DeVIL - Determining the value of information literacy for employers

Stéphane Goldstein
Research Information Network *and* InformAll, Woburn House, 20-24 Tavistock Square, London WC1H 9HF
stephane.goldstein@researchinfonet.org

Andrew Whitworth
Manchester Institute of Education, University of Manchester, Manchester, M13 9PL
drew.whitworth@manchester.ac.uk

1   Introduction

1.1   This paper[1] reports on a project, DeVIL (Determining the Value of Information Literacy) that has aimed to identify quantitative and qualitative data which demonstrate the benefits of developing information literacy (IL) in workplace settings; and to assess the return on investment (ROI) of such initiatives. What value is added by employing and training individuals that have appropriate and relevant know-how, competency and awareness in the handling of information, in whatever form that takes; and in deploying processes and creating environments that help to foster effective uses of data and information? The value might be financial, but it might also relate to other factors that are important to enterprises, such as enhanced efficiency, competitive advantage or employee job satisfaction.

1.2   DeVIL, which was funded by a bursary awarded by the CILIP Information Literacy Group, has produced a practical output: a tangible resource, in the form of a prototype tool whose variables allow for the identification of value as set against six main areas of investment by enterprises. It sets out a method that provides, through the prism of a small sample of enterprises, a means of identifying areas of workplace activity where investment in IL adds value; and it provides an opportunity for initiating some reflection on how and where IL contributes to the well-being of enterprises. The tool is available online at http://www.researchinfonet.org/infolit/ridls/transferable-skills/il-value/

2   Background

2.1   Recent literature reviews by Williams, Cooper and Wavell (2014) and Inskip (2014) have discussed the importance of IL in the workplace. The reviews counter the bias in the IL literature toward defining it as information searching competencies as displayed in higher education settings (Whitworth 2014, 74-81). Information literacy can be generally defined as the capacity to make *critical judgments* about information, and this capacity can be learned. Workplace learning, however, is less structured and more collaborative than the higher education environment. The IL skills and know-how that are valued in workplaces are more context-specific, rooted not in standards and generic guidance, but in practice and the "intersubjective agreement" of different stakeholders in the setting (Lloyd 2010; 2012). There is a greater emphasis on people (as opposed to texts) as information sources; thus, developing an understanding of workplace IL practice means appreciating: the social and informal ways in which information is processed into knowledge; good information management and organisation; and data security (Williams et al 2014, 2-3). As Inskip says (2014, 9): "This complexity requires a paradigm shift away from information literacy as a list of skills to be acquired and towards an understanding of the information environment in which the practice sits".

2.2   Seeking IL in the workplace is also complicated by difficulties with the term 'information literacy' itself. Conley and Gill (2011; Inskip 2014, 6) reported that business professionals recognized IL elements, but only when identified separately from the umbrella term. For example, Heichman Taylor (2008) reports that "critical thinking" was identified by employers as a key constituent of staff members' capacity to make critical judgments and thus maintain, or steward, local "information landscapes" (Lloyd 2010; Wenger, White and Smith

---

[1] An abridged version of this report will appear as a paper in the proceedings for the 2015 European Conference on Information Literacy (ECIL2015)

2009). "Environmental scanning" (Zhang, Majid and Foo 2010) was identified as a business process facilitated by these judgments. But these elements are themselves often vaguely defined, and their costs and benefits hard to isolate and measure, directly or indirectly.

2.3   Nevertheless, evidence exists to confirm the value of IL, and associated factors, in a range of workplace settings. Cheuk (2002) seeks to demonstrate how promotion of company-wide knowledge creation, sharing and use – and the critical IL competencies that underpin these – can lead to greater operational efficiency and the exploitation of business opportunities. Organisational competitiveness and profitability may also be enhanced through developing competence within the enterprise to use information effectively (Cheuk 1998), and a strategic approach to meeting organisational information needs (Sen and Taylor 2007). For some professions, such as law, the impact and significance of accurate and timely information are a key contributor to companies' success in the marketplace, and the information know-how of lawyers underpins this (Gasteen and O'Sullivan 2000). The fostering among staff of confidence and competence in interacting with information is also shown to add critical business value (Cheuk 2008). Conversely, in information-rich workplaces, inadequate functional IL among employees results in a noticeably less efficient workforce (Hepworth and Walton 2013). And a number of further studies show how IL helps to address significant organisational challenges, such as dealing with information overload (O'Sullivan 2002), formulating adaptive strategies for coping with uncertainties (Zhang, Majid and Foo 2010), better informed decision-making (Grieves 1998) and ensuring evidence-based practice in particular sectors such as healthcare (Ayre 2006).

2.4   A full picture of an organisation's IL environment should also account for how the architecture of information systems, and of the physical space of offices, meeting rooms and so on, affect information flows (cf. Tagliaventi and Mattarelli 2006). One's position in social networks has long been recognised as influencing how easily or not one can access information (e.g. Granovetter 1973), and this is particularly true in workplace environments, where tacit knowledge plays a more significant role in making informational judgments than it does in formal educational settings. As Lloyd (2010; 2012) and Wenger (1998; Wenger et al 2009) recognise, the informational practices and critical judgments that constantly shape the "information landscape" or "digital habitat" (that is, information and digital literacy) are also collective, and thus intersubjective; paradigms of IL which concentrate on individual facility with information fail to recognise IL's communitarian aspects (Harris 2008).

