital Science did participate in the subsequent provider interviews and the summary below was provided, for this report, at a later date.

It is worth saying that this is a rapidly developing field and that our snapshots are a “point-in-time” summary of a moving target. In six months’ time individual candidate offers may have changed – but we are confident that the principles laid out in our recommendations will have some longevity.

### 7.1 Digital Science

The Digital Science Institute Database provides global coverage of organisations that feature in the scientific lifecycle. This includes funders, those that receive funding, collaborators, those that publish articles in journals or conference proceedings, or any institution that consumes or produces any kind of scientific artefact such as data or software. It has been developed to provide solutions to typical data integration and scholarly attribution problems experienced across the portfolio of Digital Science companies and is actively used by Figshare, Altmetric, Symplectic Elements, Dimensions for Funders and Symplectic Dimensions for Institutions. A public beta release is scheduled for February 2015, but those with interest may register now for preview access at <http://idb.datasci.it>. The number of organisations indexed is 17,770 at the time of writing, and is expected to exceed 25,000 by the public release date. Metadata includes names, aliases, urls, wikipedia pages, types, relationships and addresses, with all address data linked to geonames - a widely used, free geographic database. Digital Science recognises that the community needs a public and freely available reference dataset for organisational identifiers and are committed to providing a substantial amount of this database for free under a CC-BY license. Future integration with ISNI is currently under consideration. Data is added using a meticulous, human driven process, and quality checked with a comprehensive set of automated and manual tests to ensure accuracy and reliability. Feedback mechanisms are already in place to address issues logged by users in a timely manner. It has been seeded using a range of data sources including European and North American grant databases, as well as author affiliations extracted from Pubmed articles. Substantial effort has been put into developing clear and practical policies regarding the inclusion of organisations and the metadata attributed to them. This ensures consistent processing of source data as well as clear instructions on how users should interpret information in the database.

Identifiers for 2 of the 3 organisations requested are:

The Open University: <https://idb.datasci.it/institutes/idb.10837.3d>

Medical Research Council: <https://idb.datasci.it/institutes/idb.14105.31>

The Oxford Internet Institute does not currently feature in the dataset because it is part of the University of Oxford. Digital Science states that use-cases gathered so far from a range of users have all indicated that such organisations should be grouped into the parent entity. However, it is recognised that a finer granularity is required in some cases, such as the Max Planck Society or the Chinese Academy of Sciences, and this kind of parent / child relationship is supported. Digital Science is part of the Macmillan Science and Education group, a division of The Holtzbrinck Publishing Group.

## 7.2 ISNI

ISNI <http://www.isni.org/> contains about 490,000 organisation IDs. These are derived from data sources that load into ISNI. Although ISNI has mechanisms for online new assignment of organisations, most of the database has been built by loading pre-existing data, including national library authority files and data from Ringgold and Digital Science.

ISNI is part of the suite of ISO identifiers (along with ISBN, ISSN, etc.). Its governance infrastructure is designed with the purpose of ensuring the long-term viability of the identifier. The ISNI International Agency (ISNI-IA), in compliance with ISO's policy and procedures, is designated by ISO as the ISNI Registration Authority. Its charge includes the maintenance and revision of the standard, the responsibility for the central ISNI database and assignment system, and the development of the related activities around the identifier, including contractual relations with the network of ISNI Registration agencies, ISNI members, etc. The ISNI-IA is committed to fulfil its duties by legal agreement with ISO. ISNI-IA has charged OCLC, by contractual agreement as the ISNI Assignment Agency, to set up, maintain and develop the operations related to the assignment of the identifier and its diffusion.

Assignment of an ISNI through bulk-load of contributor files is based on matching data between different sources. A match between two independent sources is required in principle for assignment. However in two cases ISNIs can be assigned even if there is no matching between sources: if a name is unique in the entire database it gets an ISNI, and rich records with sufficient disambiguating information may also be assigned an ISNI, even if the data is only supplied by one source. This can be done through manual intervention, of course, but [also] at the data processing level [through] algorithms and assignment based on matching commonalities in supporting metadata from the disparate sources[, it] errs on the side of caution. Fifty percent of the full ISNI database remains unassigned (potential ISNI status) and is not visible on the public database. It is visible on the member subscription view.

See: <http://www.isni.org/how-isni-works>

There are weightings and rules governing assignment designed to ensure as high a level of quality [as possible] is achieved. The principle of matching and linking data from multiple sources is at the core of the ISNI standard which coined the term "bridge-identifier" to encapsulate the idea that the purpose of ISNI is first to link IDs, records and data held in different systems to establish a universal, persistent identifier for each given identity.

See: <http://www.isni.org/content/data-quality-policy>

The role of Ringgold is that they are a particularly well-curated data source specialising in organisational IDs who have loaded their data into ISNI. Their data has matched substantially with data from library authority files and other sources (also all well-curated). As a result there are many good ISNIs assigned that link many data sources who agree on the precise identity of particular organisations. These are shown in the examples below.

Because ISNI is essentially about linked data it is an inevitable feature that different data sources may also disagree about the precise identity of particular organisations. What ISNI contains within its database is a clear record of these many views. Sometimes [records are] correctly separated in separate ISNIs showing hierarchical relationships between parts of an organisation, sometimes records conflate where one data source brings in what another source would consider two entities into a single record.

