Information systems to support all-age continuing personal development

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Although these views are from the supply side, they are determinedly about strengthening the demand side. That is fundamentally what needs to be addressed in IAG[1] policy and delivery arrangements in England.

We believe that Web developments cannot fix a poor career development policy model. We need to have recognition that people develop career ideas according to personal, family, social and cultural contexts. Career decision-making is not done in isolation nor at one time, or once and forever. It is part of a person's continuing development, related to issues of wellbeing, relationships and personal development and needs to be recognized as such by the technology which so far has failed to allow such integration of thinking and decision making. Therefore a policy needs to provide citizens with a framework for thinking and action, information to inform their thinking and support for decision making as, when and how this makes sense to the individual.

It is also true that career planning does not, usually, take place on an entirely individual basis; family, friends and other significant people in individuals' lives are often as influential as other sources of information. It is for that reason that, subject to appropriate research, it is reasonable to assume that social networking sites may be an increasing factor in the process.

Nevertheless, the technological solutions set out in this paper reflect the unprecedented opportunities to improve the whole career planning process for individuals as a key part of human capacity building ecosystem.

[1] We have chosen not to use the term 'IAG' after this point in this paper. 'Career' is used to denote a single pathway through (working and learning) life. Terms such career information, including labour market information, and, from time to time the provision of career advice and education, provide frameworks and associated information for the individual's personal development. 'Career education' would include pre-retirement courses, for example, and would fulfill the same function as career education for young people. Developments of this kind will have implications for the training and CPD of career coordinators, career advisers and other related mediators.

"Don't get involved in partial problems, but always take flight to where there is a free view over the whole single great problem, even if this view is still not a clear one."

Ludwig Wittgenstein

Heeding the above advice, this paper is informed by a deeper understanding of a wide range of interrelated supply-to-demand shifts, across every aspect of society and increasingly its governance than can be addressed here. Consequently these factors have been summarized in a PESTLE analysis chart in Appendix A. In parallel, as technology has matured, society has been enabled to move away from supply-oriented systems to those that enable true personalization and the meeting of perceptions of demand. These technological shifts over the last six years (since work on UCAS Advancement / Signposter) are summarized in Appendix B.

It is widely anticipated that over the period of the next few years these technology changes will evolve exponentially and their impact will be as profound as that of the Internet itself. This evolution will occur in two principle areas, both of which are pertinent to this paper:

- Cloud computing (the information and data utility) (affording SUPPLY) see Appendix C and
- Web 2.0/3.0 (the manner in which this utility is accessed) (a multi-access-point, multi-modal personal learning environment facilitating DEMAND)

These technologies will be increasingly necessary in a working-life experience where economic, civil, developing-world and environmental concerns call for increasingly urgent attention. Information needs will continue to be increasingly uncertain, yet calling for responses which are both informed and flexible.

Explained in the Appendix C, the concept of a Citizen Cloud as a dimension of Cloud Computing and as a natural counterbalance to the proposed Government Cloud (known as G Cloud) has enormous potential to become a market maker in the sense that it brings the citizen together with granular information available from public and private sector sources when they are in some kind of wondering, curious or planning mode on (formal, informal or non-formal)

learning and/or (paid or unpaid) work - or other personal development matters. In other words, it will be a major data source for a CPD environment that will support people at any stage of their career development (active or passive) and provide them with tools to use at any time they choose.

Not only will this provide an opportunity to change the way we provide support related to careers, employment and wellbeing, it will also change the nature of careers, employability[2] and consequently our unique perceptions of wellbeing and the direct impact of that on employability and contribution. Consequently it is important to build a vision for IAG in which technology can play an important supporting role, mediated by well-trained and technologically aware professionals.

Interoperability

This paper recommends the need that where possible, other related programmes, some with no apparent interoperability, are brought into a human capacity ecosystem. These include:

- Learning environments driven in part by the Building Schools for the Future programme;
- UCAS data
- Integrated children's Services;
- Managing Information Across Partners (MIAP) and the related Minerva programme;
- the Qualifications and Credits Framework (QCF);
- the Bologna and Copenhagen programmes.
- Public Service Network and the proposed Government Cloud.

The Technological Vision: a reorientation from service supply-side to user demand-side thinking

2 'Employability is both an economic, employer-focused notion AND a user centric one. In the case of individuals, it can be seen as the skills needed to secure and maintain employment.

