Review of ICT Infrastructure in the Public Sector in Scotland

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The Scottish Government

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1 Foreword

In 2010, at the request of the Cabinet Secretary for Finance and Sustainable Growth, I commenced a detailed review of the use and strategic management of information and communications technology within the public sector in Scotland. Use of this technology is pervasive in our society and touches many aspects of our daily lives. However, my review sought to understand specifically how it is being adopted in the public sector, not only to deliver efficiency benefits but also how it is helping improve the quality of public services and the ease in which they are accessed.

And of course a key consideration of the review was the question of whether investments in ICT are delivering best value for money and if not where opportunities exist to improve on the existing status.

The review covered the health service; local authorities; Scottish Government departments, agencies and non-departmental public bodies; police and fire services and also universities and colleges which, although not formally part of the public sector, rely on government funding for the majority of their income.

Many public sector organisations and individuals provided input and advice on the current landscape and also their views on how progress could be made across the spectrum of activities supported by ICT.

During my work I also engaged extensively with companies and groups within the ICT industry and gained their perspective on the public sector's use of ICT and on its interaction with the industry's suppliers.

I am grateful for the information, advice and assistance provided by these and other stakeholders in the development of this document.

2 Remit of the Review

This review was sponsored by the Cabinet Secretary for Finance and Sustainable Growth and its remit was defined as follows.

The overall purpose is to review the strategic management of investment in Scottish public sector information and communication technology (ICT) infrastructure, reporting on how best to deliver improved value for money and support multi-agency working and shared services.

The review's remit also included:

→ Describing a future vision for the Scottish public sector ICT infrastructure.

→ Engagement across the public sector in Scotland at a senior-level to establish sources of data available to determine what we have, what we should ideally have, and how to bridge the gap.

→ Mapping the current landscape, identifying key issues and opportunities for quick wins.

→ Making proposals for a strategy for change comparing the present position to the identified future state.

→ Addressing issues in governance and current ways of working, if appropriate, which will ensure that visible progress is made, having due regard for efficiency, economy and effectiveness and also any existing investment plans by public sector organisations.

3 Introduction

There is no doubt that the development of information and communications technology has been to the 20th, and the early part of this century, as significant a breakthrough as the steam engine, internal combustion engine and other advances in engineering and science were in the past. In the same way as these historical developments drove large-scale efficiencies, shaped economies and changed lives, the same effects have arisen from the inexorable progress made in the design, manufacture and application of technology available to process, manage and communicate digital information in all its forms and through many different types of networks, media, equipment and devices.

A question often raised is how much further will these technologies take us and will we continue to see order of magnitude strides over time? Evidence would indicate that there will be no limit in the foreseeable future to the "raw power" that technology can deliver. Enhancements in miniaturisation, processing and communication speeds and storage density improvements will continue.

This report deals with the subject of how this powerful capability is being adopted, deployed and used in practical ways in the public sector in Scotland.

4 Benefits from the use of ICT

Later I will comment on the existing status of adoption of ICT but before I do that it is important to examine the specific advantages that it can bring to the public sector and public services.

4.1 Enabling Organisation-Wide Productivity and Savings

There is no doubt that efficiency and productivity have been, and remain, core elements of the justification for the pursuit and adoption of ICT solutions. This is regarded as being of prime value to those organisations providing public services and it could be argued that the automation of business and other processes through the use of ICT still represents one of the most effective ways of reducing the costs of delivering services. In that sense the adoption of ICT can be seen as an investment that delivers savings in the other costs of operating organisations.

In the context of the amount of investment, the way in which ICT is deployed is crucial. Shared deployment across organisations can spread the cost so that individual organisations spend less on ICT but still deliver their own targeted savings.

4.2 Enabling Shared Services

Shared deployment of ICT will reduce ICT cost and deliver savings in costs within individual public sector bodies. However, it can also, by being shared, provide a platform for additional efficiency and savings across multiple public bodies. The establishment of shared hosted information systems, commonly used across multiple organisations makes it very much easier to also share the resources and skills needed to operate other business processes. In this way shared ICT deployment unlocks the gate to shared services opportunities in other operations and processes.

4.3 Making Services More Effective

Another factor now even more obvious and relevant is the appreciation that the use of ICT in delivering services also benefits the recipients of those services. Whether it's because of a higher likelihood of service requests or complaints being dealt with successfully, taking less elapsed time to address concerns or most important improving the quality of the content of the service there is no doubt that public services are enhanced by ICT. And of course at points across the spectrum of public services some organisations really do rely moment by moment on ICT to preserve and save lives, deal with emergencies and maintain law and order. This needs accurate and complete information and fast data communication.

4.4 Making it Easier to Access Services

For the citizen or the business the experience of benefiting from public services is greatly enhanced by the access and engagement being made easier by ICT. The less time spent and the less complexity or difficulty encountered in requesting services then the greater the value to the citizen. In this respect having online access to all public services is crucial as is having ongoing electronic communication and status reporting.

4.5 Supporting Sustainability

All of us are likely to be committed to the pursuit of actions that will lend themselves to addressing the environmental issues facing us and future generations. The challenge is not so much about what needs to happen in the area of sustainability but more about making it happen. In this context it is again obvious that public sector bodies can make important contributions to sustainability goals through the effective use of ICT. Digital solutions

such as an online transaction can be "paperless" solutions. Journeys not made thanks to the use of mobile technologies or home working or because citizens don't have to travel to a public facility all benefit our environment. And of course it's important that we ensure that the way in which we deploy and manage our ICT operations in the public sector minimises its effect on the environment in terms of energy usage and emissions as data processing equipment and supporting facilities can be significant contributors to greenhouse gas emissions.

5 Vision for a Digital Public Sector

Given these advantages and opportunities how can a "digital public sector" be created and one that delivers the type of benefits described above? What would its features be and how would it operate in five to ten years from now?

Firstly as with all appropriate ICT solutions it should be driven by user needs and demands. And in the context of that principle it can be asserted that individual citizens, communities in which they live and the businesses and organisation in which they work, are the ultimate users of, and indeed ultimately the funders of, our public services.

This report offers a high-level vision for the provision of public services that not only has information and communication technology at its heart, but also at all its points of communication and interaction.

Here are just some of the ways in which the daily life of citizens can be improved and made easier through the effective use of digital technology.

The quality of services delivered should be enhanced as a result of the use of ICT and within this report there are many examples of how services and their delivery have already been improved. In a future vision the quality benefits offered by these exemplars would be widely available. For example telemedicine and telecare would be open to all who need it and "smart homes" technology would be prevalent in its use to support the care of the elderly and other groups needing care. Results from x-rays and scans would be communicated to all patients in days or even hours through the use of digital technologies for the transmission and storage of images.

All routine transactions with local authorities should be able to be completed via the internet. In addition to enhancing quality these online services would also help avoid travel with its impact on time, timing and sustainability.

It should be standard to request all public services through the internet. For example requesting and scheduling doctor and hospital appointments

online should be the norm and making service requests and complaints to local authorities would be the same. There should be online council tax management and payment and those engaging with local councils on matters such as revenue and benefits should be able to provide information and make claims online. And of course all follow-up and communication with a public body such as a local authority or a health service should be electronic as these bodies use ICT internally to process and manage the services they provide. The utilisation of other general services should also be accessed through the internet. For example it should be possible to "visit the library" and access books without physically going there.

Access should recognise trends in the use of devices so that citizens are able to join service networks via handheld and other mobile equipment with onboard applications. And, where appropriate, links to and from citizen services should recognise the significance of social networking sites and their value in personal and general telecommunications.

There should be a single citizen portal that routes those accessing to the appropriate site and one standard way of achieving authentication for each citizen irrespective of the type of service being sought.

Physical access to facilities such as leisure centres, libraries and other public service buildings and offerings should be electronically enabled and without entrance complexities. The same should apply to concessionary public transport across Scotland and other services where physical access is involved. The use of "smart cards or devices" to authenticate entitlement should be prevalent and that technology should be standard across the public sector with multi-purpose use for all relevant services.

And of course for pupils and students the learning experience can be made more effective and satisfying through the use of learning support

technologies. Additionally access to the internet should be constantly available to support study wherever it takes place. And again "smart device or card" capabilities should ensure easy access to other more general services.

The public service employees who travel to clients and patients should be digitally enabled through mobile technologies that allow immediate online access to records and other essential information.

Similarly employees who work from home or remote locations should have the support of technology that allows them to work on their own or with a team independent of physical location.

An aspect of the digital society that is becoming more relevant is the citizen's need for services to be offered in a seamless way across existing boundaries within the public sector so that multiple access points, duplicated provision of electronic information and multiple and different modes of authentication be avoided. Also, although sensitive to information protection and privacy issues, the citizen would expect that public bodies will share and move information across these internal boundaries particularly where there is an advantage to the citizen or the community when this happens. In this way the elderly, sick and other vulnerable groups can be supported without difficulty when their needs cross organisation boundaries.

The capacity and performance of broadband available to citizens and businesses should meet their expectations and in particular the life of the remote or rural citizen or operation of a business should not be disadvantaged. Digital technologies should offer those in that category comparable service levels and access as "digital inclusion" for all is important.

Citizens and businesses will also demand as the ultimate funders of these services that internal ICT resources and procured capabilities and technologies are not only extensively adopted but are also deployed in a way that minimises the cost to the taxpayer of ICT enablement and at the same time is respectful of the environment and its sustainability. They will also expect that new technologies and concepts are adopted at the appropriate time.

The framework for ICT within the public sector to support this vision should include some key and important elements.

There should be a pragmatic recognition of what is core or non-core activity for individual organisations within the sector so that ultimate capability can be maximised without each organisation being self-sufficient in providing all of its ICT needs.

For example each individual organisation should have an "information officer" accountable to that organisation. However the services delivered would originate from different sources. There would be some delivered locally while others would be provided from either central or regional centres for that specific sector. Where appropriate, other infrastructure such as broadband should be regarded as intra public sector utilities. However, the capacity of broadband and its speed should be consistent with that offered by new broadband communication technologies and comparable to those available in other advanced economies. Also there should be central national coordination of "design authority" factors such as standards, protocols and data security.

The ICT structures, technologies and practices should support the ideal of having seamless cross-sector integration and or transfer of data.

The underlying principle of this ICT framework should be to provide effective services in support of the vision at the very best possible value to the public purse. In addition the use and delivery of ICT services should be respectful of our environment and supportive of sustainability goals.

In summary, although this vision for a "digital public sector" may take some time to achieve completely for all in the nation, these are realistic expectations and are capable of being delivered.

6 Current Landscape

Before discussing how to move towards the future vision described above it is clearly important that we have an understanding of where the public sector is currently positioned and also of the challenges that stand in the way of delivering that vision.

As is inevitable with a review of this nature views are formed and status identified through a sample of interviews, research and investigations. All efforts have been made to ensure that these activities are as representative as possible of the overall sector in Scotland or where appropriate groupings of organisations within the sector.

This part of the report assesses the degree of penetration of usage of this type of technology within the public sector. It also comments on the way in which investments in ICT are deployed and in particular if they are shared and coherent at a sector or national level.

My overall perception is that senior managers are fully aware of the benefits that ICT adoption brings to the operation of public bodies and are committed to ensuring it does play a significant part both in improving the effectiveness of and satisfaction with service delivery and also as an efficiency and productivity enabler in reducing costs across all operations within their own organisations. That commitment is matched by the realisation that although much progress has been made there is still much to be done.

My overall conclusion is that the public sector is well behind the private sector in the adoption and deployment of ICT and there is clearly some way still to travel to capture the vision described above. In some cases this is because adoption of core ICT support has been later than it could have been. In others the capability has been installed in the past and has been overtaken by new developments. In addition there are some areas of activity and potential activity that are still untouched by ICT.