The data model for organisations in ISNI allows for the expression of a large variety of relationships including hierarchical (isUnitOf/hasUnit, IsMemberOf/hasMember, isSupersededBy/supersedes, isAffiliatedWith, isRelatedTo. Changes of names can also be documented by formerName/laterName relationship. The list of types of relationships has been revised to be compliant with the requirements of NISO Institutional Identifier I2 Working Group. ISNI also collaborates with other communities, such as archives, and large research libraries (part of OCLC's Research Partners program) that have specific needs to express hierarchies and levels of granularity. The ISNI data model is likely to evolve and multiple hierarchies can be established



flexibly using a combination of name use and relationship type elements. To resolve issues, the ISNI database is supported by a Quality Team who resolve disagreements and make policy recommendations, working with members and Registration Agencies as required. This is an ongoing process which steadily improves the quality of the ISNI as an organisational identifier over time. [There is much] work to be done, and where various groups within and outside the ISNI network are providing us with requirements and purposes that helps define policy around resolving different uses of real organisational names in the real world, by libraries, supply chain, etc. Identifiers (and related information held) for the three example organisations:

- The Open University <http://isni.org/isni/0000000096069301>
- MRC (Medical Research Council) <http://isni.org/isni/0000000122478951>
- Oxford Internet Institute <http://isni.org/isni/0000000106963033>

### 7.3 Ringgold

Ringgold's *Identify* database contains 400,000 organisation records with organisational identifiers and associated metadata. Ringgold identifiers are unique and persistent and are never recycled. *Identify* includes organisations which are involved in scholarly and academic communications. The database is global and covers all market sectors, including but not limited to, universities, research centres, funders, corporations, non-profit organisations, government entities and organisations, healthcare and hospitals, schools and public libraries. We include metadata associated with the institutions held in the *Identify* database and map all institutions into their respective organisational hierarchies. ISNI is a bridge identifier, designed to provide interoperability between different proprietary identifiers, such as the Ringgold ID. It identifies millions of contributors to creative works, including individual people and organisations. It contains basic location metadata and is not designed to replace existing identifiers but to provide a bridge between them across multiple parts of the wider creative industries.

[www.ringgold.com](http://www.ringgold.com)

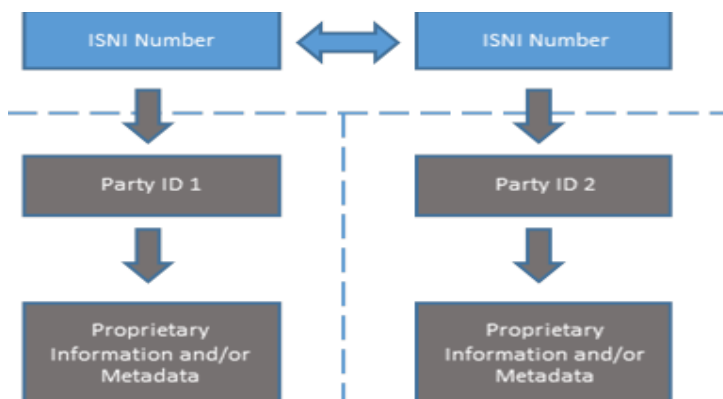
[http://www.ringgold.com/pages/pr\\_Jan14\\_LC.html](http://www.ringgold.com/pages/pr_Jan14_LC.html) - a presentation which explains organisational identifiers from a seminar earlier this year.

A spreadsheet containing [records for] the three organisations requested is temporarily available for the purposes of this study only at:

[http://clax.co.uk/Org-IDs-Jisc\\_CASRAI-UK/Hierarchies-for-CASRAI-JISC-20140919.xlsx](http://clax.co.uk/Org-IDs-Jisc_CASRAI-UK/Hierarchies-for-CASRAI-JISC-20140919.xlsx)

The information is displayed within the branch of the hierarchy of the main organisation. This visual representation is followed by the metadata association with each component of the organisation. The worksheets are quite wide and you may wish to expand the columns to see things more clearly.

The Ringgold ID is in a numeric format with four to six digits although it may be extended beyond six digits. We will not be replacing the Ringgold ID with the ISNI number, but will provide the ISNI number along with the Ringgold ID. The ISNI number is designed to sit above the proprietary identifier to link systems of identifiers together as a bridge identifier. A basic diagram appears below:



## 7.4 UKPRN

The UK Register of Learning Providers is a register of legally verified learning providers in UK. Each verified provider will be assigned with a unique provider reference number UKPRN. This information is shared across the sector with agencies such as the Skills Funding Agency, the Higher Education Statistics Agency (HESA), the Higher Education Funding Council for England (HEFCE) and UCAS. This is an optional register so not all learning providers need to register with UKRLP. You can find more information on [www.ukrlp.co.uk](http://www.ukrlp.co.uk)

From the three organisations requested we only have one registered and this is how the data is shown on UKRLP.