2.5   Thus, determining the value of information literacy for employers requires more than just an audit of the costs and benefits of (individualised) training in IL skills, as these are typically conceived in the literature. In 2007, de Saulles (2007) estimated that poor information literacy cost UK businesses alone £3.7bn per year, but though this figure provides a useful indicator of the overall, and potential, return on investment in developing IL in workplaces, more detail is required to answer questions such as: what benefits do employers derive from recruiting, retaining and developing individuals and communities of practice who are information literate? What return on investment would organisations derive by providing relevant training to their employees, and better recognising information literacy, or aspects of it, in the professional and career development of their employees? What does the IL of employees, at all levels, add to the performance of enterprises in the private, public and not-for-profit sectors? As recognised by Williams *et al*, greater evidence of impact of IL, expressed in terms that relate to industry and professional priority areas is urgently needed if business, government and professions are to be convinced of the relevance and significance of IL. This project is intended to help plug that gap in the evidence base.

3   Research design and methodology

3.1   The DeVIL project is relatively small-scale and should be seen as only the first stage in a more extensive programme of research into how the value of information literacy can be determined in specific workplace settings. It took place between March and July 2015 was funded by CILIP's Information Literacy Group (ILG). The aim of the project is to perform an initial scan of selected workplace IL environments, to determine:

- how employers perceive the value of information know-how, competencies and skills in specific contexts;

- what formal and informal training and staff development programmes take place within the workplace that are, directly or indirectly, oriented towards information;

- what organisational practices (both inward and outward facing) are in place to promote the effective and smart use, handling and sharing of information, and to foster a culture that encourages this;

- where possible, what relevant data might be collected by organisations, as part of their everyday operations, that could subsequently be used to calculate or estimate returns on investments into developing information know-how, competencies and skills.

3.2 The project employed a case study approach. A survey approach could be adopted and might secure a broader coverage, but considering the lack of recognition of 'information literacy' as a term in the enterprise sector, an approach that allows for more interaction with our respondents was deemed preferable. Workplaces are highly diverse, but the scope of the project means we had to be selective with case studies. Three UK organisations have been investigated; all identities have been anonymised.

- Case study A is a large, public sector organisation; an inner-city local authority with around 4,000 staff. It is responsible for a diverse portfolio of activities including housing, social care and management of the local environment, and a very broad spectrum of information flows into, around and back out of the organisation.

- Case study B is a small, private sector company that develops and markets a human resources information system for use in the corporate sector. It has grown in the last ten years from a 'one-man band' to now employing around 30 staff, many of them part-time, and it has a second office in the Netherlands.

- Case study C represents the voluntary sector, being a small organisation that acts as an information broker, training centre and supplier of software solutions to voluntary sector organisations throughout a large metropolitan area. It also has around 30 staff.

3.3 Our methodology generated data that permits a broad understanding of workplace information environments, and the way information literacy is constructed and valued in these environments. The first stage was a study of reports, policy documents, statements etc. that are suggested to the investigators by interviewees, by email, prior to a face-to-face meeting. These are coded by both investigators, highlighting references that discuss or are relevant to:

- information skills (e.g. processing, retrieval, seeking, searching, information management, analysis, publishing, communication, time management)

- digital skills (e.g. ICT, computer, Internet, online, e-mail, cyber-security, social media)

- workplace learning (e.g. staff development, training, CPD, communities of practice, team-building)

- business requirements (e.g. staying up-to-date, problem solving, competitive advantage, profitability, resilience, environmental scanning)

- problems (e.g. information overload, data loss, security breaches, poor information handling, outdated procedures, poor customer service, specific incidents)

For example, at one point in case A's Digital Strategy, reference is made to investments which "will enable [the authority]'s digital data to be securely searchable, retrievable and indexed enabling front line staff to securely find the data they need to take decisions and deliver services more efficiently, irrespective of the format and system in which the data is held". This coding is later (see §4.1) categorised under the business value factors of *efficiency* and *improved customer/client service*.

3.4 These annotations form the basis of the interviews. At each location we conducted a number of face-to-face interviews, lasting around one hour each. These were audio-recorded. The interviews were semi-structured, with the specific wording of the questions different in each case, building on the variation present in the nature of each organisation; the role of respondents; and the themes drawn from the document analysis. Discussions were, however, based around the following general areas of concern:

- How do interviewees, and their organisation, recognise, define and value information as an asset?

- How do they define and calculate the added value, financial or otherwise, accounted for by staff/professional development – and by extension, the return on investment in staff/professional development?

- What aspects of staff/professional development, and the acquisition of lifelong skills, are most relevant to the way the company handles information?

- What competencies do they look to staff to exhibit in the area of information? Are these monitored or otherwise formally laid down?

- How can the added value of IL-related know-how, competences and skills be ascertained in the context of the overall value of staff/professional development?