However, if the existing exemplar projects, already consistent with the vision, were made prevalent across the whole public sector then much of the vision could be delivered.

In general conventional business processes such as payroll, finance and accounting, procurement and logistics are well covered by individual applications or enterprise-wide systems.

However, there are still important business processes and procedures within the public sector that await full automation and translation into a fully electronic state. And, in particular, there is much to be done in the way of adding online capability that as discussed earlier can both improve the quality of services and reduce cost.

At the same time it should be emphasised that in most parts of the public sector there are plans and strategies in place to move individual organisations forward in ICT adoption.

Within the sub-sectors there is some common usage of proven applications but even these applications are mostly installed and run separately by the individual organisations.

Therefore, there are significant and serious shortcomings in the way ICT is deployed. The prevalent model is one of "standalone self-sufficiency" and nearly all organisations have fully and professionally staffed information functions and most also their own data centres or data processing rooms. It is estimated that within the public sector in Scotland there are more than 120 of these. This approach not only sacrifices the opportunity to reduce expenses and capital spend of individual organisations through cross organisation sharing of ICT, it also makes capturing the further opportunity from the operation of other shared business processes highly unlikely. In fact many organisations see ICT as an inhibitor to sharing other internal processes and services rather than the supporting platform that it should be.

There is also very significant scope to make progress in providing to citizens and businesses public services that have been electronically enhanced by ICT and which can be accessed and interacted with online.

There is an unstructured and fragmented approach to the ICT industry and its suppliers and formal procurement function coverage of expenditure seems low.

There is also a deficit in the availability of ICT expenditure data and no central sector or national collection of value spent. There is a mechanism for collecting external procurement expenditure information although at the time of this review the latest 100% complete data set available was for 2008/9.

At a national level and in most sectors there is no overall ICT strategy, high level architecture or consistency of approach to design standards across the public sector.

There is also very little in the way of cross sector seamless provision, data sharing and transfer including in areas where it is most needed such as dealing with the elderly, the sick and other vulnerable groups.

Finally, although there is overall sensitivity to the issue of sustainable development, there was no strong impression that any negative contribution that ICT makes was fully characterised and understood particularly in the context of the proliferation of data centres or that positive opportunities were being fully recognised through the more progressive use of mobile and remote technology.

However, within this overall summary there are distinct differences across the major parts of the public sector.

Interaction with senior executives and other representatives of the local authority sector left a clear view that those in leadership were acutely aware of the substantial value that a sound information and communications technology strategy can bring to organisations.

I also sensed a strong commitment to using ICT not only to deliver savings within organisations but also to exercising its capabilities to improve the quality of access to local authority services.

However, there is general recognition that this sector is only part of the way through a transformational journey.

One of the exemplar initiatives being pursued is the Customer First Programme which has been developed, facilitated and has its overall governance supported by the Improvement Service. This project which has had Scottish Government financial backing involves councils pursuing a standard approach to customer-facing services. As well as targeting significant cost savings in its first few years of operation its goals also include the delivery of more convenient, responsive and higher quality public services. The promotion of online access is an essential part of the agenda.

The programme for National ICT Infrastructure incorporates the shared investment of a primary data processing location and all 32 councils have a network connection to this infrastructure and use at least one of the applications hosted there.

One of these is a "Citizen Account" concept which provides a secure environment for citizens to register for and have access to services. The Account creates a single online personal record that can be securely accessed and updated using online authentication thus allowing councils to maintain a definitive record for their citizens.

Another important project is "smartcard" which employs a shared card management system to support the national concessionary fares scheme and the Young Scot partnership card which allows access to school transport, libraries, cashless catering and leisure facilities. This National

Entitlement Card is used by all 32 councils for concessionary travel and by a significant proportion of the 32 for leisure, libraries and school meals.

As an important foundation for the work of the Improvement Service is the understanding from a multi Scottish council benchmarking study that a single "face-to-face" transaction can cost up to £11.28 whereas an equivalent contact centre episode expends £6.35 yet a similar transaction online incurs just 46 pence of cost. This approach and these cost assumptions are reinforced by an external study that showed similar differentials between the different types of service transactions[1].

This has been part of the motivation for councils in general to embark on programmes to transition their practices from traditional enquiry practices to the use of contact centres and then moving onwards to online electronic interaction. However, many councils are still at, or just moving to, the second phase and achievement of the ultimate goal of providing all access online to all services is some way from being a reality. However, in a Customer First Programme Report for 2009/10 it was shown that estimated savings from this transition project for the 5 years to 2009/10 were £27.4m from a sample of just 16 of the 32 councils thus confirming not only progress but outstanding future opportunity.

Therefore, savings have commenced and the potential of capturing efficiency improvements from this style of transformation at an individual council level is typified by Renfrewshire Council's programme to modernise customer services which is anticipated to save a recurring £10m by 2013/14.

Maintaining and improving customer and citizen satisfaction during this type of change is vital and North Lanarkshire's "Service and People First" initiative has demonstrated through surveys that residents in that council's area are satisfied that it

is becoming easier to access services and that the quality of most services is improving.

Amongst leading exemplar initiatives described in more detail in the appendices to this report are projects such as the SMART homes initiative at West Lothian Council which brings technology into 3000 homes to radically change the community care of elderly people and the "textshire" service which allows residents to text about problems and faults to Aberdeenshire County Council.

Many councils are adopting technology to support remote and mobile working which offers many advantages including saving workspace and transportation costs and offering employees a more flexible way of working. It is also a trend that is good for sustainability and at Fife Council the QUAD pilot has deployed leading edge collaboration tools which allow remote staff to communicate as "virtual teams" and participate in "virtual meetings".

Although there is considerable momentum underway across local authorities it is important to recognise that most of this progress is still taking place at an individual organisation level as managements strive to improve their own ICT platforms and make savings in the cost of overall operations while at the same time engaging only in partial participation in shared ICT initiatives.

In addition to having many unique internal systems developments there has also been a fragmented and mostly unstructured approach to the use of standard applications and other technologies available in the market place.

For example 11 of the 32 councils have selected and separately installed and operated the same benefits application and 19 are using the same customer relations system. While in the area of environmental services and roads management six councils

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[1] McNish J, Customer Contact Profiling Report – ESD Toolkit, Aston Campbell Associates 2008.

separately use the same provider's application. One single supplier has applications running in 28 of the 32 councils yet there is no coordinated approach to engagement with the supplier across this range of commercial activity.

One of the consequences of this approach and mode of deploying ICT is that each individual local council has its own standalone and largely "self-sufficient" ICT function and its own data processing centre nearly all of which are in-house.

With this approach it is inevitable that overall local authority staffing levels would appear to be high and it is estimated that there are 2400 employees within ICT functions. This staffing cost is a significant part of the estimated in-house operating cost of £200m per annum.

Adding external procurement cost of £325m (2008/9) indicates that that total local authority expenditure on ICT is in the region of £525m per annum.

While the Improvement Service, the Convention of Scottish Local Authorities (COSLA) and the Society of Local Authority Chief Executives (SOLACE) work consistently to coordinate sharing, the field of ICT is particularly challenging in that context. Specifically the absence of an oversight function or group is a major disadvantage when it comes to dealing with the issues of having a multiplicity of data centres, standalone ICT structures and fragmented unstructured procurement and this very low level of sharing and coordination is adding significant cost and inhibiting shared operations of other business processes.

That issue has been recently addressed by a consortium of local authorities in the Clyde Valley collaborating in an initiative aimed at optimising their combined operations across a number of activities common to all authorities. One of the workstreams is focused on shared services including ICT and the group has developed a business case which

demonstrates that significant savings can be made in the coming years over five different business processes while recognising that shared ICT can also be a platform for sharing in the other four processes.

During my review I did not find within local authorities evidence of widespread outsourcing although there were some exceptions to this. One of the most notable of these is the major project undertaken at the City of Glasgow Council where a joint venture company between the Council and an external service provider performs a number of services including the provision of ICT support.

The health service compared to the public sector is somewhat more advanced than the public sector in general in its adoption and deployment of ICT for enabling internal processes and in areas of service delivery.

There is a strong track record of sharing ICT and other capability as evidenced by the existence of 8 special boards which support the 14 operational boards by providing central services and support. This avoids duplicated activities within individual boards.

There is a well-founded e-Health Strategy (2008-11) which incorporates a vision and lays out the challenges with a strategy and the actions required to move the use of ICT towards the vision.

NHSScotland has also established important principles for ICT adoption. They refer to how ICT solutions are obtained and recognise that in order of merit the preferred option should be firstly to "re-use" existing capability, the next alternative is to "buy" solutions externally and the last resort should be to "build" them internally.

The strategy and approach to ICT is developed and facilitated by the centrally based e-Health Division which plays a lead role in both progressing and monitoring implementation of national systems and

also in investing in funding the establishment of standard specifications and common applications for development within the sector.

Another advantage for the NHS is the existence of a central services delivery organisation for ICT. The National Services Scotland (NSS) Board is responsible for the hosting, support and management of a significant number of applications commonly used by all health boards. The same organisation also provides a central procurement service including coverage of some ICT spend.

These important activities and structures are further strengthened by an overarching system of governance. The ICT strategy and its implementation is overseen by the e-Health Strategy Board with a membership that includes the chief executives of some health boards and senior medical and clinical representatives.

As a result of new activities and prior investments the existing landscape within NHSScotland is populated with examples of good progress in the adoption and crucially the shared deployment of ICT solutions.

For example, there is a single core wide area networking capability with the entire sector in Scotland using the N3 broadband service.

There has also been as part of the national strategy a focus on a number of key initiatives across the sector.

One of these is a new Patient Management System (PMS) which sponsored by the e-Health Division has been procured by a consortium of five separate health boards. This system was the subject of one single contract and is now installed in separate instances in each of these five boards. The investment in the PMS was £44m.

A similar type of central coordination was involved in replacing the existing single and centrally hosted GP system (GPASS) with two more advanced alternative offerings, i.e. EMIS and VISION. The decision as to which of the two to select and install locally is made by the individual health boards and GPs will utilise the specific system being adopted by their own local board.

Work is progressing for a Clinical Portal. An incremental approach is being pursued in developing this portal which will provide a single online entry point through which various elements of information related to a single patient can be accessed by authorised users. Centrally sponsored within the e-Health Programme three separate consortia of health boards have been commissioned to examine options for delivering the Clinical Portal.

As indicated earlier the NSS organisation provides a central service for common applications. There are 26 separate applications centrally hosted and operated just once for the whole sector by NSS's outsourced service provider. The extent of this use of common applications together with their shared central deployment is unique within the public sector in Scotland and the list of applications includes many that provide support to 24x7 critical front-line services.

The health service is sensitive to the opportunities that special technologies offer, not only to reduce cost but also to significantly improve the quality and effectiveness of services. This includes initiatives such as telemedicine and telehealthcare and the Telecare Development Programme is making a £16m investment that allows people to receive care in their own homes by using a range of technology and devices including sensors. Also the Picture Archiving Communication System which through the use of digital technology allows the transmission and storage of images benefiting patients through shorter waiting times for results of x-rays and scans.

Although it is clear that ICT is playing an important role in reducing costs and in delivering better quality services there is much progress still to be made in

facilitating electronic online capability for patient access to and engagement in delivering services.

Also there is untapped potential in providing seamless systems to citizens and patients in areas of overlap and essential interlock between health boards and local authorities.

Despite the progress that has been made particularly in shared deployment the health service, in keeping with other parts of the public sector, is still structured in a way that means that each board has its own standalone ICT function including some local development and self-sufficient data processing facilities.