Empowering the user in the foreseen future will require a change project across the current IAG landscape and beyond, as well as in the way the consumers of the service perceive it. From the combined experience of major research and implementation programmes undertaken by the contributors to this paper, that rethink can begin with the design of the technological architecture.

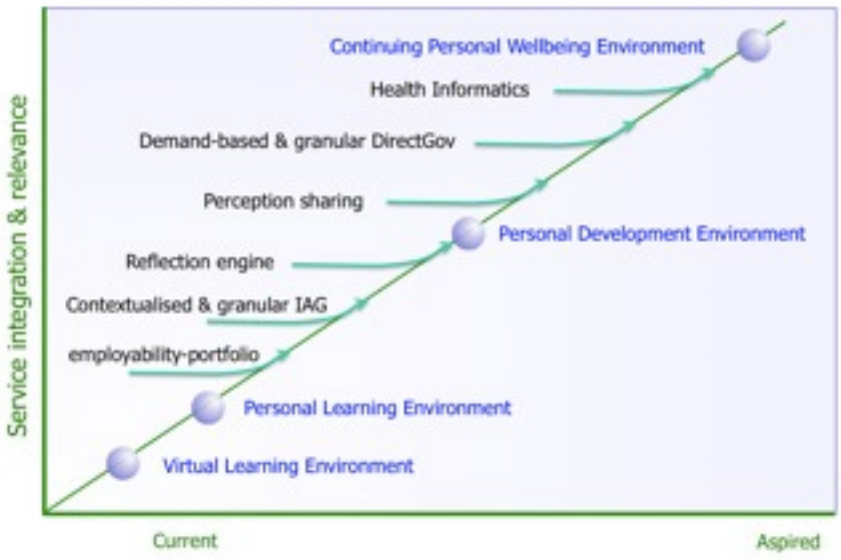
Personal infrastructure.

For decades organizations have been using ICT to run their processes to manage the affairs of individuals who will now equally need personal ICT infrastructure to support themselves as active identities assisted by organisations. This is already happening in a number of areas: institutional learning management systems are being complemented, if not replaced, by personal learning environments (PLEs). Overall individuals are increasingly taking control over their own data, be it either their learning achievements (eportfolios), or health information (personal health records, PHR). The supplier driven notions of employment is being complemented if not replaced with user-centric notion of well-being, quality-of-life, etc. However, these efforts are isolated and do not yet reflect the broader underlying requirement for each individual to have his own personal data store. Such store should be build from the ground up to interoperate and communicate personal information, with the user being in full control over who gets to see what; reusable personal employability information generated in various business processes should automatically be provided to the users' personal data store.

A Personal Development Environment (PDE) that is multi-access-point and multi-modal.

The evidence is that many Virtual Learning Environments, a mandatory component part of the Building Schools for the Future programme, have promised much and delivered little. There is an identifiable trend leading to separate digital environments of this kind, along with separate Records of Achievement or e-portfolios which are beginning to merge as technological maturity and ubiquity make this possible. These will bring

the citizens together with granular information available from public and private sector sources when they are in some kind of wondering, curious or planning mode on (formal, informal or non-formal) learning and/or (paid or unpaid) work - or other personal development matters. PDEs will support people at any stage of their career development –active or passive – and provide them with tools to use at any time they choose any Government sites such as diagnostic health check, Skills Accounts, etc. The diagram below is one of the later ones in a series, as part of a technology and society foresight exercise, a longitudinal study over 12 years anticipating how technology and policy change are beginning to drive this. The ambitions and developments evident in the leading countries continues to validate the exercise.



Learning environment value chain. Source: Cloud Relevance Programme

Demand-led services.

A demand-led services paradigm requires that service providers have some foresight in what the demand will be. Here access to (anonymised) user profiles becomes a necessary basis for understanding the changing shape of overall demand. Similar processes are used in purchasing (RFPs, service requests). Once a user states the need, the service

should be highly personalized. To that purpose, and similar to QCF, public and private sector career development providers may want to granularise their offerings.

Trust & security.

With the user in control over (who gets access to) his own data, the trust perception of the user will be crucial.

“What’s in it for me”? (perceived relevance)

The needed value-add might come from a range of personal intelligence services allowing the user to navigate and orientate through life and its service offerings. Similarly business intelligence services could be provided to both employers and services providers providing foresight in service demand, and collective intelligence services to policy makers, detecting white spots and real-life trends.