**UKPRN: 10007773**

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Further comments show that The UK Register of Learning Providers was set up almost ten years ago on an initiative from the then Learning and Skills Council. The intention to was create a register to generate unique IDs – UKPRNs - for training providers across United Kingdom to be used by the sector. The Skills Funding Agency of the UK government now own and fund the initiative which is run on contract by hotcourses (<http://www.hotcourses.com/>). HEFCE also use the UKPRN on their system and hold a table of equivalence – UKRLP does not, it flags providers if approved by HEFCE. It does store other numbers such as Company House, Charity Commission etc. but not in lookup tables.

The UKRLP requires any registered body to be a legal entity and checks most of them every 21 days. They did not have entries for the Oxford Internet Institute (but did for the University) or for the MRC. Where legal entities change, split or merge they “follow the pattern of the merger”. So if the providers merge to create a new entity, they would then dissolve the two current UKPRNs and create a new one. If one has taken over the other, they will dissolve the one UKPRN number and will continue with the one that has taken over the dissolved entity.

## 8 Data gathered

### 8.1 Quantitative

Using a five-point Likert scale ranging from “very undesirable” (scoring 1) to “very desirable” (scoring 5), we asked questionnaire respondents about the desirability to them and their organisation of different features, firstly of **organisational identifiers in use**, and secondly of **an organisational identifier service**. (We asked respondents to select a sixth option “don’t know” if they had no view on the desirability of a particular feature.)

We calculated the average score for each feature. The extent of respondents’ agreement as to the desirability of different features varied; and for the purpose of this report we differentiate and colour-code the extent of agreement as to desirability, arbitrarily, as follows:

<b>Very strong agreement</b>	<b>4.5 or more</b>
<b>Strong agreement</b>	<b>4 to 4.49</b>
<b>Weaker agreement</b>	<b>3.4 to 3.99</b>
<b>Equivocal</b>	<b>2.5 to 3.39</b>

The two tables below list the desirability of features we asked about, in descending order of agreement (according to the 16 respondents). [Note: We have left in the letter-designations of each feature to facilitate subsequent discussion of the report.]

**Table 1**

<b>Organisational identifiers in use</b>	
d) The minimum data-set is available under a licence similar to CC BY, allowing it to be used for any purpose (including commercial) providing there is proper attribution	4.8
c) The specification of the identifier is open and non-proprietary	4.6
f) There is a check digit or similar mechanism that would allow systems to identify mis-keyed identifiers	4.4
a) The 'data space' is capable of providing sufficient identifiers to accommodate likely global demand over a 100 year period including any new organisations	4.4
e) The minimum data-set and the service are managed through a not-for-profit organisation that is internationally founded	4.2
b) Identifiers are associated with formally constituted legal entities	3.6
g) Identifiers have a structure with spaces similar in nature to bank codes (e.g. 40-56-21) that is designed to help with data entry	3.5
h) The identifier consists only of numeric values and break markers rather than being fully alpha numeric	3.3

**Table 2**

<b>Characteristics of an organisational identifier service</b>	
b) A web service (API) is available that other systems can use to query the system	4.9
c) A web-based enquiry form is available that allows humans to query the system	4.8
g) The organisation managing and maintaining the identifier is sustainable and has long term viability	4.7
d) It is easy to discover the previous identifiers used by an organisation when the organisation splits or merges	4.6
h) The organisation managing and maintaining the identifier has open and transparent governance	4.6
f) There is a mechanism that allows organisations to formally acknowledge or challenge parent, child, divisional or affiliate relationships	4.5
k) The service can demonstrate compatibility/working relationship with one or more widely used person identifiers	4.5
e) Records can hold a parent organisation ID that reflects a divisional or affiliated organisational relationship	4.4
l) The service is distributed or mirrored internationally	4.3
i) There is an arbitration process to resolve disputes	4.1
a) Organisations are able to manage their identifier(s) themselves	4.1
j) The software used to create and maintain the identifier is Open Source	3.9

## 8.2 Qualitative

There were sections for respondents to comment on the general issues raised by the questions shown above and also the opportunity to comment on individual candidates. Selected comments have been summarised and brought together here. They are not all verbatim.

### General comments

1. The ID number and a very limited metadata sent should be public domain, licenced CC0, CC BY or similar (different suggestions for which licence)<sup>6</sup>.

<sup>6</sup> see <http://www.isni.org/content/isni-international-agency-information-license> for ISNI's licence based on

2. Openness is important. Can a not-for-profit be sustainable? Stability and long-term viability can be helped by shared commitment and investment. ORCID model is useful, can it apply here?
3. Identifiers for departments and groups are very desirable so ID should not be limited to legal entities.
4. Open and transparent governance is essential (at least of the minimal data).
5. Maintaining hierarchies and historical data (linking name changes and moves, splits and mergers) is a difficult task requiring much ongoing time and effort. The key thing now is to agree that the URI quoted by added value services should be the independent standard (i.e. ISNI) and value added services can use their own identifiers behind the scenes to deliver customers' needs.
6. Several comments as to undesirability of organisations directly managing the metadata associated with their IDs. General agreement that it is desirable to have quick and responsive feedback mechanisms so organisations can correct and challenge.