In this context there seems to be a need for reconciliation and then clarification of an agreed NHS approach on whether and when central hosting, regional or local hosting is the most appropriate approach. Related to this there also seems to be inconsistency in understanding as to whether single common applications or multiple choice alternatives offer best value.

It is estimated that there are at least 1700 ICT staff across the NHS in Scotland. The cost of this staffing together with other internal infrastructure costs would indicate that internal expenditure is around £135m per annum. If external procurement spend of £215m (2008/9) is included then total ICT annual spend for the sector would have been approximately £350m.

There are more than 100 major separate units within the domain of the "wider Scottish Government". This includes the integrated SG departments, Agencies and non-departmental public bodies (NDPBs). Their interests and responsibilities vary from organisation to organisation.

Information Service and Information Systems Division (ISIS) is the formal ICT services provider to the core Scottish Government departments and directorates and ten government agencies. It has its

own in-house large-scale data centre which is not fully utilised and capacity and associated services are being offered to other organisations across the public sector.

ISIS staff includes the Scottish Government's Chief Technology Officer and the organisation also oversees a broadband network capability which is contracted with one of the large telecommunications providers.

In January 2009 it published internally a technology strategy which set out a five year plan for technical infrastructure.

The plan recommended use of thin client workstations, storage area networks, open source software, consolidation of servers and the use of more recent and emerging technologies such as video-telephony, voice over internet protocol and wireless capability.

The strategy emphasises the objective of centralising provision and management of services and the consolidation of hardware and expects this to reduce systems and support costs and provide data security at a lower cost.

ISIS also offers technical and other services to the wider Scottish Government organisations such as SCOTS, a fully managed and supported service that enables customers to access a set of desktop tools and other facilities including connection to the Government Secure Intranet. Other services include managed telephony, electronic records and document management and information assurance.

ISIS officers play key roles in representing Scotland in UK-wide groups and have been especially active in engaging and working on the UK Public Sector Network project which is part of a UK ICT Strategy.

The ISIS organisation has scale and competence and its services are widely used especially by units within the core Scottish Government. However,

some organisations including many NDPBs are not consistent users and adoption of ISIS as ICT provider is not their default mode.

A number of NDPBs have indicated that they are willing to receive additional services provided the cost of service demonstrates the value of sharing and an appropriate provider/customer model can be developed. Although NDPBs do not participate to a significant level in shared ICT services there are a few initiatives and one of these is where a consortium of NDPBs including Skills Development Scotland, Scottish Enterprise and Highlands and Islands Enterprise has engaged an external provider to supply and support a single core network and service platform. This project has significantly reduced ICT resources within the individual organisations and delivered significant cost savings and other bodies are likely to join.

There have also been important developments in the use of ICT to improve access to and the quality of services and Learning and Teaching Scotland has shown outstanding leadership in using ICT to support its mission through a quite exceptional development.

Glow was reputedly the world's first national schools intranet and provides a range of tools and resources for pupils and learning practitioners. A similar use if ICT is incorporated in SDS's new online service for careers guidance "My World of Work" which will support and enhance the current service level through ensuring that all interested in learning and work can engage interactively in planning their careers and potential next steps to understand and improve their prospects.

Also Visit Scotland in supporting the tourist industry is planning to deploy a new "open platform" website which will connect with millions of internet users across the world so they can engage with Scotland's 26,000 tourism businesses.

However, despite the existence and use of ISIS and other sharing initiatives the trend is still for organisations to have their own "self-sufficient" ICT functions.

As indicated earlier the Scottish Government and its associated bodies have widely varying responsibilities and work content so the pattern of proportions of income spent on ICT also vary widely from organisation to organisation.

However, overall, it is estimated that the wider Scottish Government has an annual spend in the region of £280m per annum[2] including an external spend of £185m (2008/9).

Although universities and colleges in Scotland are autonomous bodies the majority of their funding comes from the public purse and the arrangements in place with the Scottish Funding Council (SFC) include a requirement to demonstrate best value. In any case institutions and their representative bodies embrace that principle and have worked to pursue and demonstrate their commitment to it.

For many years the university sector in the UK including Scotland's universities have participated in central ICT offerings provided by JISC (Joint Information Systems Committee) and its associated organisation Janet. Funded by government and through the various UK funding bodies Janet is an association which manages the operation and development of a network linking the UK's educational and research organisations. It was used by all of Scotland's universities and also now its colleges so that for broadband there is a shared service approach.

[2] Figure derived from sample data collected and extrapolated to provide an estimated figure

The total investment by the Scottish Funding Council in the JISC/Janet structures was £8.6m in 2007/8 and £6.1m in 2008/9.

Other sharing initiatives include adoption of the UK-wide Universities and Colleges Admission Service (UCAS) system which deals with learner applications for places to study at higher education institutions.

The adoption of ICT solutions and their use as internal productivity tools is generally quite advanced and ICT is also used in electronic-based learning such as "virtual learning environments" which include a range of different applications and technologies.

However, although there are some progressive initiatives, such as at University of the Highlands and Islands (UHI), there is still the opportunity to use technologies more extensively in addressing the need to deliver a better and wider offering of further and higher education provision in remote and rural areas in Scotland.

In the area of business systems all colleges and universities have a modern application for financial processing and although generally procured and operated separately there is some commonality in the usage of standard applications.

A recent survey showed that 15 colleges used the same procured package and the next most frequently used application featured in 10 colleges. Also across 17 of the Higher Education Institutions there were only 4 different standard applications in use.

However, despite this commonality in selection of applications the situation in the further and higher education sectors is similar to others in that nearly all institutions have their own dedicated ICT support and data processing facilities and less than a third of the institutions had at least one shared service.

In recognition of the opportunity to improve this status the SFC has provided in financial support to a project developed by the Higher Education Information Directors Scotland (HEIDS). This is studying the feasibility of opportunities for shared ICT services.

Recent mergers involving nine separate colleges and universities have included in their business cases recognition that sharing ICT services can offer benefits including important financial savings.

It is estimated that total annual ICT spend by universities and colleges is around £150m including more than £100m (2008/9) of external procurement spend.

Scotland's Police Forces have already progressed along the shared services route. In 2007 the Scottish Police Services Authority (SPSA) was established. This unit combined the support resources from the eight regional forces into a shared services organisation of 1600 staff with a current budget of around £100m[3]. The services it provides ranges from forensic capability and related resources through to ICT support to the eight forces.

The sharing of ICT services is a key priority and since formation the SPSA has saved an important proportion of its peak ICT resources.

At the Scottish Fire Service there is a sound policy of ICT adoption. There is also a "virtual" central procurement organisation within which a selected lead authority focuses on specific categories of spend on behalf of all the others. ICT is one of these categories. While individual Fire services are not opposed to sharing there are at present no major projects in the area of shared ICT.

It is estimated that the overall annual spend on ICT by the two services is approximately £95m including external procurement spend of £50m (2008/9).

[3] Information available on the Scottish Police Services Authority website at www.spsa.police.uk/about.

7 Broadband

Broadband access and performance are amongst the most critical of the factors associated with both delivering an effective digital public sector and also supporting the nation's broader economic and social goals.

There is evidence to support the view that economic activity and social wellbeing are both enhanced when businesses and individuals are able to conduct business, access commercial and public services and generally improve quality of life through the internet. And of course that is only likely to happen when broadband access and performance levels are at or beyond an acceptable level.

Indeed, it is asserted that there is a direct correlation between improving economic activity on one hand and wider access and better broadband performance on the other. It is certainly the case that lack of access and poor performance are inhibitors to economic growth.

There is no doubt that for this next decade and beyond broadband infrastructure will be as relevant to economic progress as roads and transportation including effective rail and air links.

There is also no doubt that it would be highly unlikely that the vision described earlier in this report for a "digital public sector" could be realised without progression to effective and efficient next-generation broadband.

Also, there is a growing concern that rural and remote locations often have poor broadband service (broadband speeds in rural areas being less than half of that in urban areas). Also a concern is the fact that even in urban areas there are groups of people within the population who for social and other reasons do not have access to the internet and electronic-based services.

It also appears that despite Scotland having many companies including small and medium enterprises (SMEs) playing key roles in developing a national "digital economy" a significant number of small businesses are lagging behind in their commercial use of the internet.

In summary, whether for social reasons, economic growth and regeneration or ambitious inward investment projects (which include plans to attract large data service complexes to Scotland) the likelihood of successful progress is highly dependent upon the availability of high-speed broadband links to the rest of the UK and beyond.

The Digital Scotland Report[4] issued by the Royal Society of Edinburgh emphasised the need for a digital strategy for Scotland. It asserts that the UK as a whole is lagging behind the capability of technology and the speeds projected by Neilsen's Law of Internet Bandwidth and associated data. It also pointed out that unless action is taken the current gap would widen significantly in the future. The report suggested a broadband speed target of 16Mbps being available to all in Scotland by 2015 and proposes this should rise to 128Mbps by 2020.

It also estimated that 2500km of additional fibre was required in rural areas in Scotland to make high speed connections available to every community and reiterated the findings of the UK Department for Business, Innovation and Skills Broadband Group that laying broadband in rural areas could cost between £15 and £40 per metre.

The report also recommended a funding scheme that would include a combination of commercially led investment and borrowing through non-profit distribution models.

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[4] The Royal Society of Edinburgh's Digital Scotland report is available at http://www.royalsoced.org.uk/enquiries/Digital_Scotland/index.htm.

The "reform scotland" think tank organisation in its digital power publication presented a comprehensive review of broadband status and plans. In emphasising the importance to our economy it highlighted the fact that the nation's strong presence in software, digital media and creative industries made access to high speed broadband even more of an imperative. The recommendations included the appointment of a Minister for Digital Scotland.

As with the Digital Scotland document this report also focused on the current rating system for fibre which is seen to discourage investment in fibre deployment.

The Scottish Government's *A Digital Ambition for Scotland* document[5] also set out the government's thinking in this area. The follow up to this, *Scotland's Digital Future* document[6], is referenced below.

Broadband service and its capability is very much about the existence of physical infrastructure and the operation of the networks that it supports. That infrastructure is owned, operated and delivered by a small number of commercial telecommunications providers. Their services and business models within the UK are regulated by Ofcom.

Providing broadband telecommunications infrastructure is a capital expenditure intensive operation. As mentioned above depending upon the technology type being used investment of between £15 and £40 per metre would be typical of the investment needed to expand or improve upon the existing status of capability in Scotland.

This requirement for high levels of capital investment creates a commercial environment in which population size and economic activity and their direct link to levels of usage and anticipated broadband service revenues are seen by private sector providers as being prerequisites for justifying significant investments in infrastructure. At the same time it is obvious that it is possible to trade-off investment levels and performance and in particular to use different approaches and technologies as part of this balancing act. For example fibre broadband to the roadside cabinet is less expensive than fibre to the premises. The ability to utilise existing unused fibre (dark fibre) could have significant financial advantages as could using a mix of alternative technologies in particular situations such as wireless, mobile and satellite broadband.

Over recent years there have been a number of initiatives that have sought to address the area of broadband access and performance and in particular the issue of service to remote and rural locations.

One of these is the Scottish Government-sponsored Pathfinder Project. This project was first considered and scoped in 2001/2 and following further definition, development and procurement was initiated in 2006. It involved two separate schemes, one for the North and the other for the South of Scotland. These will run until 2014.

£90m of public expenditure was committed in this intervention (£63m for the North and £27m for the South). It supports the provision of high speed broadband to rural and more remote parts of the country.

The lead roles were taken by two consortia of local authorities engaging after a Scottish Government-led procurement exercise with one single service provider.