Diversity and equality.

Not all individuals are equally willing or able to be proactive in their own personal development. Therefore, measures will have to be taken to go beyond mere service provisioning and to assist them with support in taking up an active role in the demand-led service economy. This will include processes such as on-line mentoring, career education in all its forms and career guidance.

The human-technology generally outlined above, in common with every other aspect of this paper, can be expanded upon and explained in greater detail. However it is a vision based upon intelligent personal data services, designed to empower the user through a demand-led service ecosystem. Within this ecosystem a whole new private sector supporting content can emerge, where career development content is produced to support decision-making and route planning. The model is one of disintermediation and granularity, allowing the individual and the people and systems assisting them to aggregate content relevantly and within context within their own Personal Development Environments and unencumbered by vendors delivery platforms. It will stimulate a market that will allow entrepreneurialism to thrive and small companies to

compete in creating by the support ecosystem for all-age personal CPD support.

Quality control and content standards

In such a vision CPD support may not be a recognized, branded service with its own web presence, more a utility which leads people to construe a perception of service excellence, not dissimilar from that when browsing the web and finding appropriate, relevant and intuitive content. Citizens will get to know about the resource in many ways, from the formal to the serendipitous, for example via sparks of curiosity or inspiration from elsewhere on the Internet. They could then be made aware of the components of CPD support according to their need, e.g. reliable databases and assessment procedures, e.g. icould stories, Horse's Mouth - which, between them, provide valid information on facts and trends, and also authentic accounts of what is entailed in the experience of (say) work as an actuary or youth worker.

How it might work: three examples

A 14 year-old girl with more than a passing interest in nursing, confirmed by the profiles produced by occupational preferences and (for example) personality preference profiles. She might choose to download a backdrop environment from the Royal College of Nursing to contextualise her collaborative environment, refine her goals and develop pathways to achieving these goals. This would tag a number of other resources filtered by her e-persona and therefore commensurate with her age and ability and relevant to her geography. These resources may include those provided by iCould and Horses Mouth (but without recourse to their specific web environments) but would also include video frequently asked questions (VFAQs) and talking heads not just of young role model nurses but also similarly-motivated youngsters in her area or people with the same qualifications and aspirations, building dynamically what is often referred to as communities of practice. While communities of practice dependent on voluntary contributions (YouTube, Wikipedia, Twitter and blogs) demonstrate an insatiable appetite for uploading personal reflections and other productions, young people might be persuaded to contribute to this virtual peer catalogue as a part of their community involvement or other

encouraged voluntary programme. (Signposter set a precedent for this with the Power Bar concept). The seamless integration of these interactions and the services they call upon need must be context dependent and meaningful to whoever is consuming the service and how they wish to consume the service.

A 35 year old city worker who, through social networking sites such as LinkedIn, Facebook and YouTube, as well as talking to local acquaintances, finds that he is attracted to changing direction into a more socially focused career pathway. Through a combination of searching the learning and career information databases that are pushed to him through his 'persona' and talking to a career adviser on-line, he decides he decides to undertake a psychology degree after considering going into social work.

A 55 year old farrier wants, and needs, to find something less physically demanding but after a lifetime interacting with animals and the outdoors is unsure. As an infrequent user of the Internet, his daughter encourages him to use it to develop his thinking, compiling evidence of his achievements to complete a CV. As a result, the system pushes information to him that leads him to train as a blacksmith instructor.

Existing technology

While this paper is informed by a detailed understanding of the technological roadmap and how that is being played out by governments in Europe, the United States and Australia, it is important to emphasize that what is envisaged for the delivery of career personal development related services can be achieved by bringing together a range of existing, tried and tested technologies. In addition the new personal infrastructure that is required by individuals to actively engage (PDEs) has no legacy and will be built from the ground up to communicate and interoperate from day one. Consequently there is no risk of the over-selling and partial-delivery associated with a number of recent government technology programmes.

Three base services are needed to equally equip the end-user in order to deal with others, organisations and institutes in a more distributed and trusted IAG landscape:

1. Personal data stores (widely ranging from a physical personal database to merely being a reference index of remote data)
2. The trust and security infrastructure needed to manage all personal information bases services and ensure all IAG business process comply with privacy, trust and security requirements
3. Intelligence support to help manage and optimise personal data.

Where should the information and data reside?