- What is the value of IL know-how, competences and skills acquired prior to joining the organisation, notably through the education process? What is the role of work experience, internships? How do these external educational processes relate to the professional development of their staff?

- What are the different levels of need, between senior and junior staff, different departments or areas of work?

- What specific examples of relevant data exist? How can ROIs be measured – e.g. financial returns? Competitiveness? Quality of services provided? Accountability? [more?]

- Are there any specific cases of where problems were caused – or money identifiably saved?

3.5   Interview subjects were relatively senior officers in each organisation who are responsible for one or more of the following key areas of work, each relevant to our research questions: information policy and governance; information systems; human resources; staff development; or finance. Each interview (with one exception, marked * in table 1) was conducted by both investigators, and dual coding used to draw out the key themes discussed in section 4.

3.6   Details on interviewees and documents are presented in table 1 below. Codes (A1, B4) are used for reference in the results section.

Table 1: Case study details

Case A interviewees	Case B interviewees	Case C interviewees
A1: Head of strategy and performance, Housing dept.	B1: Operations manager	C1: Training manager
A2: Strategic Lead, perform-ance and improvement	B2: Human resources manager	C2: Software and database manager
A3*: Head of ICT service integration	B3: Finance officer	
A4: Deputy Head of ICT, Chief Information Officer	B4: Software development manager	
A5: Co-ordinator of Corpor-ate Information Governance Group		
A6: Lead Human Resources advisor, organisation learning		
A7: Business advisor, finance		
Case A documents	**Case B documents**	**Case C documents**
A8: The local authority's "Digital Strategy"	No documents were available from this case.	C3: The organisation's strategic plan 2011-2014
A9: "Information in [authority name]" a document drawn up by the CIGG (see A5).		C4: The organisation's strategic plan 2014-2016

4   Summary of results

4.1   The first coding pass, through the documentary evidence, is used to identify organisational objectives and goals which reflect desired ROIs. Refined by data gathered from the interviews, these key *value propositions* are grouped into five categories, tabulated in the first column of the spreadsheet tool (with sub-categories of ROI in the second column), and diagrammatically in figure 1 (see §4.18 below):

- returns measured in terms of increased efficiency;

- as improved profitability;

- as better customer/client service;

- as improvements to the motivation and morale of staff;

- and as maximised compliance with relevant legal and/or regulatory regimes.

The second pass then seeks references to these categories of return and notes when these are mentioned (by interviewees or in the documentary evidence) alongside direct or indirect investments in any aspect of organisational practice. These are grouped into five categories:

- investments in staff development, support and guidance, organisational culture;

- investments in information systems, technologies and representations;

- investments in practices;

- investments in use of space;

- investments in outreach and client relations.

Each is discussed in more detail below.

Investment in staff development, support and guidance, organisational culture

4.2   All three case study organisations invest in staff development and in the fostering of organisational cultures, with a direct impact on the way that staff members relate to business data and information. This commitment is set out explicitly in relevant strategic documents: case A's Digital Strategy allows for "education, awareness etc. for staff about the integrity, validity and intent of internet information" [A8]; C's Strategic Plan talks about fostering "an internal culture of experimentation and curiosity" [C3]. But the approaches vary between the organisations.

4.3   As might be expected in a large and complex organisation that has to comply with a broad range of statutory requirements, formal training in IL-related issues takes place in A to address areas that are mandatory for local authorities, such as training on protocols and processes needed to ensure data security and confidentiality, covering sensitive areas such as child protection; this is what A terms 'transactional' training [A6]. The training may be face-to-face where it is important for staff to demonstrate appropriate knowledge, but is also done online. Organisation A has developed interactive tests (that are in the process of being made mandatory) on information management and data security [A5]. Transactional learning is also used to develop expertise in specific tools such as Yammer. In some specific cases, high-level information competences are achieved through professional qualifications, notably CISSP (Certified Information Systems Security Professional) [A3]. There is also an expectation that staff will become familiar with statutory and ethical requirements regarding the handling of data, as outlined in A's extensive guidance. A network of different categories of experts, located in different departments, is available to provide advice where this is needed; these are known as Information Asset Owners, Local Information Managers and Data Stewards [A3, A5, A9]. It follows that different aspects of data literacy are crucial to enable staff to meet many of A's obligations to its clients as a public service provider.

4.4   C also engages with this sort of training, but geared less to its staff than to the client base (voluntary organisations within the city region). C exists to make the local voluntary sector more informed, and enable it to use information effectively; it aims to "foster an internal culture of experimentation and curiosity" among its clients. As such, outreach activities, including training courses and briefings (for instance, in data protection), form part of C's efforts to empower its clients, impart reliable information to them and thereby equip them with appropriate business know-how. [C1, C2, C3]. C also requires its staff members to "[build] intelligence and understanding of and for the voluntary sector – carrying out research, collecting and disseminating information and ideas" [C1].