1169 local authority and school sites are connected with broadband connectivity ranging from 2Mbps to 1Gbps[7].

[5] A Digital Ambition for Scotland is available at http://www.scotland.gov.uk/Publications/2010/10/Digital/Digital-Ambition.

[6] Scotland's Digital Future: A Strategy for Scotland is available at http://www.scotland.gov.uk/Publications/2011/03/04162416.

[7] Figures from the Pathfinder Evaluation Study: Final Report, March 2011, available at http://www.scotland.gov.uk/Publications/2011/02/23091038.

The intervention has resulted after subsidy in a cost-effective broadband network compared to that experienced by the local authorities prior to the Pathfinder Project. This is a consequence of both the government contribution and the aggregation of broadband spend by seven local authorities. A Scottish Government sponsored report[8] highlighted that the cost of the bandwidth within the North reduced from £3323 per Mbps per annum to £600 per Mbps per annum within the project.

This same report described the other benefits from the project and in particular the high level of "customer satisfaction" within the participating local authorities and their staff. In general there is a view amongst users that without the Pathfinder project then many progressive and beneficial public services and processes would not have been delivered or supported.

Although it is clear that many benefits have been delivered to those participating, the very early original scope of the project was not pursued.

The scope was reduced from creating a telecommunications infrastructure that would have served not only local authorities but also the health service and further and higher education to one that is primarily local authority centric and within local authorities used for specialised although important services. Also within the original scope was a desire to allow access to the Pathfinder network to private and community networks.

One intangible but important attribute associated with this project, given remarks elsewhere in this report on the sharing of ICT investments, is that the Pathfinder Projects involved collaboration across seven local authorities having similar needs and facing equivalent challenges. This demonstrates that "common needs" driven sharing can be a reality.

One of the consequences of the deployment being more limited than planned is that the level of utilisation of the capability has been well below the full potential of the network and therefore although value has been obtained by those who participated, had a wider group of user organisations taken advantage of the service then the value delivered would have been greater.

As a result of the commercial arrangements, and despite the significant government investment, the provider owns the network infrastructure and all its associated and connected equipment.

The provider can use the infrastructure to service other public and private sector customers provided the capacity is not being utilised by Pathfinder partners.

Within the Scottish Government's administration the ISIS Division has a central network infrastructure contract with one of the providers and this supports the core Scottish Government's organisations and also other bodies in the context of data links, services and support.

The Scottish Government's "Interconnect" network was set up by Learning and Teaching Scotland to support the delivery of content to local authority data centre boundaries and as mentioned earlier the Glow content has been perceived as highly beneficial.

Also in Scotland the National Health Service committed itself to using the central N3 network for the complete sector and the Police Services take advantage of a central PNN3 contract.

Janet is a UK-wide network used extensively by Scotland's universities and colleges. This network addresses the needs of research and education institutions. Its origins go back to the 1970s and since then, through various developments, it has

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[8] Pathfinder Evaluation Study: Final Report, March 2011, http://www.scotland.gov.uk/Publications/2011/02/23091038.

evolved into a highly capable and widely-used service. Its financial supporters include all of the UK's funding bodies including the Scottish Further and Higher Education Funding Council.

However, these co-ordinated or aggregated contracts are only part of the broadband structure within Scotland and is estimated that in addition to these there are at least another 140 separate wide area network (WAN) arrangements[9] between individual public sector bodies and the small number of telecoms providers. It is estimated that the annual cost of this is around £200m.

Outside of Scotland a number of local authorities have come together in different places to create regional public sector networks. The Kent PSN and the Hampshire PSN are two leading examples of this. In addition there is a London PSN which provides a centralised network service to 33 London boroughs.

One of the most ambitious projects is the Welsh Assembly Government's PSBA Network. This is a project which aggregates the public sector demand for network provision. It is a single integrated next generation communications infrastructure for the Welsh public sector with managed gateways into other UK networks such as N3, Janet and GCSX.

This Welsh project also incorporates an approach of "local loop unbundling" a complementary technological solution which is touched upon later in this report at section 8: New Technologies and Techniques.

The UK Government has a Broadband Delivery UK scheme which has been allocated £530m to facilitate the delivery of broadband. This is being distributed to rural areas on a project by project basis. Through a competitive bid a Highlands and Islands Enterprise-led initiative has been successful in being awarded up to £10m to undertake a next generation broadband pilot to improve connectivity in the region[10]. There may be opportunities to win additional funding from the UK Government for this and other projects.

The very recently published *Scotland's Digital Future* document sets out a plan to ensure that by 2020 next generation broadband will be available to all in Scotland with significant progress towards that goal being made by 2015. It also includes an aim of being aligned with the EU's Digital Agenda which has a target of 30Mbps for all in the 2020 timeframe.

The report points out that currently 99% of our population can access basic broadband with a speed of 512kbps compared to only 45% having that level of service in 2001. However, it acknowledges the findings of a recent Ofcom report that showed that third generation broadband (3G) coverage in Scotland at 41% in terms of geography and 66% of population is well below the UK average of 76% and 87% respectively although it highlights that broadband infrastructure is not the key reason for this gap. In this context the document focuses on the need to increase participation in the "digital world" including the internet. The document also lays out a comprehensive plan to pursue the other most important elements for Scotland including a broadband implementation plan, a digital economy thrust and a public services delivery project.

Within the UK Government's ICT Strategy[11] there is a specific Public Sector Network Strategy. This was proposed as a single holistic telecommunications infrastructure serving the whole of the public sector in the UK. It is described as a network of networks.

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[9] Figures from the Scottish Public Sector ICT Infrastructure Scoping Study, Sopra Group on behalf of the Scottish Government, December 2006.

[10] Government announces successful bid for superfast broadband for Highlands and Islands, 20 October 2010, http://goo.gl/DX2l3.

[11] The UK Government ICT Strategy is available at http://www.cabinetoffice.gov.uk/resource-library/uk-government-ict-strategy-resources.

The programme was established to deliver:

→ Converged voice and data communications.

→ A coherent design and facilitation of market delivery of interoperable services.

→ A stimulation of the private sector to deliver PSN services and the creation of a "Government Conveyance Network".

→ A set of common standards and processes and governance.

→ A central transition plan to transition to this new approach.

In support of these goals the network would be "secure by design", utilise open standards, be interoperable with legacy systems, energy efficient and highly competitive in terms of cost.

In the context of the Scottish Government's digital strategy and in particular the need to act now to secure future goals the PSN concept offers many advantages. One very practical one is the fact that work is already completed in creating common standards, seamless connectivity, information assurance protocols and "PSN assured" supplier services. This is of great benefit and avoids both the need for investment and the delay involved in developing other alternatives in these fundamental areas of technical design.

8 New Technologies and Techniques

As indicated earlier in the report there is a constant flow of new technologies and innovations and these generally offer performance and or cost advantages compared to current practice.

There are a number of technologies that have been introduced into the market in recent times that have not yet been fully adopted by the public sector in Scotland.

One of these is "voice over internet protocol" (VoIP). This technology takes advantage of digital infrastructure and communications technology for voice communication. By converting the regular voice signal to a digital one it can use broadband connections for voice telephony.

VoIP offers cost advantages primarily through not paying incrementally for the cost of a call irrespective of the time spent or the distance to the other party. Even when using VoIP to call a traditional phone in a public switched telephone network the call can cost less and within large organisations with many VoIP connections there are significant savings available as nearly all calls will incur no charge. And of course this approach avoids the need to operate traditional and complex PBX equipment.

It also allows the easier convergence of voice and video, e.g. through video-conferencing features.

Mobile technology is accelerating in its capability and there is a constant flow of devices and applications coming to the market. While there are many initiatives within the public sector in the use of mobile technology there is very fertile ground for accelerating the pace of adoption. The savings potential from mobile and home working is significant. However, there are also tremendous advantages to be gained in terms of timing and speed of access and execution. Portable devices such as laptop and netpad computers can create a movable office environment. Also handheld devices such as personal digital assistants and smart phones can transform communications so that

dynamic mobile working becomes the norm rather than being exceptional.

Mobile devices are also being used as physical access devices so that in areas such as travel or other access the device becomes the boarding pass or ticket. There are also many specialised smartcard and smart device technologies which offer tailored but flexibly updated access and authentication.

The basic technologies behind new approaches such as VoIP and mobile and access devices are already tried and tested and offer very significant opportunity to the public sector to capture financial, employee satisfaction and citizen benefits. However, their use is far from pervasive and this lag in adoption means potential benefits are not being captured.

This status is before taking into account further opportunities in "telecapability" and its tailored applications. Currently within the public sector there does not appear to be a routine use of video-conferencing although recently its benefits are becoming more widely recognised and appreciated. And of course the escalating cost of travel makes the financial case for its use much more obvious.

As benefits have become more obvious so also has the capability being offered by the industry. The combination of new more sophisticated equipment together with improving broadband communications means that the public sector has available to it many new ways of using telecapability.

The quality and flexibility of video-conferencing is dramatically improving. For example telepresence uses different technologies and techniques to create the impression that groups of users are physically together in the same suite and provides quality of interactive video and voice that is equivalent to face-to-face communication.

At the other end of the spectrum desktop video-conferencing is becoming less expensive and also of much higher quality than before thus offering

a realistic alternative to face-to-face meetings involving a small number of individual staff.

However, in addition to conferencing there are a number of other opportunities where telecapability can add value and save cost.

Amongst the most important of these is the use of these technologies in telehealthcare and telemedicine where they can support a transformation in how services are delivered particularly to patients who live remotely or who can be supported at home.

"Cloud Computing" is another emerging approach which reflects the argument that much higher speeds of data communication can support a reversal of the trend that prevailed over many years. This trend saw a dramatic growth in distributed computing, meaning that locally hosted, desk-top and even hand held device applications offered significant computing power at the edges of the network including quickly accessed data storage. In the absence of very high speed broadband this was an essential but is now regarded as a relatively expensive approach. Now with much higher capacity and faster data communication much of this distributed power can be centralised in a way that provides at least comparable service to the user but in a more flexible and less expensive way.

By centrally hosting applications and data storage in a network-enabled model for ICT solutions there is the opportunity to contract for services "on demand" while incorporating a "pay as you use" model.

In addition to avoiding fixed internal cost this business model is particularly relevant to the public sector in that it can avoid capital expenditure during difficult times for public sector capital budgets.

Some organisations are considering "Cloud Computing" but there are as yet no formal programmes, which although not surprising, is an opportunity for pursuit since this approach offers

outstanding advantages compared to the current model of standalone self-sufficient hosting of applications.

In considering "Cloud"-style computing there are a number of different offerings and options. One of these is to have an external provider host and provide its own label standard applications and data storage centrally. Another is to build public sector "Cloud" capability that hosts unique or specialised applications for multiple user bodies.

Within this latter option there is a further choice which is to operate this service internally within the sector or to outsource it to a data services company. In the context of investment avoidance and an option to "pay as you use" it is obvious that the external and outsource options are more likely to offer this advantage.

This review separately mentions that within the current landscape there are already some internal "Cloud"-type installations such as those within the health service and the wider Scottish Government's ICT offerings.

In the area of broadband progress to next generation provision has, as mentioned at section 7. Broadband, a high dependency upon capital investment in new technology. This investment is mainly driven by replacing copper wires with newer technologies, primarily fibre optic cables. Having fibre connections direct to premises is the best user service option but is more expensive than fibre connections to roadside cabinets. Clearly there is a trade-off between investment levels and the quality and performance of the service. Another potential dynamic within the broadband cost equation is whether use can be made of dark fibre. This is existing installed fibre which is not utilised by its owners hence the term "dark" in contrast with actively used fibre optic cable. The use of existing "dark" fibre assets should in theory have a lower cost and could reduce the level of new capital investment required.