Personal

That which is personal to the citizen should reside with him or her, and be constantly updated, often automatically. This can be referred to as the e-persona (sometimes also known as identities). An e-persona flexes with time and life events so that it reflects changes in competences gained and preferences expressed, in much the same way as a store loyalty card responds to the changing buying habits of a customer.

But unlike a loyalty card an e-persona is also a record of the holder's geographic location, learning preferences etc gained through simple psychometric activities and inputs from the holder and the mediators in his/her life, be they teachers, parents, peers, prison officers, employers, career advisers, pre-retirement counsellors etc. In this way the e-persona manages the flow of content, interactions and context data so that it is always commensurate and perceived as relevant and timely, either by the individual themselves or the mediators with a responsibility for their development or in relation to how incentives and funding are made available. This flow management is achieved because the encoded data within the e-persona controls the search for pulled information and acts as a filter to the pushed information thus reducing effort and providing a higher assurance of an appropriate outcome being achieved.

Today an individual's data sits in a thousand databases. In a lighter touch government, a citizen needs his/her data to be under his/her control, access with his/her consent and there for their benefit. If needed, it can remain in these databases, but s/he will now decide on whom gets to see what. This requires personal (management) infrastructure, much the same as those that commercial organizations have had at the heart of their enterprise systems for decades.

The Digital Environment

This thinking draws heavily on the personal sphere research being undertaken at the moment. Personal sphere is defined as:

> *" .. intuitive systems that help individuals secure, manage, visualise and interpret their personal information, attention trail and social history so as to enable the provision of personalised and context dependent information from multiple sources and services."*
> (EU FP7 description)

Such individual systems need to provide a number of levels of functionality including:

The Personal Development Environment,
the workspace where e-supported learning, decision making, information seeking and collaboration can take place;

The Collaboration environment,
where communities of practice can be joined and left, ideas can be shared, peer support can be given and received

The e-persona,
a repository of the personal metadata relating to the holders changing digital identity which presents a dynamic filter influenced by competences mastered, opinions and preferences expressed and acts as a filter which

ensures that the results of any search are predominated by commensurate, relevant and increasingly intuitive information.

Navigation,

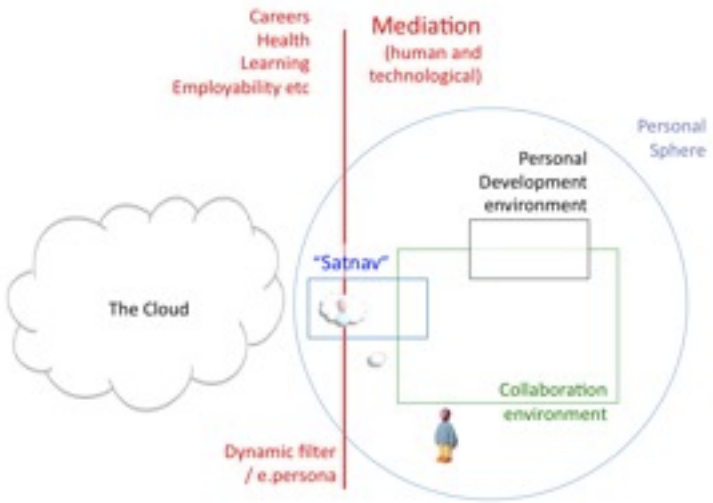
The Web 1.0 world spoke of signposting, an apt term as signposts are part of the environment and only relevant to the context in which they are placed. In a Web 2.0 world multiple context-dependent signposts are replaced by personal "satnavs", informed by the e-persona and capable of helping the user to navigate their personal information space.

Personal devices,

(e.g., an iPhone, or similar) could store a copy of the e-persona, making it ideal for using to access larger technology infrastructure when needed, in the home, school, workplace etc. Naturally, loss of a personal device would not result in loss of data, a new one being cloned from information in the system.

Where no appropriate learning environments a special environment may need to be used but increasingly integration with envisaged all-age continuing personal development and wellbeing environments will replace this. These environments and the technology and services behind them will truly reflect the real dynamics of lifelong engagement in working life that requires individuals to have their own personal infrastructure.

While it is recognized that this is too sketchy an overview of the technologies, the diagram should help to explain the interrelationship between these



components until a more detailed explanation is requested. Absolutely central to the diagram is the mediation (both human, and digital) that runs through the proposed system, underlining our determination that high quality career education and guidance is complemented and enhanced, by the technology in a demand-led process.