**Specific candidates** (Digital Science not included<sup>7</sup>)

**Comments on ISNI**

1. ISNI seems the best candidate for backing an international OrgID infrastructure, given they're already doing it for ORCID, but as with the authorID, it would probably work better in coordination with an organisation that specifically deals just with OrgIDs (e.g. Ringgold).
2. ISNI includes data from authoritative data sources, representing the "public identity" of a person or organisation, and this generates linked data links. This is supplemented with end user input allowing individuals and organisations to [indirectly] manage their "public identity". End user input is curated by the ISNI Quality Team. There is a public web interface and enquiry API (SRU). There is a persistent URI in the format [isni.org/isni/<isni>](http://isni.org/isni/<isni>).
3. The data is available under the equivalent of a CC-By license (see: <http://www.isni.org/content/isni-international-agency-information-license> and see point 1 under General above). The data model includes fields for expressing hierarchies and links. Registration Services are currently available via Ringgold and hopefully other agencies in the future.
4. Coverage is good but multiple ISNIs mean that a relationship between the parent (the id that identifies that organisation as a whole) and the child entries (e.g. departments or units of the parent organisation identifier) will need to be established. There are a small number of cases where there does not appear to be an ISNI that identifies the organisation as a whole entity e.g. University of Manchester.
5. Hierarchical nature of this ID (and Ringgold) is probably crucial for Org IDs to reflect multiple parts of single organisations. Not-for-profit nature makes this option attractive as does the extended nature of the coverage.
6. The question is one of resource capacity in ISNI if this option is extensively taken up. Also the cost implications, if any, are not clear for an institution which wishes to contribute to maintaining its own data.
7. ISNI's role as a "bridge-identifier", where in addition to current supplied identifier sources, an integration of additional sources will continuously happen, may widen the potential contributions to organisation disambiguation and enhance the quality of organisation identification. Playing a role with Linked Data makes it suitable for Open Data usage and

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the *French Open Licence*

<sup>7</sup> In the case of Digital Science, staff changes meant that it was unable to supply the information for the questionnaire

- thus potentially many more additional sources for bridging/disambiguating in the future.
8. ISNI is international by design, which is a crucial element in the Research domain. It is important that ISNI, as the minimal dataset or “bridge identifier”, is independent, demonstrably managed internationally and decentralised in the sense that it will survive if any one country or commercial partner withdraws.
  9. ISNIs are already being dispersed in different communities. ORCID is using ISNIs for organizations; ISNIs are also represented in Wikidata. See for example the Wikidata entry for the University of Oxford at: <http://www.wikidata.org/wiki/Q34433>
  10. The detailed examples are impressive; however, there is nothing here about how organisations' names would be connected over time - if they change name. What are the resource implications of this?
  11. ISNI is more a mechanism to enable cross matching of data than a system in itself. It still relies on the ability of others to correctly identify where an organisation in a dataset is linked to an existing organisation with an ISNI or needs to have a new one generated.

### **Comments on Ringgold**

1. Ringgold's approach is right but it fails to meet some of the key requirements presented above. It needs to demonstrate interoperability with ISNI and ORCID, the capacity to process a large amount of data and the ability to deal with multiple lower-level hierarchical orgID entries
2. Ringgold as an organisation should try to become more open to other research information management initiatives currently taking place by attending events and becoming part of the global conversation in a similar way to what ORCID has done.
3. Is there an ISNI for every Ringgold ID? If not why not? It needs to be clarified whether an ISNI is automatically minted when a new Ringgold ID is created. It should be ... and this would be an attractive service offering.
4. Small organisations might only need ISNIs and consider Ringgold as “overkill”. So Ringgold might be considered a paid for service which gives a more carefully curated subset of ISNI.
5. Mention was made several times of decentralisation and formal delegation mechanisms on the model of the DNS. There is not consensus that the DNS model is appropriate and there is considerable doubt that commercial entities such as Ringgold would accept that structure.
6. In terms of value-added services, Ringgold seems to be publisher oriented and not (yet?) institution oriented; Ringgold is intending to move towards more institution facing services and this group should encourage that.
7. There is not firm agreement about the level of hierarchical linking (e.g. department within universities) which is desirable/feasible.

### **Comments on UKPRN**

1. Concerns about coverage. UK only and learning providers only, so research institutes and international organisations excluded.
2. Requires legal entity which enhances its accuracy and currency but greatly restricts its application. Well managed and regularly checked but not suitable for managing hierarchies within organisations.
3. UKPRN does a good job nationally and is used in REF and by HESA and UCAS which makes it a candidate for national coverage but would need to be integrated in some way into an international standard to be useful as a research organisation ID.

## 9 Providers scored against the quantitative data gathered

In Table 3 below we have brought forward features identified in the questionnaire that respondents agreed strongly or very strongly to be desirable for the specification and provision of organisational identifiers (refer to Table 1, Section 8).

We then reviewed the material provided by the suppliers in the structured interviews and from their websites to score the degree to which each supplier's offer currently meets the feature in question. In many cases there was not a clear cut answer or sufficient evidence to provide an unequivocal Y/N, the five point scale allows us to represent a more nuanced match against the feature.