There is also an opportunity to mix the use of alternative technologies particularly in certain geographic areas by incorporating other technologies to carry broadband communications such as wireless, mobile and satellite.

The question of next-generation broadband availability and performance is therefore not only about technology capability but equally as much about economics. There is certainly a measurable trade-off between investment levels and the reach, quality and performance of the service and that balance needs to be struck across the whole network.

However if investment levels can be mitigated by using existing assets and a mix of the alternative technologies mentioned above then this greatly improves the prospect of having affordable high performance broadband. In this respect and as mentioned elsewhere in the report the public sector does not exert influence that is commensurate with its annual spend of around £200m per annum on communications infrastructure.

Also featuring more recently in the area of broadband is "local loop unbundling". This is a technical and commercial approach which involves carriers renting a local loop connection and installing their own equipment in local exchanges. The bonding together of copper wires combined with the utilisation of ethernet technology allows companies providing this service to claim significant performance and cost advantages. As with other areas of broadband provision these arrangements fall under the regulatory powers of Ofcom but it would seem that this approach can provide performance and financial benefits in the short to medium term and in advance of migration to next generation broadband.

In reviewing the public sector's position in relation to new technologies and approaches it is appropriate to say that there are few organisations that could claim to be "early adopters" of new offerings and overall there seems to be a lag in adopting new technologies. Despite that there are a number of initiatives and projects that are aimed at the opportunities that technology driven advancement brings.

Being behind in achieving potential in this area, although disappointing, actually offers an ideal opportunity not only to make progress in the adoption of newer technologies and approaches but also to do it in a way that spreads the investment and any risk through cross organisation shared installations, services and procurement.

It is obviously easier to share at the outset of a new development than to reconcile alternative approaches and converge once there is already a pattern of different provisions.

9 Procurement and the ICT Industry

Over the last ten years we have seen the boundaries of the ICT industry extend as more and more aspects of business and life in general are touched by digital technologies. Within this growth we have also experienced the convergence of technologies and the companies that provide them.

There has been a great deal of consolidation through mergers and acquisition. The net effect of all of this is that the expanding market place is serviced by fewer major companies than five years ago. On the other hand there are many thousands of small- and medium-sized technology companies anxious to bring their innovation and capabilities to bear.

The diminishing number of large suppliers, the commercial interaction between them and the complexity and dynamism of their technologies means that having a coherent overall procurement strategy and operational approach is vital. The Scottish public sector could not be further from this ideal at the present time.

Since 2006 the structures for and professionalism of public sector procurement have developed at an impressive rate. There is a single centre of expertise for each of the sectors and a national organisation to deal with ICT commodities and services that are common across the whole of the public sector. However, it appears that these structures are able to access and support procurement of a relatively low level of the nearly £900m of spend[12] with the ICT industry. And of course because the bulk of that spend is handled locally and primarily on behalf of individual public sector bodies it means that one of the Scottish public sector's largest categories of spend is one of the most fragmented in its approach to the supply base.

Although there is a low level of procurement involvement considerable effort has been expended by the various procurement departments across the public sector to make inroads in terms of aggregating spend and offering professional procurement involvement ICT expenditure.

For example the Procurement Scotland organisation which handles national contracts on behalf of the entire public sector has developed contracts for some categories of hardware, certain software licences and other ICT commodities. There are framework contracts in place covering a potential of more than £100m of external spend. The National Procurement organisation within the NSS Board has also been active in pursuing coverage of ICT spend as has the Advanced Procurement for Universities and Colleges (APUC) unit for universities and colleges and also the Central Government Centre of Procurement Expertise (CGCOPE).

However, all of these organisations find it difficult to engage comprehensively in the area of ICT spend primarily due to the fragmentation of user activity and the absence of complete governance models.

Another key challenge in the field of ICT is associated with the perception that installation and ongoing contract management should not be integrated within the procurement process. Ideally a complete procurement process should be regarded as including the commissioning and management of external ICT applications, services and installations.

The mixture of a market place with large and powerful ICT companies on one hand and this extremely granular and uncoordinated approach on the other is certainly not a recipe for achieving good value. In addition, it will never deliver progress towards an efficient and effective digital public sector.

This situation is even more damaging when the level of external ICT spend referred to above is taken into account.

[12] Figure derived from sample data collected and extrapolated to provide an estimated figure.

The profile of overall spend with suppliers for 2008/9 shows that the external spend was assessed at nearly £900m. (Although some data was available for 2009/10 it was not 100% complete.)

Within that one supplier accounts for more than £100m which is nearly 12% of total spend. Although there are approximately 4000 suppliers 80% of the value was spent with just 239 (6%) of these and just the top nine suppliers account for 38% of the expenditure. Within these spend statistics there is a value of around £200m per annum being incurred for broadband services provided by just a few suppliers.

And of course with there being very little sharing of ICT services and therefore fragmented procurement, most of the large amounts spent with single companies will originate from many individual contracts all separately tendered and awarded. For example, it is estimated that there are more than 140 separate contracts for the broadband services referred to above.

In addition, there are some contracts with large providers where services have been vertically bundled into single contracts. In these cases it is essential to have transparency at each layer of service so that best value can be assured throughout the life of the contract.

As mentioned above there is a community of small- and medium-sized businesses striving to offer the public sector innovative solutions and good value. Bodies representing these suppliers are greatly concerned about the difficulty they have in having access to bring forward these innovative solutions and services to users and those specifying requirements.

At the same time large suppliers are also not satisfied with the current situation. They undoubtedly incur considerable cost in engaging with and tendering to hundreds of different public bodies.

Also they are anxious to engage at the leadership level with the sectors so that they can position themselves to offer added value, new technologies and often worldwide experience to the public sector. Some may also be willing to make significant capital investments as an element of tendering and winning contracts. Others are ready to make business propositions to sectors and also the overall public sector in Scotland including partnership arrangements which could be of mutual benefit. So whether its investment, skills, technologies or experience there is no doubt that the ICT industry and its suppliers can bring effective capability to the aid of the public sector.

Given all of these factors and recognising the characteristics of the ICT industry a radical change and indeed a complete paradigm shift is required in how the public sector orchestrates itself in engaging and contracting with suppliers and also how it takes account of and manages the opportunity offered by working in partnership with the ICT industry within the context of EU legislation. This approach will not only deliver best value but also assist in advancing the public sector towards the vision described earlier in this report.

10 Finance and Resources

There is at present no system or process for capturing completely accurate external spend data but extensive analysis of available information from an "improvisation based" application leads to the conclusion that in 2008/9 nearly £900m was spent with suppliers of ICT related services and goods. Although some 2009/10 data is available it is not 100% complete.

Similarly there is no central record of numbers of ICT staff but this review concludes that there are at least 6200 people involved in ICT across the whole public sector and that it operates more than 120 data centres or data processing facilities[13].

If that staffing level assumption and its cost is taken along with the costs of facilities and support and the external spend referred to above then it can be concluded that the public sector invested in fiscal year 2008/9 approximately £1.4bn[14].

Pending the commentary offered later in this report in section 13: Savings Opportunities it is asserted that the mode in which ICT is deployed and operated, with its fragmentation and duplication of resources and its unstructured external spend, cannot possibly deliver optimum levels of cost. Also the fact that more than 60% of total ICT expenditure comes from external spend with the industry points to a major dependency upon how the public sector structures its ICT procurement.

[13] Figure derived from sample data collected and extrapolated to provide an estimated figure.
[14] Figure derived from sample data collected and extrapolated to provide an estimated figure.

11 Issues and Opportunities

→ There are some impressive individual and sector-wide projects that can be built upon. If these exemplars were the norm and not exceptions the sector would be closer to achieving the vision described earlier in this review.

→ Adoption of ICT although lagging behind the private sector is progressing and benefits are actively pursued.

→ ICT could be used much more extensively in improving the quality of services and in offering easier and improved online access to services.

→ Deployment of ICT is far from optimum and could be greatly enhanced in most parts of the sector.

→ Although there are some good examples of shared deployment step function progress is required in the sharing of ICT investments and operations.

→ Excess resources and cost are being created by the existing operating mode of "standalone self-sufficiency" including the operation of many separate data centres and local systems development. The public sector should recognise that this operating mode is no longer affordable nor is it appropriate given the capability now available in the industry including in particular high speed broadband telecommunications.· The public sector's internal processes and "go to market" approach for procurement and commissioning is mostly inadequate especially given the industry's characteristics. It could not possibly be achieving best value.

→ At approximately £1.4bn the absolute level of investment in ICT could be reduced by implementing essential change in its management, structures and strategy.

→ Savings can be made and could be partially reinvested in more quickly progressing ICT adoption and pursuit of the vision for the public sector.

→ The absence of oversight and some form of governance over ICT within each part of the public sector and nationally is a major reason for the fragmented and uncoordinated approach.

→ Shared ICT is the key to wider sharing of other internal processes and services.

→ There are few examples of seamless cross-sector sharing of ICT capability and data in pursuit of addressing the needs of those requiring support from multiple parts of the public sector. It is clear that there is at present no forceful cross-sector pursuit of this and it seems there is even reluctance to engage in a citizen/customer/patient-driven single-focused approach. As a result there are similar parallel investments taking place within sectors that might be combined to avoid duplicated spend.

→ Potential advantages of and savings from outsourcing are not fully exploited in most parts of the public sector thus creating more internal fixed cost, a higher need for capital investment and a greater need for long-term maintenance of internal skill levels than may be sustainable.

→ Environmental sustainability while regarded as being a key goal is not well served by the existing set of structures and operating practices such as the multiplicity of individual data centres, the progress still to be made on mobile working and electronic delivery of and access to public services.

12 Proposed Strategic Principles

In developing a new set of strategies for ICT within the public sector in Scotland it is proposed that this work embraces the following strategic principles.

→ Although "information management" is a core activity it is not essential to operate totally self-sufficient local information processing, support and development.

→ The number of data centres and associated support should be minimised.

→ The shared hosting of common applications delivers ICT savings and central and regional plans open up ICT and other shared business process service opportunities. The existing clusters of nearly common applications should be built upon by selecting the best single application implementation and associated business processes and then from there achieve a reconciling of and agreement on common business processes so that the number of separately hosted instances can be rationalised and reduced.

→ A framework of oversight and governance for each part of the public sector and at an overarching national level is critical.

→ Co-ordination of interaction with the ICT industry within each sector and at a national level is essential and will be beneficial.

→ Relationships with suppliers should have a stronger partnership element.

→ It should not be a given that investment in and ownership of ICT assets and capability such as systems development is the norm and all avenues including investment avoidance and transaction/usage based charging should be pursued.

→ Citizen services and data should be seamless and integrated across public sector and should specially address the needs of the elderly, sick and other vulnerable groups which cross organisational boundaries.

→ Most of the required ICT capability is specialised by sector yet there are vital national dimensions and cross-sector imperatives.

→ Order of merit should be to first re-use, then buy and build only as a last resort. Existing initiatives and exemplars should be built upon and have their capabilities extended through free sharing with others.

→ New technologies and concepts be pursued especially where they can reduce investment and support other efficiency and sustainability goals.

→ The negative impacts of and positive opportunities from effective ICT on the environment should be addressed and pursued.

13 Savings Opportunities

Earlier in this report it was indicated that overall ICT investment in the public sector during 2008/9 had been assessed to be around £1.4bn.