Recommendations

The approach recommended is that this should not be treated as a big technological project. At its core must be a strong vision, truly individual centric, with a governance model (which is more collaborative, hierarchical and federated, likely to be based on a private-public partnership) where trust and privacy are built into the governance model, architecture and business model as well as far higher standards for interoperability in the landscape of e-careers than currently exists.

The first step is to define what success would look like relative to as-is now (baselining); the benefits and outcomes; the principles of a effective service (e.g. simplification, streamlining, consistency, transparency etc.)

Thus a second step might be a comprehensive stakeholders analysis as well as detailed business process analysis - who are the initial stakeholders to engage with and business processes to transform first?

Understand the current and scheduled investments in QCF/MIAP, occupational standards strategy, skills accounts etc. These are key enablers to the transformation and interoperability required but appear to lack a common vision at present, primarily as they see the individual still as a subject not a key stakeholder. The thinking outlined in this paper provides a basis for the process. Further they don't fully recognise competences as currency of the labour market nor too the importance of collective intelligence to shift from a supply to a demand focus.

Leverage the good work that has already been implemented or researched; build and scale on what has worked (e.g., TAS3, Limburg, Personal Sphere and the Intelligent Personal Data Services (iPDS) research)

The next steps will need to be to confirm and clarify, if necessary, the vision, and then move providers and stakeholders need to be in dialogue with each other to build a sustainable change and implementation strategy.

It is recommended that to attain the vision outlined above, a change project would need to be set up and managed, inc the roles and responsibilities of WHO needs to be involved, as well as WHO needs to provide the drive and the 'glue' to turn the vision into reality.

The minimum next step needs to be to define a plan for project activity over the next quarter. Perhaps this could be to set up and hold a strategy forum. If so, the plan will need to define:

when it will be;

who will organise it;

who needs to attend;

what it is intending to do;

who needs to be on (and drive) a policy and planning action team for a strategy forum;

what would be the cost of such a strategy forum;

where would the budget for this need to come from;

and what would then be the outputs of the strategy forum

... that might start to ground the thinking into an action project/change project.

Appendix A

PESTLE	Up to 2006	2011 anticipated
Political	Big state governance	Localisation of governance
	80/20 supply/demand model	20/80 supply/demand model
	State provision of services	Empowering the citizen the private and voluntary sectors to take increased responsibility
	Mass market policy and funding models	Devolved yet supported responsibility
	Mass Customisation to dominant interest groups	Recalibrating to account for markets of one - customisation to a 'long tail' of niche groups
Economic	Economic prosperity	Economic recession and slow recovery
	Strong employment (employer-defined view)	Active identity (end-user perspective) - increasingly defined in terms of work-life balance and quality-of-life
	Defined sectoral boundaries: public; private; third (voluntary sector)	Innovation across sector boundaries collaboration
	Public services-centric funding	Citizen/community-centric funding
Social	Emphasis on competitive employability	Increasing eEmphasis on flexible responsiveness
	Separated, niche communities	Dynamic, overlapping communities
	In times of need the state will seek to protect you and your family	The state will seek to enable an ecosystem for personal development enabling you to protect you and your family
	Rigid binary definitions of Work and Worklessness	Emphasis on employability. Recognised third sector involvement between periods of employment
	Self-orientated life-journeys	Self in a societal ecosystem
	Access to opportunity pursued on behalf of identity - e.g. race, gender and class	Access to opportunity pursued in terms of locality, poverty and background culture
	Residual trust in expertise on facts, factors-and-trends	Increasing trust in narratives of experience

Technological	Web 1	Web 2, 3
	For business/technology efficiency	For personal ease of contribution (Web 2.0) & innovation (Web 3.0)
	Portals	Semantic web technologies
	Closed systems	Open system environments, open source and open API
	Silos of information relating to learning, health, civics etc	Integrated, on demand, cloud
	Information publishing	Information exchange
	Bordered communication	Borderless collaboration
	Enterprise, institutional	Personal, ambient
Legal	Simple, easy to control	Increasingly complex
	Protecting personal data	Sharing personal data in a protected, consensual way
'Environmental	passive response to affects of global warming	Concerted action on CO2 levels

Professionalism	Centrally addressed to individual decision making - based on matching thinking	Increasingly addressed to flexibility -based on change-of-mind
	Protective of carefully contained professionalism	Increasingly aware of other sources of informal help from all sectors (public, private and third both domestic and international
	Few opportunities for the more effective uses of curriculum	More opportunities for the effective uses of curriculum
	Relying largely on impact research - on overall effectiveness	Increasing aware of diagnostic research - on what works well, with whom & on what issues
	Using content-driven models for learning	Increasingly interested in process-driven models, especially for interrogating social and virtual influences
	Favouring bilateral partnerships	Needing multilateral partnerships

Appendix B Major changes in available and emerging technology since the inception of Signposter.