**Table 3 Organisational identifiers in use**

Desirability	Organisational identifiers in use	UKPRN	DS	RG	ISNI
4.8	d) The minimum data-set is available under a licence similar to CC BY, allowing it to be used for any purpose (including commercial) providing there is proper attribution	1	2	2	5
4.6	c) The specification of the identifier is open and non-proprietary	1	2	3	5
4.4	f) There is a check digit or similar mechanism that would allow systems to identify mis-keyed identifiers	1	5	1	5
4.4	a) The 'data space' is capable of providing sufficient identifiers to accommodate likely global demand over a 100 year period including any new organisations	2	4	5	5
4.2	e) The minimum data-set and the service are managed through a not-for-profit organisation that is internationally founded	1	1	1	5
	Totals	6	14	12	25

Notes on Table 3:

1. Ringgold states that the ISNI IDs are held on their service for the majority of clients that have a Ringgold ID. Footnote 17 has more details on Ringgold/ISNI cooperation.
2. The UKPRN identifier is an 8 digit ID without a check digit, allowing the number space to be expanded if desired.
3. In discussion with Digital Science and Ringgold there was a stated intention to make data more open and to provide some sort of open licence for parts of each service; however there is insufficient detail to allow us to score either higher than a 2.

Table 4 below lists the key functional characteristics that respondents agreed strongly or very strongly to be desirable for an organisational identifier service. We have used the same five point scoring scheme to indicate the degree to which each of the suppliers' current solutions would be capable of meeting the requirement.

**Table 4 Characteristics of an organisational identifier service**

Desirability	Characteristics of an organisational identifier service	UKPRN	DS	RG	ISNI
4.9	b) A web service (API) is available that other systems can use to query the system	5	2	4	5
4.8	c) A web-based enquiry form is available that allows humans to query the system	5	5	5	5
4.7	g) The organisation managing and maintaining the identifier is sustainable and has long term viability	2	3	4	4
4.6	d) It is easy to discover the previous identifiers used by an organisation when the organisation splits or merges	1	2	3	4
4.6	h) The organisation managing and maintaining the identifier has open and transparent governance	3	3	4	5
4.5	f) There is a mechanism that allows organisations to formally acknowledge or challenge parent, child, divisional or affiliate relationships	2	2	4	4
4.5	k) The service can demonstrate compatibility/working relationship with one or more widely used person identifiers	1	1	5	5
4.4	e) Records can hold a parent organisation ID that reflects a divisional or affiliated organisational relationship	1	2	3	4
4.3	l) The service is distributed or mirrored internationally	1	1	1	1
4.1	i) There is an arbitration process to resolve disputes	3	2	4	4
4.1	a) Organisations are able to manage their identifier(s) themselves	2	2	2	2
	Totals	26	25	39	43

Notes on Table 4:

1. b) API
  - 1.1. While all the systems have APIs, Digital Science’s API is not yet publicly available.
  - 1.2. In addition to standard APIs, ISNI offers support for linked data<sup>8</sup> mechanisms that are capable of providing semantic parsing and contextual data queries.
2. g) Long term viability
  - 2.1. The UKPRN is owned by the UK government which gives some reassurance; however, when discussing longevity and viability, the system was designed for a specific purpose and there are examples of similar government systems being outsourced or replaced.
  - 2.2. ISNI was scored with a 4 because it is still at an early stage in its development. It does have capable contractors handling many functions, but some concerns have been expressed about response times and the large number of organisational records with provisional status<sup>9</sup>.
  - 2.3. While the parent organisation of Digital Science, Macmillan, is clearly mature and financially viable, the service offer in this area was the least mature with many features described as in development or to be released soon.
3. f) Challenge data
  - 3.1. Ringgold has identified this as an issue and has mechanisms that can add a marker to indicate formal recognition of a relationship.

<sup>8</sup> In Semantic Web terminology, **Linked Data** is the term used to describe a method of exposing and connecting **data** on the Web from different sources. Currently, the Web uses hypertext links that allow people to move from one document to another.

<sup>9</sup> This may be a good thing- there is always a balance to strike between coverage and accuracy.

- 3.2. ISNI has a published data policy that defines how organisations and individuals can challenge data<sup>10</sup>.
- 3.3. Digital Science does not currently have this functionality but indicated in the interview that it was something that it recognised, and that it intends to provide for specific clients.
4. d) Organisational change
  - 4.1. UKRLP maintains historic records of data but the UKPRN but does not formally track changes within the database.
  - 4.2. Digital Science is looking at this to ensure that its data reflects the world as best it can; it does not perceive there to be sufficient value in preserving historical associations.
  - 4.3. Ringgold has existing policies and procedures used to capture organisational change (mergers, splits).
  - 4.4. ISNI standard data structures contain fields to identify both *supersededby* and *superseded* as well as *affiliated* to. In addition it allows for tiered organisational structures<sup>11</sup>.
5. k) Integration with person IDs
  - 5.1. UKPRN and Digital Science currently make no use of generic person IDs<sup>12</sup>.
  - 5.2. Ringgold and ISNI both have a formal relationship with ORCID<sup>13</sup>.
6. e) Rich organisational structures
  - 6.1. UKPRN has very limited ability to identify sub-organisational structures or affiliations as it requires a legal entity for registration.
  - 6.2. Digital Science does not currently have this functionality but indicated in the interview that it was something that it recognised, and that it intends to provide for specific clients.
  - 6.3. ISNI standard data allows for tiered organisational structures<sup>14</sup>.
7. l) International hosting
  - 7.1. None of the organisations indicated that they mirrored their data across more than one country
8. i) Dispute resolution
  - 8.1. UKPRN has formal dispute processes.
  - 8.2. Digital Science recognised the need for such a process.
  - 8.3. Ringgold has a formal dispute policy<sup>15</sup>.
  - 8.4. ISNI's data policy (see footnote 7) describes a formal process for dispute resolution.
9. a) Self-managed data
  - 9.1. All providers have mechanisms to create and/or suggest changes to records, some more sophisticated than others. None of the suppliers provide a mechanism to allow data subjects to directly edit their record. In our conversations and interviews it was stressed that such functionality may not be appropriate<sup>16</sup>.