4.5   B is too small a company to run formal training; for an SME of its size, it is not cost-effective to run or to send its staff on face-to-face and/or residential courses. Instead, the focus is allowing its staff up to 40 hours per year to make use of modular, online courses [B2]. However, it runs semi-structured, internal masterclasses where staff members are encouraged to share know-how in groups, and where such know-how is demonstrated and explained. It also runs an apprenticeship scheme, with one individual currently in post. But even for B, it is imperative to ensure that its staff members have the know-how to care for certain types of sensitive information: the company recognises the importance of knowledge of protocols and processes needed to protect the confidentiality of customers' data [B1, B2].

4.6   Less formal approaches to acquisition of skills and knowledge – and to the fostering of a culture characterised by extensive information sharing – are characteristic of both A and B. They therefore present similarities in spite of the differences in business purpose and scale. Case A deploys what it terms a 70/20/10 approach to training. 10% of the overall training activity aims to be 'transactional' (see above), and 20% takes the form of online courses. The remaining 70% relies on learning through colleagues, by osmosis and/or learning by doing [A2, A6]. There is an explicit commitment to take people out of their 'comfort zone' and put them into places where skills are developed and immediately applied, for example, leadership events, directorate management teams, presenting at board level. This is learning that is cost neutral to the organisation but stretches the staff, makes them feel motivated and engaged [A6]. This 70/20/10 spectrum thereby blurs the distinction between formal training and the informal acquisition of know-how, over time, through more casual forms of interfacing [A1]. Tools such as Yammer encourage the regular, informal exchange of knowledge, breaking down the formal, hierarchical chains of command and information flow. Communities of practice develop, founded on a culture of openness and transparency, and a readiness to share information. Staff are stimulated into using (and learning how to use) delegated means of sharing information, without the need for formal training, because it works for them – and also because they want to keep up with their peers and managers [A1, A2, A4].

4.7   For B, given the relative absence of structured training, there is a reliance on staff learning and expanding their knowledge base in less formal ways. The open, collaborative nature of the organisation, along with a strong inbuilt sense of teamwork, facilitates the effective flow of information within the company, and between it and its customers [B1]. Having relevant information at hand is important for ensuring good levels of customer service, and staff are expected to be all-rounders to deal with the full range of customer interactions – with regards to both technical knowledge and soft skills, such as the ability to communicate with customers in a language which the latter can relate to. It is therefore important for staff to keep themselves constantly informed about evolving customer systems, products, needs and expectations; about the rapidly changing technological environment (particularly important for front-end developers); and also about what their competitors are up to.

4.8   Cases A and B rely also on the deployment of in-house experts, or champions, to advise and guide their staff. Case A has sufficient critical mass to make provision for specialist services that support its digital strategy; these function through four centres of excellence relating to agile working, business intelligence/open data, customer experience and data join up/collaborating with partners [A4]. Similarly, and as outlined at §4.3, expert support is also at hand to help with areas such as information governance. The same critical mass also allows A the resources to formulate detailed guidance on information management, information security, data protection and the use of social networking [A9]. This sort of well-developed corporate documentation is less likely to be a factor for smaller organisations, and neither B nor C offer such material to their staff. B makes use staff expertise to provide informal in-house training, focused on technical skills [B1]. B also runs semi-structured masterclasses where staff members are encouraged to share know-how in groups, and where such know-how is demonstrated and explained - an instance of the use of peer-networks to develop staff know-how [B2].

Investments in information systems, technologies and representations

4.9   Case A has by far the biggest investment in information systems. The multiplicity and complexity of these systems has led the local authority to push for systemic improvements in three broad areas, all involving the concomitant acquisition by staff of information-related skills:

(i)   Making data more readily available and shareable through systems designed to allow staff to control and manipulate it in a delegated fashion: this allows them to make use of, interpret and analyse data relating to service delivery, rather than pass it on through the line management chain as would have been the case in the past. There is thus improved management of data by a large number of staff members, and more intelligent and critical use of it to gauge performance and impact [A1, A2, A8].

(ii) Integrating data so that staff may deploy it in a more seamless and holistic way for the benefit of clients: this means that data about the local authority's clients and/or users that was once scattered is now increasingly brought together to provide a rounded view of the needs of each case. [A3, A5].

(iii) Deploying business collaboration and networking tools. Yammer was introduced as a deliberate means of changing the way that information is exchanged across the organisation. It is an example of a system being implemented strategically with the very clear aim of effecting the changes in organisational culture outlined above.

4.10   For C, investment in information systems is on a much smaller scale. It trains its clients in the use of CiviCRM, contact management software designed to meet their diverse data management needs. Over 50 clients are presently being supported with this software. C offer consultancy to identify each client's data needs and how they manage relevant information. Clients vary greatly, so C sets up and configures the software according

to those needs, and after set-up, provides training to clients' staff. This is a paid service, acting as a social enterprise which can support other work undertaken by C. Case B's core business is developing an information system for use by other organisations, but beyond applications such as financial accounting software, there is no particular use made of information systems to govern the company's work processes.