More than 60% of this expenditure (£875m) was conducted with the industry's suppliers. It is also estimated that the cost to organisations of the 6200 ICT staff referred to earlier was approximately £250m. Finally it is considered that other costs of ICT such as space, data processing facilities, energy including cooling, other equipment and capital financing could have a cost of another £275m. It will have been noted that there are more than 120 data centres and data processing facilities.

Given the "ICT landscape" within which it is being spent it seems obvious that this level of spend could be reduced and savings made, either to free up totally or partially re-invest in progressing ICT.

The public sector's fragmented and inadequate mode of engaging and tendering with suppliers together with the structure of the industry leads to the conclusion that additional savings within the £875m of external spend[15] could begin in the year 2012/13 and grow progressively over a five-year period.

In addition, if a transition programme including the sharing of ICT staff resources and the ICT capabilities responsible for the other costs is pursued savings in these areas can commence in 2013/14 and again grow progressively.

In the year 4th year (2015/16) the annual savings would be at least £230m per annum and the cumulative savings over a five-year period beginning in 2012/13 would be at least £870m and potentially up to £1bn.

This assessment of potential savings is based on consideration of the impact of proposed actions on existing expenditure levels.

Another angle of approach is to compare existing expenditure levels with an external benchmark or comparator. Clearly different types of organisations will have variable structures and operations and of course in the public sector will provide different services to different groupings within the population. Some will be more "ICT intensive" than others. For example a public body which uses ICT to actually create its services and is able to both market and engage with users through ICT will have higher ICT costs as a proportion of income than another body where there is less scope for that intensity of usage. Where characteristics such as these are common to a group of organisations then there is scope for external comparison and benchmarking. An outstanding example of this comes from the Society of Information Technology Managers (SOCITM) which is adept at developing and conducting benchmarking exercises within the local authority sector within the UK. These have produced valuable information.

In the context of this type of benchmarking this review has focused on data representing assessed spend level ratios to total income for all public sector bodies in Scotland. There are some apparent and perhaps justifiable variations versus average percentage spend at an individual organisation level but leaving those questions aside this work has also provided the opportunity to assess spend ratios for the separate parts of the public sector within Scotland.

Extracts from this work show that it appears that the health service overall spent 3.5% of income in 2008/9, local authorities 2.9% and universities and colleges 4.4%. The Scottish Government (and its associated bodies such as NDPBs) is estimated to have spent 6.5% of income.

This information does not override the earlier analysis and savings projections based on elements of spend but in its detailed form can be used to calibrate the investment levels of individual bodies and indicate where savings opportunities may specially exist.

[15] Figure derived from sample data collected and extrapolated to provide an estimated figure.

14 Recommendations

ICT Strategy	
14.1.1	A new five-year ICT strategy should be developed for each separate part of the public sector. These should plan to move the model from local self-sufficiency to sharing within each sector, i.e. local authorities, health service, universities and colleges, wider Scottish Government, police and fire.
14.1.2	An overarching national public sector IT strategy should be developed which addresses national imperatives and pan public sector opportunities and needs and incorporates the sector strategies recommended above.
14.1.3	These strategies should adopt the proposed strategic principles outlined at section 12: Proposed Strategic Principles.
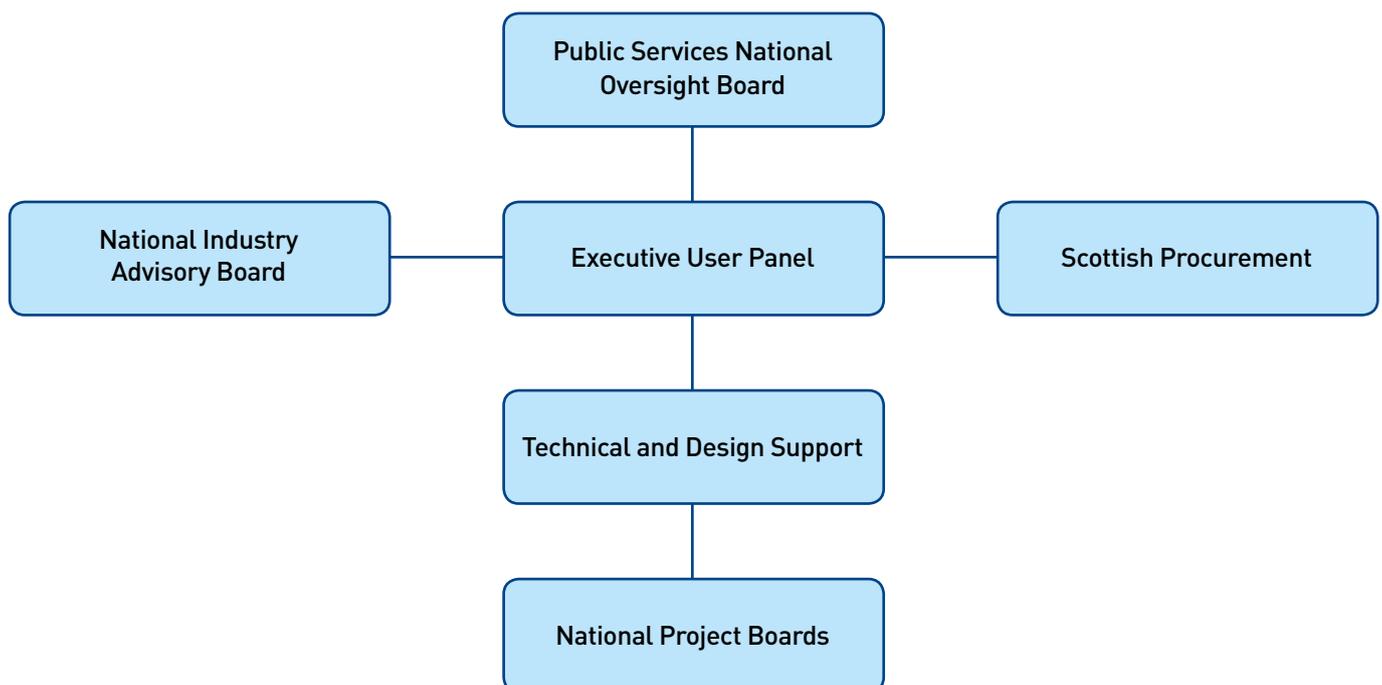
Figure 1: illustration of proposed national governance structure described at 14.2.1

Oversight and Governance	
14.2.1	There should be a national oversight and "ICT futures" board chaired by the Cabinet Secretary. This board should exercise leadership, responsibility for the strategy and the appropriate authority to deliver it. In addition it should have specialised responsibility in areas of ICT that have national dimensions such as broadband, design standards and citizen focused needs that demand seamless cross-sector capability without boundaries.
14.2.2	Each major part of the public sector should also have a group or board responsible for developing, overseeing and implementing the ICT strategy for its own sector. As with the national activity these sector boards should have responsibility and authority. These structures will require technical support and should lean on existing mechanisms and groups. They should also have a user panel which oversees and supports sector procurement and commissioning and also sponsor and make use of benchmarking exercises for their own sectors along the lines of those orchestrated by SOCITM for local authorities.
14.2.3	The "authority" referred to above should be adopted by the Scottish Government by requiring mandatory participation and compliance by all Scottish Government departments, agencies, NDPBs and the health service. Other sectors such as local authorities and further and higher education should arrange to have a system of delegated central authority within their own sectors and also formally sign up to participating in the National Board and its Committees and to upholding their decisions and actions.
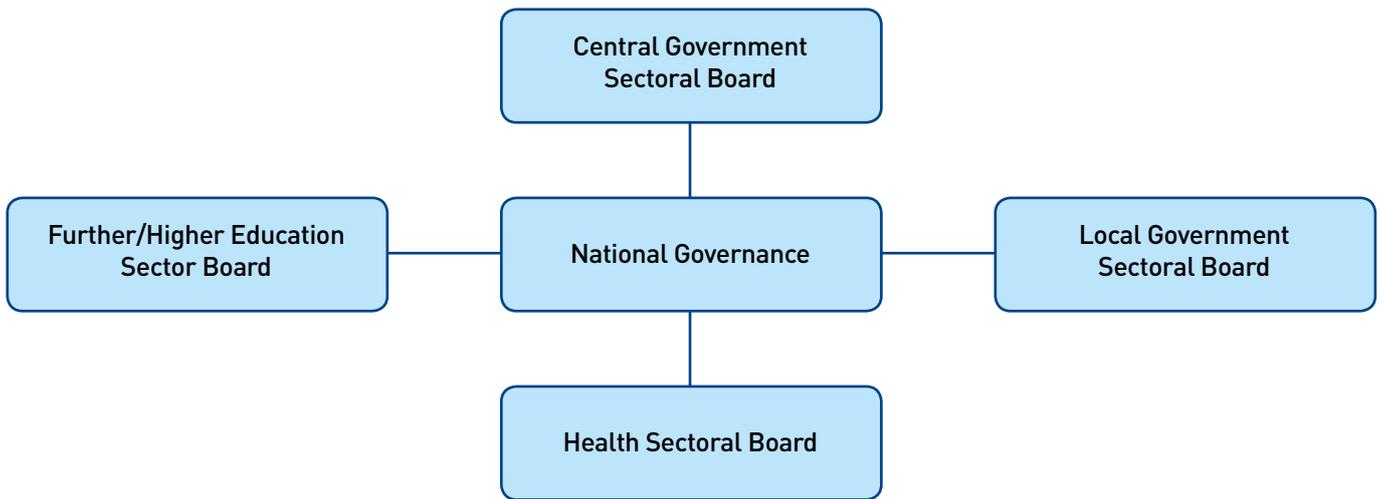
Figure 2: illustration of proposed sectoral governance structure described at 14.2.3.

Transformation	
14.3.1	Supported by these new boards the public sector in Scotland should embark upon a major programme to transform how it progresses ICT at a local, regional, sub-sector and national level towards the vision described in this report and in line with the strategies recommended at section 12. Proposed Strategic Principles. This initiative should drive a paradigm shift in how ICT is adopted, deployed and services delivered and should include the monitoring and provision of guidance on the national or sectoral optimisation of investments in ICT. The overall leadership, oversight and facilitation for this transformation programme should be provided at a national level.
14.3.2	The programme should also lean heavily on existing initiatives, infrastructures and organisations and technical forums should support it in vital areas of standards, security and protocols to facilitate cross sub-sector sharing at a regional level and/or in specific linked customer facing areas such as social and health partnerships. Given the need to build upon exemplars and existing sunk investments the transition will have a strong theme of convergence and connecting infrastructures rather than building everything new.

High Level ICT Operating Framework	
A high level ICT architecture should be developed to act as a blueprint for moving from the status quo towards the ultimate vision. The fragmented public sector landscape, although not an environment where sharing is prevalent, is partially populated with examples of excellence from individual organisations which have also in some cases installed the same common systems capability as others. Sometimes these common systems are deployed in a single shared instance but in most cases not. This has evolved into a complex landscape and one where a detailed plan is required to build on these points of excellence and partial sharing and extend them to create a network of common applications which are shared through being centrally hosted in a minimum number of "instances" for each sub-sector. The blueprint should also focus on online access and interaction and the use of ICT to improve the quality and effectiveness of services delivered. The following are the proposed elements of this framework.	
14.4.1	There should be differentiation horizontally across by sector and vertically down over the distinct layers of ICT infrastructure. Each part of the public sector should agree on where services are best provided from. Some will come from within individual organisations, some will be provided at a sector level or regionally within a sector. Others could be provided regionally across sectors and finally there will be services provided nationally.
14.4.2	Broadband should be a national service as should services that are closely interwoven between the various sectors and the Scottish Government.
14.4.3	Sectors should operate their own minimum number of data centre services either at a central level or regionally or a hybrid of both. Cross-sector sharing may be appropriate in some parts of the country and also of applications that support the need for seamless citizen related services described earlier in this review. This approach should incorporate aggressive pursuit of internal and external "Cloud Computing" concepts. Sustainability should be a key consideration.