<sup>10</sup> ISNI's data policy <http://www.isni.org/content/isni-data-policy> last accessed 19/11/2014

<sup>11</sup> Fields 20 and 21 of the Tab Delimited Format for Contribution of Data in Bulk for ISNI Assignment for Organisations ([www.isni.org/filedepot\\_download/140/393](http://www.isni.org/filedepot_download/140/393) last accessed 19/11/2014).

<sup>12</sup> Individuals who attend UK government funded organisations allocated a UKPRN will have a unique learner number (ULN) used as a unique identifier.

<sup>13</sup> ORCID is an open, non-profit, community-driven effort to create and maintain a registry of unique researcher identifiers and a transparent method of linking research activities and outputs to these identifiers.

<sup>14</sup> Fields 20 and 21 of the Tab Delimited Format for Contribution of Data in Bulk for ISNI Assignment for Organisations ([www.isni.org/filedepot\\_download/140/393](http://www.isni.org/filedepot_download/140/393) last accessed 19/11/2014).

<sup>15</sup> Ringgold data dispute policy <http://www.ringgold.com/pages/privacypolicy.html> last accessed 19/11/2014

<sup>16</sup> This may well need more discussion. Can ISNI scale up their support effort to accommodate e.g. changes of address if there is very widespread uptake? Will this be a "value-added service" provided by registration agencies? Will issues of scale force a change to permit organisations to update a limited amount of their own metadata?



## 10 Checking the candidates against use cases

In Table 5 below we have used the titles of the use cases listed above in section 6 and in more detail in annex 2. Each candidate has been scored on a scale of 1-5 on its ability to fulfil the requirements of each use case either in full or partially using its current capability. A score of 5 indicates that a supplier evidenced the capability to fulfil the requirement if contracted. A score of 1 indicates that there is little evidence that the supplier could fulfil the requirement. Evidence used in assessing suppliers' ability to meet the requirement was taken from documents taken from suppliers' websites and the structured interviews undertaken. Our judgement was further modified using the assumptions detailed below which provide an overarching context.

In addition to the four suppliers studied, we have included an additional column, namely ISNI+. This has been added to allow us to indicate that while none of the suppliers individually achieved a score of 5 for any of the individual use cases, there is an existing relationship between ISNI and Ringgold (and potentially a relationship between ISNI and others such as Digital Science) that has the potential to fulfil the use cases more completely.

**Table 5**

Use Cases	UKPRN	DS	RG	ISNI	ISNI +
1. Researcher - applying for funding	1	2	4	3	5
2. Funder - minimising conflicts of interest	1	2	3	3	4
3. Funder - tracking published outputs	1	3	3	3	4
5. Researcher or research manager - reporting academic impacts to funders	1	4	3	3	5
6. Researcher - tracking organisations across time	1	3	4	4	5
7. Repository manager - populating repositories, managing automation	1	2	4	3	4
8. Developer - directory services	2	2	4	3	5
Totals	8	18	25	22	32

Notes on Table 5:

The scores are indicative and have been derived from the interviews, desk research and our understanding of each supplier's existing production services and capability.

**UKPRN** - a business focus on the UK with a heavy bias towards state funded education providers excluding organisations only involved in research. The lack of any international or research focus or ability to access person IDs resulted in the lowest score.

**Digital Science** - focused on the affiliations of authors and those who have received research grants, through parent group, Macmillan, Digital Science is a member of ISNI and has supplied organisational data. It does not have a direct relationship with ORCID. Important functionality necessary to fulfil the use cases was not yet publicly available and at various stages of development. Digital Science public API services are under development.

**Ringgold** – currently has the most evidenced capability to fulfil the use case requirements. Ringgold already has a formal relationship with ORCID which currently consumes some of its data and provides some Ringgold-derived data via the ORCID API.

**ISNI** - ISNI typically acts through agents. The licence model permits commercial exploitation of data and the linked data architecture model enables extensible and sophisticated data services to be constructed. ISNI and ORCID have a signed memorandum of understanding and ISNI members also serve on ORCID's technical team. While ISNI has the best "data and governance fit", it has limited ability to provide the necessary technical services to fulfil the use case requirements.

**ISNI+** assumes an organisation such as Ringgold or potentially Digital Science working on top of the ISNI data services layer and ISNI organisational and ORCID IDs. Such a model has the potential to fulfil most of the requirements identified in the use cases providing the assumptions summarised below are valid and acceptable.