Investments in practices

4.11   Cases A and B in particular deploy a range of practices intended to facilitate the handling of information and data and the ability to make critical judgments about relevance and significance. All such practices require a degree of know-how on the part of staff who are expected to ensure that information flows efficiently, that it reaches or is passed through the correct channels, and that ethics, laws, confidentiality and other statutory requirements are not breached. Therefore, there is a mutual connection between this and the first category of investment, into staff and the organisational culture. However, what this category captures are those investments which are made in new or revised procedures, protocols and standards for information handling within the organisation.

4.12   There is a particularly strong emphasis, in different settings, on the importance of information and data sharing between individuals or departments within the organisation, for instance for improved business intelligence, or to support the provision of joined-up services [A1, A2, A3, B2]. The latter factor is associated with the aggregation of data from different business sources in order to present a more holistic view of client needs, as outlined at § 4.9 (ii), and to break down barriers that retard the movement of information between different internal databanks, sources and operational units. Investment in developing and supporting these practices allows for the provision of a more seamless and professional service to clients, thereby making it easier to intervene preventively through deriving a fuller and more rounded picture of client needs [A3]. Joining up of data may also have a further beneficial effect, with a very direct financial value for organisation A: it can lead to the reduction of fraud by identifying cases where undesirable practices (e.g. subletting) only become obvious as a result of juxtaposing different data and information sources. To achieve effective sharing and aggregation, it is obviously important for staff to ensure that inputted data is of good quality, reducing the scope for mistakes and avoiding the need for expensive and time-consuming data cleansing.

4.13   Many practices revolve around the need to ensure information security and the protection of sensitive or commercially confidential data, safeguarding information for instance through security protocols [A2, A3, A5, B1]. There may be an obligation to ensure that information is given out rapidly and efficiently: systems and practices therefore need to be in place to ensure responsiveness, with a capacity to respond readily and quickly to client enquiries and requests for information (including, in the case of public bodies such as A, freedom of information requests). Case A also deploys a "right first time" approach to answering such requests [A2] [A5] [A7] [B3].

Investments in use of space

4.14   In two case studies it was plain that information management and, thus, information literacy was facilitated by the spatial configuration of their premises. Both A and B have open-plan offices, and both rely on the nature of the spatial environment to help foster a particular type of working culture that is founded on a aptitude to share information, particularly across departmental or team boundaries. In case A, the local authority has recently moved into a large new building, designed to a high specification to encourage new, less hierarchical ways of working and to provide cost savings on accommodation. The building is smaller than its predecessor, as the authority promotes flexible, home and/or off-site working using mobile devices, so the building is not large enough to contain its full complement of staff at any one time. 'Hot-desking' is the norm, and the use of paper has been reduced to a bare minimum. Careful design and use of space helps to create an informal and flexible working environment, designed to capitalise on conversations between small groups of staff members with no fixed work-stations; it encourages agile working and the breaking down of silos. In this way, the physical working environment contributes to culture shift and to the way that information is shared and exchanged [A1].

4.15   In the case of B, the office is considerably smaller, and has not been specifically designed for the company, but the ethos remains the same: an open space which deliberately [B1, B3] serves as a venue for facilitating links between teams and the sharing of information. Small areas reserved for leisure activities reinforce the informal nature of the environment. For C, however, the creative use of office space to facilitate information sharing is not an evident factor.

Investments in outreach and client relations

4.16   Information flows, in both directions, between the organisation and its customers/ clients must be accounted for when determining the value of information literacy to each. All three organisations are attentive to

their client or customer base, and rely on well-informed staff to ensure good relationships with these external stakeholders. For A and C, the empowerment of users is an important factor. Case A has a mandate to reduce digital exclusion, and takes steps to develop digital skills in the community, for instance through the use of local "digital champions": residents in housing estates, supported by the local authority, who undertake outreach work to engage with their more digitally-excluded neighbours. Council services, such as libraries, and volunteer networks are also used for such purposes [A4]. A's Digital Strategy states that "By tapping into the rich and diverse talent pool that exists in [the locality] including our volunteers, third sector and local business we can add capacity to develop digital confidence and life skills" [A8].

4.17   For C, there is a similar capacity-building imperative, to build and expand the capacity of the voluntary sector to operate in a businesslike way – particular important in a financial context where voluntary organisations are increasingly being called upon to play a greater role in local service delivery [C1, C2]. Indeed, the very nature of the organisation leads it to capitalise on its ability to nurture its client base; the capacity to impart reliable information is crucial for this. B also gains from having an information literate customer base, in terms of getting high quality feedback, for instance about potential new product development. There is thus a relationship between ensuring that customers are well-informed about B's products and their applicability, and future business opportunities [B1, B4].

Towards calculations of returns on investment in IL

4.18   Figure 1 presents key value propositions that emerge from across the data (see §4.1). These represent aspects of operations where information literate practices are likely to add value to the three case study organisations. Each proposition represents a business objective for which the investments in information literacy, discussed in §4.2-§4.17, can potentially deliver returns. Figure 1 also represents the basic structure of the spreadsheet tool, described further below.