14.4.4	Chief Information Officer functions, information management and unique services should be delivered by local organisations.
14.4.5	Standards, protocols and overall technical design authority should be led nationally but be a cross public sector participative activity.
14.4.6	At all levels outsourcing and industry partnerships should be evaluated to take advantage of industry experience, rely on their capital investments and optimise cost.
14.4.7	Local loop unbundling should be evaluated and where appropriate adopted on a cross-sector regional basis.
14.4.8	Extension of the use of other new technologies and concepts should be evaluated at a sector level or where more appropriate nationally.
14.4.9	Existing applications and physical infrastructure will require to be re-used and built upon. Where a concentrated number of common applications or capabilities prevail then an approach of connecting the "islands of excellence" should be pursued so that there is a minimum number of hosting and support activities within each sector and minimal if any local development. Migration plans should be firm but recognise existing contracts and investment so that transition costs are minimised.
14.4.10	At the national level there should be a formal project dedicated to citizen priorities including seamless cross sector integration of service and data and in particular the needs of the elderly, sick and other vulnerable groups. It should also include other areas such as transport access and data management.

Procurement and the ICT Industry

The public sector's unstructured approach to the ICT industry and its suppliers needs radical change. This change should embrace a more integrated approach to procurement, specific structures and arrangements to deal specially with the largest suppliers and also a special focus on SMEs which are not only vital to our economy but also need channels to offer innovation and new technology into the supply chain. These new arrangements should allow the public sector to be formally advised and supported by the industry's experience and skill and even where appropriate to form partnerships in which the industry through outsourcing and its own investment can assist the public sector with different business models during these times of financial constraint.

14.5.1	Given the strategic, technological and structural nature of the ICT industry there should be executive and technical professional leadership of the "go to market" approach. This mode should be supported by the established centres of procurement expertise. This leadership and co-ordination should be established sector by sector and also nationally and be an integral part of the oversight and governance model already recommended.

14.5.2	The aggregation of purchased value and management of awards and tenders is a critical success factor in achieving value and delivering progress in ICT adoption and delivery. The presumption should be that major ICT contracts are awarded for a complete sector. Important exceptions would be where national priorities or opportunities show advantages. Broadband, telephony, some software licences and some types of hardware are examples in that category. These procurement activities should be overseen and supported by executive user panels.
14.5.3	In an industry with a combination of SMEs, companies offering specialised products and services and also a number of very large vertically integrated general providers it is vital that tenders and contracts are carefully formulated. Contracts should also be"future-proof" and where there are elements of bundling there should be complete transparency for each type of service or product and procurement should incorporate commissioning and contract management. Also special attention is required to deal with the issue of ensuring SMEs have appropriate access to the public sector and in particular the opportunity to offer innovative solutions and when contracts are awarded to large suppliers they should be encouraged to take advantage of the services and products offered by SMEs.
14.5.4	The activity of procurement is incomplete without being extended to include both the commissioning of ICT and ongoing contract management. A special focus on this should be developed sector by sector so that staff can be trained and critical resources concentrated and shared.
14.5.5	The ICT industry is a vital cog in the machinery of the public sector and one on which there is a crucial dependency. Engagement with the industry is important and at present is far from optimal. The recommended governance mechanisms should provide a focal point for formal and informal partnership style engagement with the industry. And at a national level there should be a formal Industry Advisory Council. The Council must include SME presence.

Broadband	
A new and unique plan is required to address the issues and opportunities associated with large scale broadband infrastructure within Scotland where despite prior and existing initiatives there is much room for further development. This plan should address not only cost but also the need for improved performance in terms of capacity and speed. Progress in this key area is mandatory not only for the public sector but also to ensure that there is spin-off of this capability for citizens and businesses in support of economic growth. In generating this plan current UK government initiatives should be taken into account.	
14.6.1	The few large and many other multiple small contracts should be aggregated to build a single Scottish Public Sector Network that adopts the standards and protocols of the UK PSN.
14.6.2	The combined spend should be leveraged to gain cost and performance advantages for the public sector. Also it should seek availability advantages for the private sector and citizens in remote and rural areas. The contract should be a long-term arrangement and should take account of all existing initiatives and investments.
14.6.3	This network should be used by every public sector body and university and college in Scotland.
14.6.4	The technology of "local loop unbundling" should be evaluated and where appropriate adopted regionally.

15 Implementation

15.1 Implementation Resources

The changes and initiatives outlined at a high-level above will require to be driven within each sector and at the national level by effective leadership and project management. These are senior and important responsibilities.

→ Formation of a National Oversight Board and associated technical, design authority and commercial support will require leadership, staffing and appropriate skills.

→ Sector Oversight Boards with the possible exception of NHS will require similar staffing.

→ Existing organisations and structures such as the Improvement Service, Procurement Centres and IT Councils should be heavily relied upon and interlinked into the transformation programme.

→ Although the public sector is rich in ICT skills at the individual organisation level and full advantage should be taken of this, external specialised skills including some ICT industry experience may be essential.

The marginal new resources required to staff the oversight and governance structures and provide appropriate management should cost no more than £2m per annum.

15.2 Implementation Proposals

→ Agree to adopt the recommendations from this review as soon as possible.

→ In meantime request that pending high value conflicting decisions be suspended or amended.

→ Set up national and sector led oversight structures by the end of June 2011.

→ Establish membership and remit of Industry Advisory Board by end of June 2011.

→ Complete individual and national new strategies by end September 2011.

→ Commence new procurement and technical plans in October 2011.

→ Agree new strategies and future ICT budgets by the end of November 2011.

16 Executive Summary of Review

The public sector is lagging where it should be and there is an opportunity to capture a multiplicity of benefits in radically changing how ICT is adopted and deployed and in how it enhances access to and improvements in the quality and value of services. Shared ICT platforms, a connection and spread of exemplar projects and enhanced engagement with the industry would reduce the proportion of cost invested in ICT by individual organisations and deliver local savings which might be partially reinvested in advancing the progress of ICT. It would also open the door to significant additional and wider savings in public sector costs by providing a platform for the operation of other shared services and better support sustainability goals.

The public sector should recognise that in the current economic environment a largely standalone and "self-sufficient" operating mode is no longer affordable and should commit to an era of sharing in ICT that will not only offer better value but also still meet the needs of individual organisations and their customers.

These views are emphasised by the following key points:

→ ICT adoption is progressing but still lagging where it should be.

→ There are many outstanding exemplars and much progress can be made through a strategy of extending adoption of the practices and sunk investments executed by these exemplars.

→ The use of ICT is not yet pervasive in the delivery of services and online access to services is still limited.

→ Deployment is far from optimum and there is insufficient sharing.

→ The standalone self-sufficient operating mode for ICT needs to be discontinued.

→ Fragmented operating practices and structures are adding significant unnecessary cost.

→ Procurement, commissioning and engagement with the industry are inadequately performed.

→ Sustainability impacts and opportunities are not fully addressed.

→ Lack of "oversight and governance" is a key reason for the current status.

→ A complete paradigm change is required.

→ If the recommendations from this review are implemented savings in ICT investments can start in 2012/13 and grow progressively over five years to between £230m to £300m per annum with a cumulative saving over five years of from £870m up to £1bn. It should be noted that this assessment excludes any further savings from shared services in other business operations which are facilitated through this transformation in ICT.

17 Appendices – Landscape in Detail

17.1 Landscape – Local Authorities

Interaction with senior executives and other representatives of local authorities left a clear view that those at a leadership level were particularly strong in their awareness of the substantial value that a sound information and communication technology strategy can bring to their organisations.

I also sensed a strong commitment to using ICT not only to enable savings within their organisations but also in exercising its capabilities to improve the quality of and access to local authority services.

Whilst that commitment is obvious there is also a general recognition that they are only part of the way through this transformational journey.

In my summary of the landscape I referred to exemplar activities. One of these within the local government sector is the Customer First initiative which has been developed, facilitated and has its overall governance supported by the Improvement Service. This project which has had Scottish Government financial backing involves councils pursuing a standard approach to customer facing services. As well as targeting significant cost savings in its first few years of operation its goals also include the delivery of more convenient, responsive and higher quality public services. The promotion of online access is an essential part of the agenda.

Its key elements include a programme for National ICT Infrastructure. This infrastructure supported by a primary data processing location involves shared investment in hardware, telecommunications, systems software and shared business applications. All 32 councils have a network connection to this national infrastructure and use at least one of the applications hosted there such as the Citizen Account and National Personal Licensing Databases, the National Entitlement Card (NEC) System and the One Scotland Gazetteer a single property database for Scotland. The Citizen Account concept is an advanced one in that it provides a secure environment for citizens to register for and have access to services. The Citizen Account creates a single online record that customers can access securely and update themselves, using online authentication. This allows councils to maintain a definitive electronic record for their citizens. Also the smartcard concept employing a shared Card Management System has supported the national concessionary fares scheme and the Young Scot partnership card project which allows access to school transport, libraries, cashless catering and leisure facilities. The NEC facility is used by all 32 councils for concessionary travel with 12 also using it for leisure, 16 for libraries and 22 making use of the card for school meals. The Gazetteer is also accessed by many councils.

As an important foundation for the work of the Improvement Service is the understanding from a multi Scottish council benchmarking study that that a single "face-to-face" transaction can cost up to £11.28 whereas an equivalent contact centre episode expends £6.35 yet a similar transaction online incurs just 46 pence of cost. This approach and these cost assumptions are reinforced by an external study that showed similar differentials between the different types of service transactions[16].

This has been part of the motivation for councils in general to embark on programmes to transition their practices from traditional enquiry practices to the use of contact centres and then moving onwards to online electronic interaction. However, many councils are still at or just moving to the second phase and achievement of the ultimate goal of providing all access online to all services is some way from being a reality. However in a Customer First Programme Report for 2009/10 it was shown that estimated savings from this transition project for the five years to 2009/10 were £27.4m from a sample

[16] McNish J, Customer Contact Profiling Report – ESD Toolkit, Aston Campbell Associates 2008.

of just 16 of the 32 councils thus confirming not only progress but outstanding future opportunity.

One key aspect of the transition is the need to ensure that customer satisfaction is maintained or even improved as these changes are made.

Within North Lanarkshire Council they have a "Service and People First" programme at the heart of which is ICT. Within this visionary project the move from direct contact towards other channels is well underway and the Council conducts surveys to test how residents within the area feel about these changes. Recent results show that they are satisfied that it is becoming easier to access services and that the quality of most services is improving. They have also reacted positively to an improved website which provides useful information such as on the status of roads and school closures.

Overall, these are very encouraging developments and embrace the important principles of organisations not only adopting effective ICT but also allowing its deployment to be supported through shared ICT operations, so all involved in supporting and adopting the Customer First project should take great credit.

As indicated all councils have engaged in this Customer First initiative and one example of many, and typical of where the adoption of ICT is also supporting major transformation, is the work that is underway at Renfrewshire Council. It has embarked on a project aimed at modernising customer services to meet the changing expectations of customers, allowing them to access services in the ways they do in other aspects of their lives by having less face to face services and more services available on the telephone and the Council's website. It is also expected to make recurring efficiency savings of around £10m by 2013/14[17].

The core components of the new customer service delivery model include further development of customer relationship management systems, installation of modern telephony, a "tell us once" records service and development and deployment of mobile and flexible working in support of service delivery, asset management and sustainability goals.