## Assumptions

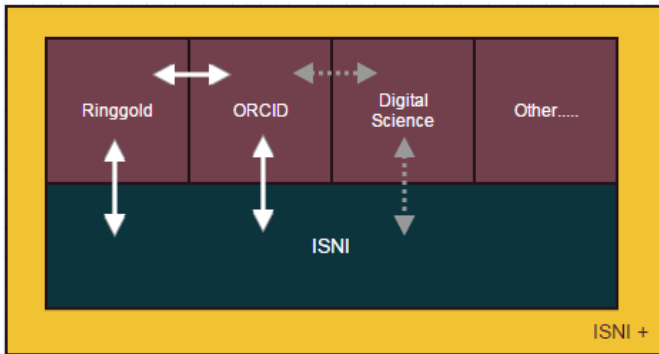
While the use cases provide a high level story of what is required, the stories exist within a sector and data context. The assumptions below have been used in addition to the evidence collected from the interviews and desk research to inform the scores.

- **Assumption 1:** The sector is international in nature and will require any provider to have the potential to have global coverage.
- **Assumption 2:** Many of the use cases will require the ability to associate individuals with organisations; as a result, interoperation with ORCID is desirable.
- **Assumption 3:** In order for some of the use cases to be *completely* fulfilled, there is an assumption that suppliers' records are comprehensive. It is unlikely that any supplier's database will be comprehensive.
- **Assumption 4:** While some use cases require the ability to be able to identify when an organisation changes in nature through mergers, splits, or through a change in its legal status, we must recognise that with certain exceptions suppliers currently have not retrospectively captured historical data. The assumption is that all suppliers will have a year zero from which searches can be run. Data coverage will be less comprehensive the closer the required data is to year zero for any search.

# 11 Conclusions, suggestions and recommendations

## 11.1 Conclusions and suggestions

It seems clear that each of the candidate orgIDs is being used successfully and performing useful functions for users within its own sphere of influence. None of them on their own can meet the general and specific needs of UK researchers. However the option which we have discussed above as “ISNI+” is the one which in our opinion offers the most benefits and the least drawbacks. Our vision for the future would be for ISNI to emerge as a strong, sustainable and internationally well supported baseline or in their own words “bridging” ID with a few commercial players, and perhaps some non-commercial ones such as the BL and



HEFCE, acting as registration agencies and holding crosswalks or equivalence tables to their own IDs. This is some way off but we hope that the Working Group’s recommendations will spell out the desirability of this vision and contribute towards its development.

There are already requirements expressed in this report which, in our opinion, go far beyond the feasible expectations of an international standards organisation such as ISNI. We expect commercial and other organisations to fulfil these requirements but we strongly advise such organisations to build their work on top of ISNI rather than compete against it. And we advise their customers to require ISNI compliance and registration as part of the service expected from such commercial players. We expect Jisc and CASRAI to think carefully in the next phase of their work about the **drivers for strong engagement** with ISNI (and ISNI+) by the organisations which will most benefit from pervasive use of a standard orgID.

We now briefly summarise our conclusions on each candidate and then go on to make recommendations which we hope will be of interest, not only to the Working Group but also to the providers of the candidate orgIDs and to others discussing this issue in other countries and other research sectors, including business, government and NGOs.

### 11.1.1 ISNI

ISNI is a relatively new organisation, partly dependent on self-funded effort from members, though it does have contracts with OCLC as the Assignment Agency and EDItEUR also provides administration services under contract. ISNI will need to demonstrate that it will rapidly become a sustainable and responsive organisation where dedicated staff bear the brunt of day to day duties and can implement strategic developments in consultation with the members who represent an increasingly wide range of stakeholders.

In view of the emphasis on international coverage found not only in the responses to our questionnaire but also in the use cases, ISNI is the obvious candidate for adoption as a potentially very widely used, authoritative unique orgID. ISNI’s use of Linked Data structures has the potential to be strategically important as it will allow contextual searches using modern semantic languages such as SPARQL. This, together with the ISNI licence, should encourage widespread adoption - the wider the use, the more accurate the data is likely to be. In addition much work has been done on the structure of the data held and the cost structure for users and registration agencies. Resilience to political or economic change is an essential feature required for international acceptance, duplication and/or distribution of key data will reassure potential users that ISNI is not dependent on a key partner or a single country. We suggest that Jisc is in an excellent position to negotiate with ISNI on matters including sustainability, responsiveness and bulk registrations for the UK.

### 11.1.2 Ringgold

Although relatively small, Ringgold is the commercial player which has most developed this area. Its large database and position as an ISNI registration agency and as an ORCID partner and collaborator make it a strong candidate for organisations seeking value added services. Via its API Ringgold provides the ORCID service with IDS and organisational data curated by Ringgold as part of its existing service. This should be considered as strong evidence of capability. It is important that in the near future ORCID's organisational affiliation data is underpinned by ISNI. This work is in progress, see footnote 17.

There is a possibility that Ringgold alone could be considered to provide a viable orgID solution. We would caution against taking this approach as Ringgold alone does not fulfil many of the requirements for openness, international and community involvement called for by the questionnaire respondents. Over time, a "tie-in" with Ringgold without the security of ISNIs in the background could result in siloed data constrained by licence and commercial arrangements restricting the potential applications made possible by wider adoption. Providing it continues to work closely with ISNI, then using ISNI (which does fulfil most of those requirements) as a bridging ID will answer those concerns. It is important that Ringgold make a statement that (possibly with a few exceptions) for each Ringgold orgID, an equivalent ISNI will be registered and it is reasonable for potential clients to require this.