Figure 1: value propositions relevant to information literacy
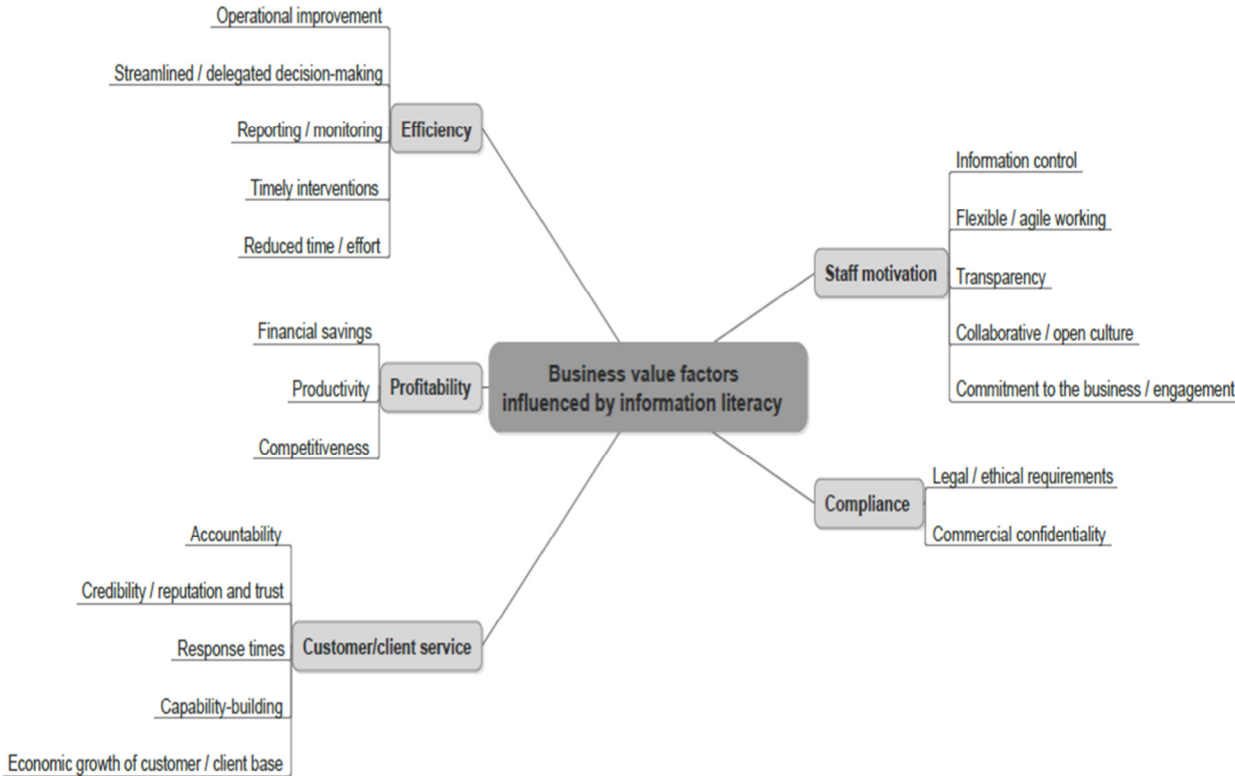
4.19   Value propositions under the *profitability* and *efficiency* headings are often expressed quantitatively, in terms of direct costs, though the specific financial data are not always easy to come by, either because the organisation is too small to generate them [B3, C1, C2] or, at the other end of the scale, because of the size and complexity of case A, and its legacy of multiple, and not always complementary, information systems [A7]. Some data were available from case A: for example, the move to the new office and the parallel work to adopt

new information practices (see §4.12) saved £10m [A4]. Similar quantitative data may be available in other cases.

4.20   Other costs are more indirect, or potential. Giving staff greater access to and control of relevant data (and hence business intelligence) allows for improved accountability and enhanced monitoring and reporting. This not only generates more efficiency through time-saving, but allows for the potential stripping of management layers resulting from a more devolved way of working [A1, A2, A8]. Failure to meet regulatory standards may result in fines. The local authority A had never been found culpable in any breach of data protection standards, thus not subjected to fines from the UK Information Commissioner [A5] but the potential remains. B and C, at smaller absolute scales but no less importantly in relative terms, acted as custodians of client data and would both lose valuable credibility and trust if poor information-handling practices on the part of their staff were to result in data loss or breaches of security or privacy [B1, C2]. This would in turn impact on reputation, and the companies' ability to acquire repeat or new business from customers. Therefore, investments in information literate practices are here akin to 'preventive maintenance', with the benefits measured in terms of the reduction of the risk of incurring costs at a later date due to poor information handling.

4.21   Staff turnover is an important cost to account for. There is a direct financial cost associated with replacing staff, and a substantial indirect cost, as well. As noted in §2.4, a great deal of the information that is embedded in any workplace landscape is tacit, stored in the minds and embodied in the practices of colleagues (Lloyd 2010; 2012). Even in case A, with its substantial investment in information systems, not all the valuable information can be captured and made explicit, and staff members' accumulated knowledge of matters such as to whom information requests should be directed would be lost if that person were to leave [A2]. In the smaller organisations this problem is many times more acute. Thus, investments in staff to develop their information know-how are perceived as having returns in the shape of job satisfaction and motivation. Staff who feel valued and that they can develop their careers in the organisation are more likely to stay and thus keep their tacit knowledge within the landscape [B2, C1].