Previously	Now and imminent
A multiplicity of web-sites overloaded with content, much of which is irrelevant Supplier-driven push model	"Digital SatNav" - Personal navigation shaped by the learner with the assistance of mediators such as teachers, careers advisers, employers etc…Demand-driven pull model
Separate institutional learning management environments for schools, colleges and workplaces	Institution-agnostic, portable Personal Learning Environments
Separate virtual learning environments, e-portfolios, records of achievement & competence	Combined continuing personal development environments and eventually continuing personal well-being environments
Isolated qualifications	A move towards granular accreditation supported by the Qualifications and Credits Framework and MIAP
Separate, non-contextual email, text messages	Contextual, unified collaboration. "Waves" enabling flows of multimodal information, including video, related to a particular interaction
Personal information scattered over a thousand databases as the residue of a person's past processes.	Aggregated personal information making the person a stakeholder in processes, not just a subject.
Disparate institutional competency models	Competencies as the common currency of the labour market.
Every content provider has own delivery channel; metadata, semantics	Unified Content Gateways, taking care of the business model, unified metadata and semantic models

Appendix C Cloud Computing

The G Cloud

The Digital Britain report refers to a strategy study to determine whether the technical advances associated with Cloud Computing ("server and storage virtualisation, systems management automation, image management, and self-service provisioning") could be used to provide a private cloud for Government: the 'G-Cloud'. That study has since established a route-map for G-Cloud, which involves the consolidation of existing government data centres and services.

The proposed C-Cloud

There is an emerging argument for a Citizen Cloud (C-Cloud) to manage the flow of information required to manage citizen-centric governance and the equilibrium of information flows between citizen and state. Because of the increasing convergence of citizen data necessary for each of us to manage the growing complexity of the relationship between skills, qualifications and employability for the purposes of learning, employability and citizenship.

Within the C Cloud would be stored granular information and data ready to be assembled on demand according to need. Each granular component is tagged or its presence marked in more sophisticated ways, so that not only will each piece of video, voice recording, text or image be able to be called up in isolation but through network-resident intelligence and stored provenance, each component will also know with which other components it is normally associated with respect to a particular geographical location, age group, qualification set or occupation and increasingly a combination of all of these. This granular information would include, inter alia, that provided by UCAS, Hot Courses, Connexions Direct and private and voluntary sector sources such as icould, Horse's Mouth and TheSite.Org.

In line with national research about the changing nature of universities, some are already exploring the new thinking about the nature of SuperJANET and their individual contributions to Cloud Computing. Furthermore, they are actively

considering their role as knowledge transfer partners, not simply as research agents but increasingly as providers of services to schools, communities and business enterprises within the sub-regions in which they are located[3] as well as client organisations in other countries. In the former regard they are well suited to provide a continuum of information services across the range of age-related institutions and other vested interests.

Where would personal information in the C-Cloud be assembled?

The presentations and discussions in Portcullis House made reference to Web 2 technology and to the changing business model. It recognized that over time, the discrete services and tools provided by career development support organisations would reside in The Cloud and the platforms previously used to manage their access and remuneration for the service would be replaced by a personal collaborative environment and a micro-payments system respectively. This means that as a combination of the user and their e-persona (informed by the careers adviser) instigate a flow of data from the C-Cloud, it is assembled in a way that is deemed relevant and commensurate.

Citizen Cloud (C Cloud) is a concept initiated within the Cloud Relevance Programme, a public private venture between Manchester Metropolitan University and Cisco Systems. In the context of this paper, it is offered as a model as shorthand for the part of the solution stack where the information and data might reside.

[3] The emerging city region model is an early pointer to how governance and funding models might change to enable a demand based public services environment http://www.communities.gov.uk/localgovernment/performanceframeworkpartnerships/multiareaagreements/cityregionpilots/