### 11.1.3 Digital Science

As part of Macmillan and The Holtzbrinck Group (which includes Nature Publishing Group), Digital Science is clearly backed by a substantial parent organisation with key relationships to relevant stakeholders. However, the Institute Database service is fairly new and comparatively small. Digital Science tells us that *its utility has already been demonstrated across a range of use-cases, including those discussed in this report. In particular, Uber Research products (namely Dimensions) have gone a long way to certifying its value through successful disambiguation and attribution of large quantities of grant and publication data.* There is a public launch date in February and details of the service, the relationship with ISNI and the licensing of the data have yet to be confirmed. The group which includes well-known names such as Altmetric, figshare and Symplectic Elements, may need for an orgID to aid future interoperability. Symplectic and figshare were ORCID launch partners, so, although the Institute Database currently does not use person IDs, this may come with further integration of Digital Science products. Important players such as Macmillan will certainly be providing their clients with an orgID service, visibly or behind the scenes. Digital Science tells us: *Development of relations with ISNI, and ultimately integration with their registry, combined with data made available through a CC-BY license, would put the Digital Science Institute Database in a strong position.* We believe it would be healthy for the sector if Digital Science were able to act as an ISNI registration agency and automatically assign ISNIs as part of their service to clients - we would welcome this service as a value-added competitor to Ringgold. It would be reasonable for clients to require or expect ISNI registration as part of an orgID service.

### 11.1.4 UKPRN

The UK Registry of Learning Providers (UKRLP) has a robust structure for maintaining and checking its UKPRNs. Their widespread use amongst universities in the UK makes them initially attractive but the lack of coverage, both in terms of research-only organisations and international ones, and the lack of hierarchical and stored historical information would rule UKPRN out without a major policy change. However, it may well be useful for HEFCE to hold a table of equivalence between ISNIs and UKPRNs; and HEFCE may wish to consider making an arrangement, perhaps through Jisc, or perhaps through existing relationships with the British Library, to block-register all holders of UKPRNs, to maintain a table of equivalence and even to consider becoming/creating a registration agency for ISNIs handling specifically the UK academic and research community.

## 11.2 Recommendations

1. The Working Group should consider recommending a hybrid approach with ISNI as the backbone. Institutions and others needing to register and use orgIDs should use a solution which relies on and feeds the minimum data set curated by ISNI. Jisc is in an excellent position to request assurances from ISNI on sustainability and responsiveness; and to negotiate with registration agencies on the most effective strategy for bulk registrations for the UK research sector.
2. In considering registration solutions and value-added services, organisations should bear in mind that, in the short term, Ringgold is the most developed agency conforming to recommendation 1. The Working Group should ask Ringgold to confirm that any organisations involved in research receiving Ringgold IDs will automatically have an ISNI created<sup>17</sup> (or checked for pre-existence).
3. However, we very much hope that soon there will be other service providers working to deliver value added services on top of ISNI and the Working Group should do what they can to encourage such competition by, for example, Digital Science, who should consider the possibility of acting as a registration agency for ISNIs in a similar way to Ringgold.
4. Jisc should investigate the possibilities and costs of a bulk deal for UK academic institutions for value added services with Ringgold and (in time) with other service providers.
5. CrossRef should consider creating and maintaining a crosswalk or table of equivalence between FundRef IDs and ISNI, either through a direct relationship with ISNI or through a third party / registration agency. We also understand that the Bibliothèque nationale de France (BnF) has recently become a registration agency for ISNI and we recommend that HEFCE and the British Library discuss whether it would be appropriate for there to be a UK-based registration agency and how bulk creation/checking of ISNIs (and bulk registration and/or the creation of a table of equivalence for UKPRNs) might take place for UK academic institutions and other organisations involved in research.

### Postscript

The Working Group met on the 27 November 2014 and have indicated that it wishes to take forward the conclusions and recommendations of this report in other forums and in group members' own organisations. Specifically, the group identified two actions which have been encapsulated in a further recommendation:

6. Members should return to the organisations they represent and obtain support for a summary statement, to be created by the Working Group with support from the authors of this report. In addition, the recommendations should be tested with two practical initiatives:
  - i] a merged list of organisations, created from UCL's interactions with Wellcome, should be submitted to ISNI to test the quality of the UCL/Wellcome data and the quality and timeliness of the existing ISNI data and their response;
  - ii] three "sandbox" experiments should be set up with Ringgold, Digital Science and ISNI to look at whether the data tested in [i] (or a subset) is capable of providing a solution for Use Case 1 with the present state of orgID services.

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<sup>17</sup> Ringgold response 26/11/2014: *As soon as we have worked through the additional matching processes with ISNI – and can confirm the accuracy of the matches that they make – we will have an ISNI number for every Ringgold ID and ISNI numbers will be assigned for all new records in the Ringgold Identify database via the ISNI API service. We are not yet in a position to release the ISNI data as we have had problems with the results of the matches that ISNI has provided – we are testing the ISNI API at present and ISNI will be completing a refresh of all of our data next month – which will need to be tested – we are hopeful of a release of the ISNI data in 2015.*