4.22   Offering effective customer/client service, and preserving credibility and trust, also brings returns on investment in terms of the organisation's interactions with its environment in ways that keep that environment sustainable, so the organisation can continue to draw resources from it. Local authority A seeks to build information literacy in its residents partly to optimise solutions like new information systems and thus drive internal efficiency gains, but it also undertakes this work to enhance their employability, and thus sustain the economic potential of the locality [A8]. C also seeks to increase the capacity of its client base and thus address its own sustainability [C1-C4]. Such returns on investment must be calculated on a much longer term than is typical in direct financial accounting.

The DeVIL tool

4.23   The essential purpose of the DeVIL tool is to illustrate how IL adds value to enterprises, allowing cross-referencing between areas of investment and potential returns, and providing detail on specific examples of such investment. The tool can reflect only the evidence gathered in the context of the limited number of case studies, but it has the potential to help develop the evidence base on the benefits of IL in the workplace, and thereby demonstrating to a range of stakeholders – including businesses themselves – that IL is an important contributor to the capacity of enterprises to thrive and innovate.

4.24   The tool is articulated around the five broad value propositions set out in figure 1. These propositions should be instantly recognisable to any enterprise, whatever the sector. They therefore allow IL to be couched in terms that employers can relate to. Associated with the propositions, and branching from them, are twenty indicators of value. These are the building blocks, at the heart of the tool, which set out how value – in its various forms – may be achieved.

4.25   The tool takes the form of a spreadsheet. The columns to the left are the tabular representation of figure 1, and they list the value propositions and their indicators of value. The row at the top represents the areas of investment described in § 4.2 to 4.17. The cells below the row therefore allow for the insertion of specific factors, relevant to IL, that illustrate the correlation between given indicators of value and areas of investment. Hovering over the cells brings out a brief but more detailed explanation of these factors and of their relevance to IL. Filters provide an element of interactivity. By focusing on a particular factor under a given area of investment, it becomes possible to identify easily which are the relevant indicators of value. For instance, under 'practices', fraud reduction is flagged in association with two indicators of value: financial savings and legal/ethical requirements. Filters may also be applied on the indicators of value themselves, to provide an view of all the factors associated with any given indicator. Finally, the spreadsheet also picks out the number of references, gathered during the interviews and in the background documents (see table 1), and illustrates them graphically to give an idea of the relative weight given to each factor in the evidence uncovered by the study. A

short set of illustrated explanatory notes have been produced to provide basic guidance in the use of the tool; this is also available at http://www.researchinfonet.org/infolit/ridls/transferable-skills/il-value/.

4.26   The tool therefore provides a means to navigate around a crude map of indicators of value for enterprises, and to pick out IL-related factors corresponding to particular sorts of value. It is not designed to calculate the value or return on investment of information-literate workforces in quantitative terms; as explained in section 2, it would require a more comprehensive and detailed study to derive such findings. Instead, the tool allows enterprises and other interested parties to chart the relationship between how organisations perceive value and factors related to the competent and professional handling of information and data.

4.27   The intention of the tool is to provide the basis for dialogue and investigation of diverse workplace contexts, rather than generalised figures for returns on investment. It can help identify areas in which returns may not have been considered, thus allowing for a better appreciation of the impact of an investment. For example, an filtering on 'investments in outreach/client relations' reveals expected returns in organisational competitiveness, which may he those expected by a firm, but also shows a strong link with the development of information-handling capacity in the client base. If this had not been considered, the perceived impact of the investment may be skewed.

4.28   At present, the tool is best seen as an interactive summary of the connections made by our interviewees between investments in various aspects of IL, and potential ROIs. The tool can become more comprehensive, and reflect a broader view, firstly by being used as the basis for investigations of IL practice in other enterprises, with data gathered from these used to refine and deepen the connections already displayed within. Another way to develop the research would be to use this initial framework to drive a more in-depth investigation of one or more enterprises, focused on seeking more specific and quantitative data on returns in specific organisational contexts over a period of time. Through doing so, a firmer estimate of the financial and other benefits of investment in IL, complementing and updating de Saulles' (2007) calculation (see §2.5), could begin to be made. But even before any further research is undertaken, the tool may be tested and deployed in business settings; users are encouraged to check its applicability and potential usefulness, and to provide feedback.

5   Conclusion

5.1   As noted in section 3, the DeVIL project has been a small-scale, preliminary investigation of how the value of information literacy to employers can be determined. Our interviewees have helped us establish a range of areas in which their organisations are investing to promote information literacy among both their staff and their client/customer base; they also identified areas of practice in which returns on these investments may accrue, directly or indirectly. At this stage, therefore, we have created crude maps of the organisational areas in which returns on investments in IL can be expected. These are akin to "base maps" of, say, urban areas over which further, quantitative information (say, levels of employment, or property prices) can later be overlaid. The spreadsheet tool, and this paper (which will both be made available under a Creative Commons license), can be seen as a basis for subsequent investigations in specific contexts, and the beginning of a dialogue with businesses and any stakeholder interested in the use of information in employment contexts - through which the tool can be further refined.

5.2   Limitations to what we have done thus far must be acknowledged, however: as these suggest areas in which this research should now be developed. Firstly, these base maps have been constructed through data generated by a range of different stakeholders in three quite different organisations, and thus capture something of the potential variation in how the value of IL can be perceived (cf. Whitworth 2014, 160-5). Missing, however, are the perceptions and views of other sorts of organisational players (e.g. large private sector businesses), and importantly, voices of 'on the ground' staff and the clients/customers: at best, our interviewees have acted as proxies for these perceptions. This does not invalidate our initial conclusions, but does show one way in which they can be further enhanced, as noted in §4.28 above

5.3   Owing to the context-specific nature of all information landscapes and, hence, all workplace IL practice, it would be an epistemological mistake to seek generic rules which can be applied without consideration for the unique features of given settings (Whitworth 2014, 164-5). What we have sought to create is an initial prototype *tool*, but like any tool, its relevance and effectiveness can only be judged *in practice*, undertaken by those on the ground. Section 4 of this paper summarises the broad *range* of factors that come into play when determining the value of IL to employers, but further research, in specific workplaces, will be needed in order to use these maps as the base for more context-specific data, and generally, to hone the tool and the insights which it provides.

References

1. Ayre, S. 2006. Workplace based information skills outreach training to primary care staff. Health Information and Libraries Journal, 23, 50-54 (2006)

2. Cheuk Wai -Yi, B. An information seeking and using process model in the workplace: a constructivist approach. Asian Libraries, 7(12), pp. 375 -390 (1998)

3. Cheuk, B. Information literacy in the workplace context: issues, best practices and challenges. White paper prepared for UNESCO, The US National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy Meeting of Experts, Prague, The Czech Republic (2002)

4. Cheuk, B. 2008. Delivering business value through information literacy in the workplace. Libri, 58(3), pp. 137-143 (2008)

5. Conley, T., Gill, E.: Information Literacy for Undergraduate Business Students: Examining Value, Relevancy and Implications for the New Century. Journal of Business and Finance Librarianship 16, 213-228 (2011)

6. De Saulles, M. Information literacy amongst UK SMEs: an information policy gap. Aslib Proceedings 59, 68-79 (2007)

7. Gasteen, G. and O'Sullivan C., 2000. Working towards an information literate law firm. In: C. BRUCE and P. CANDY, eds, Information Literacy Around the World: Advances in Programs and Research. First edn. Wagga Wagga, New South Wales, Australia: Centre for Information Studies, Charles Strut University, pp. 109-120 (2000)

8. Granovetter, M. The strength of weak ties. American Journal of Sociology 78, 1360-1380 (1973)

9. Grieves, M. The impact of information use on decision making: studies in five sectors - introduction, summary and conclusions. Library Management, 19(2), pp. 78-85 (1998)

10. Harris, B. R. Communities as Necessity in Information Literacy Development: Challenging the Standards. Journal of Academic Librarianship, 34, 248-255. (2008).

11. Heichman Taylor, L. Information literacy in subject-specific vocabularies: a path to critical thinking. College and Undergraduate Libraries 15, 141-158 (2008)

12. Hepworth, M. and Walton, G. (eds) Developing people's information capabilities: fostering information literacy in educational, workplace and community contexts. Bingley: Emerald Group Publishing Ltd (2013)

13. Inskip, C. Information literacy is for life, not just for a good degree: A literature review. CILIP, London (2014)

14. Lloyd, A.: Information literacy landscapes: information literacy in education, workplace and everyday contexts. Chandos, London (2010)

15. Lloyd, A. Information literacy as a socially enacted practice: Sensitising themes for an emerging perspective of people-in-practice. Journal of Documentation 68, 772–783. (2012)

16. O'Sullivan, C. Is information literacy relevant in the real world? Reference Services Review, 30(1), pp. 7-14 (2002)

17. Sen, B. A. and Taylor, R. Determining the information needs of small and medium-sized enterprises: a critical success factor analysis. Information Research, 12(4) (2007)

18. Tagliaventi, M., Mattarelli, E. (2006). The role of networks of practice, value sharing, and operational proximity in knowledge flows between professional groups. Human Relations 59/3, 291– 319.

19. Wenger, E. Communities of practice: learning, meaning and identity. Cambridge UP, Cambridge.

20. Wenger, E., White, N., Smith, J. Digital habitats: stewarding technology for communities. Portland, OR, CPSquare (2009)

21. Whitworth, A. Radical information literacy: reclaiming the political heart of the IL movement. Chandos, Oxford (2014)

22. Williams, D., Cooper, K., Wavell, C. Information literacy in the workplace: An annotated bibliography. Robert Gordon University/InformAll, Aberdeen. (2014)

23.   Zhang, X., Majid, S., Foo, S. Environmental Scanning: An Application of Information Literacy Skills at the Workplace. Journal of Information Science, 36, 719-732. (2010)