Although this encouraging progress at Renfrewshire is typical of the journey that councils are making it also highlights the extent of the work required, the level of challenge involved and the fact that all councils still have a long way to go to achieve their full potential.

During this review many other examples of good practice in the use of ICT were observed. These applications cover a variety of areas demonstrating the breadth of the responsibilities held by councils and therefore the diversity of opportunities where technology driven approaches can be adopted.

West Lothian Council has been changing the community care of older people, working in partnerships to develop telecare systems and SMART technology which can be installed into people's own homes. The council has around 3000 SMART homes.

This technology is an important step in supporting people to continue to live in their own homes. It increases security and safety and also enhances services given by support workers. By allowing people to remain in their own homes for longer the clients are happier and the council is able to reduce the number of people admitted to care homes, resulting in increased customer satisfaction at reduced costs.

The benefits of this technology are not limited to older people, many of the solutions developed can also be used for people of all ages including

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[17] Outlined in Transforming Renfrewshire – Final Business Case, Renfrewshire Council, 22 June 2010 which is available on the Renfrewshire Council website at goo.gl/SkaYU.

those with disabilities thus helping them to sustain independent living.

The activity of recruitment can be expensive and the Improvement Service has developed an online recruitment portal, myjobsscotland available to all councils. It was projected that this would save £4.3m - £6.2m per annum. Uptake by councils and applicants has made the portal a success. It has resulted in 40-60% reduction in advertising spending, reducing the time to hire to around half and creating a positive view of the application process for applicants.

Aberdeenshire has developed and implemented a "textshire" service, whereby people are able to text in problems such as faulty street lamps directly to the council. This simple way of contacting the council reduces the time it takes for problem to be reported, resulting in quicker solutions and therefore happier customers. Moreover, it reduces the amount of time both the council and the customer have to spend on the problem, making it popular with both citizens and staff and reducing the cost to the council. This is a simple but very effective use of technology.

Aberdeenshire has also recently undergone a work style transformation. By adopting technology supported remote and mobile working it has reduced the number of desks and therefore workspace required in their offices so that there are seven desks for every ten employees. This has been very successful and it is believed to be possible to reduce the number of desks further, to five desks for every 10 employees. This has reduced costs and is releasing assets. It is also attractive to staff, many of whom prefer the flexibility of this way of working. It is made possible through readily available technology including hand held devices and like similar projects is ideal in its support for sustainability goals.

At Fife Council there is a leading edge project (QUAD) underway to support flexible mobile working by deploying collaboration tools from a major

networking systems company. It supports staff and work groups likely to be providing services from remote locations. The collaboration tools will allow staff to communicate as "virtual teams", participate in "virtual meetings" and securely share information between location independent workers. This adds to the agenda of "new workstyles" being promoted by the Council.

Fife Social Work also set up a data sharing partnership which led the development of the Fife Child Protection Register. This project has won several awards. Fife Social Work developed and hosts the register which has been made available free to all members of the partnership within Fife; police, social work, education and health. Users can log on 24 hours a day and update the register. This allows for real time updates and real time re-evaluations of potentially dangerous situations, keeping more vulnerable children safe.

At South Lanarkshire Council there is a strong ethos of using ICT to deliver efficiencies across the council's operations and also to minimise ICT transaction costs. The Council also through its Caird Road data centre offers a hosting service to other public sector bodies. Recent investment in the centre has seen it upgraded and capable of providing this shared service. Although there are a number of existing customers there is still underutilised capacity at the centre.

At the City of Edinburgh Council ICT has been used to transform how its public library operates. Routine transactions such joining the library or loan renewals can be conducted on line and an electronic catalogue allows internet accessed searching for books, films and music. Another key development is "Your Library". This online library can be used from home and offers a wide range of services including access to reference material and downloads.

At Orkney Islands Council remoteness is a characteristic that this body deals with as a matter

of routine. For example it is largely self- sufficient as its geography does not lend itself to the sharing of ICT operations or other services with other local authority bodies. Although there have been some recent projects with the local health board including the establishment of a shared procurement service a more extensive proposal for sharing services between these two organisations was not supported.

Broadband performance and access is a key issue across the authority but in particular for the islands. The Council see this as a barrier to attracting industry and commerce.

Broadband access and performance is also making it difficult for the Council to implement flexible working especially related to the islands where travel is expensive and time consuming.

Officials are examining how alternative technologies such as wireless can help address this key problem.

Although there is without doubt considerable momentum within the local authority sector it is important to recognise that much of this progress is still taking place at an individual organisation level as they strive to improve their own ICT platforms. This is because most of the ICT operations, including applications hosting and development, are being separately undertaken and are not part of a centrally hosted service such as the National Infrastructure project mentioned earlier.

In addition to different internal developments there has also been a fragmented and mostly unstructured approach to the use of standard applications and other technologies available in the market.

This largely independent adoption of externally procured systems applications for similar business processes has resulted in an interesting pattern of selections across the authorities. The 32 councils use a limited number of suppliers of specialised applications software and indeed for major business processes there are only a few individual applications

being used. However, despite this mosaic style landscape there are clusters of commonality.

For example, 11 of 32 councils have selected the same benefits application and 19 councils are using the same customer relations system. While in the area of environmental services and roads management six councils use the same provider's application. One single supplier has different applications running in 28 of the 32 councils.

These applications have mostly been separately procured and all are run as different instances within each council's data processing centre. In addition in many cases the standard offering has been modified at local request.

One of the consequences of this approach and mode of deploying ICT is that each individual council has its own standalone and largely "self-sufficient" ICT function and its own data processing capabilities, nearly all of it in-house.

These ICT functions are professionally staffed and run and would appear to provide very good service to their local organisations including local development capability.

With this type of structure it is inevitable that overall local authority staffing levels would be high and it appears that there are around 2400 employees within ICT functions and this staffing cost is a significant part of the estimated in-house operating cost of around £200m per annum.

Adding the external procurement cost of £325m (2008/9) indicates a total spend on ICT in the region of £525m per annum.

The local authority sector is not only strong in its professional ICT ethos it is also extensively involved in benchmarking. This is well facilitated by SOCITM an organisation of IT managers primarily from the UK local authority sector which does excellent work in influencing and promoting good practice.

Information released from SOCITM benchmarking studies shows ICT spend ratio data, internal customer satisfaction feedback and skill levels. Some of this data is referred to later in this report.

While the Improvement Service, COSLA and SOLACE work consistently to coordinate progress in efficiency, productivity and resource sharing the field of ICT is particularly challenging in that context. Specifically the absence of an oversight function or group is a major disadvantage when it comes to dealing with the issues of having multiple data centre investments, standalone ICT structures and fragmented unstructured procurement. This low level of sharing and coordination is adding significant cost and inhibiting shared operations of other business processes.

That issue has been recently addressed by a consortium of local authorities in the Clyde Valley. Glasgow, East Renfrewshire, Renfrewshire, North and South Lanarkshire, East and West Dunbartonshire and Inverclyde and Councils are collaborating together in a ground-breaking initiative aimed at optimising their combined operations across a number of activities common to all local authorities. One of these workstreams is focused on shared services including ICT. This services strand is being led by East Renfrewshire with support from the Improvement Service.

The group has already identified opportunities and developed a business case which demonstrates that significant savings can be made over the coming years. It covers five different business processes and recognises that shared ICT can also be a platform for sharing in the other four processes.

During my review I did not find evidence of widespread outsourcing or even the view that outsourcing was generally regarded as a strategic component of ICT delivery.

There were some exceptions and one of the most notable of these is the major project undertaken at the City of Glasgow. This well formulated and advanced scheme is founded on a joint venture between the Council and an external service provider and the formation of a legal joint venture company jointly owned by the two parties. The company performs a number of services for the Council including the provision of ICT support. Its initial arrangements incorporated the secondment of Council employees including ICT staff to the new company.

Whilst traditionally the largest proportion of the operations of a typical local authority has been focused on the unique duties of that authority there has been in recent years more recognition that cross sector collaboration and partnering in some citizen facing areas is not only advantageous, it is essential. The citizen who becomes a patient, the patient who needs citizen and social care services, the vulnerable child, the disabled, the elderly, the accident victim all need seamless services and support that are not hampered by organisational boundaries.

A similar principle applies to other areas such as access to facilities and concessionary transport where entitlement should be gained through common technology.

This means that information needs to be universally available and support systems need to be common or at a minimum shared.

In addition it can be asserted that access to a citizen style portal would be an important aspect of this and although there is project work in this area with local authorities by the Improvement Service that theme is unique to the local authority sector. However, this would be only an access point and ICT capability needs to be developed beyond that point to effectively achieve this seamlessness.

17.2 Landscape – Health Service

The health service compared to the public sector in general is somewhat more advanced in its adoption and deployment of ICT for internal processes and in areas of service delivery.

There is a strong track record of sharing ICT and other capability within and across the NHS in Scotland. This is symbolised by the existence of eight special boards which support the 14 operational boards. These boards provide central services and support thus avoiding duplicated activities within each individual board.

In recent years one of the key foundations for ICT has been the eHealth Strategy (2008-2011). This ambitious and structured approach, supported by the Cabinet Secretary for Health and Wellbeing, incorporated a vision and laid out the challenges with a strategy and actions required to move the use of ICT from where it was then towards where they want to get to.

The priorities identified included eHealth expertise, collaboration and common support, information governance and confidentiality, interoperability of core systems and patient identification and records. It also identified as a priority the development of a clinical portal to enable "single sign-on" to different sources of patient information for authorised clinicians.

The strategy also recognised the particular challenges faced in transforming a patient's journey through the health service (from GP via hospital services through to community services) from one that is reliant on information silos, some of which are still paper based, to an integrated electronic capability which satisfies all needs including confidentiality.

NHSScotland has established important principles for ICT adoption which are commonly held both centrally and across the Health Boards. They refer to how ICT solutions are developed and recognise that in order of merit the preferred option should be firstly to "re-use", the next alternative would be to "buy" solutions externally and the last resort should be to "build" them internally.

These are in my view critically important principles and their pursuit to a maximum extent should not only deliver best value but also take advantage of the continued technological progress being made by the ICT industry and its providers.

This strategy is developed and facilitated by the centrally based eHealth Division which plays a lead role in both progressing and monitoring implementation of national systems and in investing its funding in establishing standard specifications and common applications for deployment within the sector.

Another attribute unique to the health service is the existence of a central service delivery organisation for ICT. The National Services Scotland Board (NSS) is responsible for the hosting, support and management of a significant number of common applications used by all the Health Boards. This same organisation also provides a central procurement service including coverage of some ICT spend.

These important structures are further supplemented by an overarching system of governance. The ICT strategy and its implementation is overseen by the eHealth Strategy Board which is chaired by the Director-General and its membership includes the chief executives of some health boards and senior medical and clinical representatives. Its work includes the alignment of the eHealth Strategy with policy and Scottish Government related activity.

It also sets delivery targets, approves budgets and holds NHS boards accountable for meeting targets in conjunction with the Health Directorate Management Board.

Another key part of this overall governance structure is the eHealth Programme Board which is chaired by the director for eHealth. This board is responsible for development and ownership of the eHealth Strategy and ensuring programme and individual projects are appropriately resourced. The governance structure also incorporates structures of internal users such as clinicians.

A recent topic for this governance structure was a new eHealth Finance Strategy for 2011-14 which within very comprehensive content focused on how important it is to take an overall national view of costs including individual board spend and also the potential value and cost reductions associated with convergence of systems and processes.

The area of governance was highlighted as one that needed improvement in an Audit Scotland report in 2006 and the structures described above are core elements of the response to that report.

As a result of all of these new activities and prior investments the existing landscape within NHSScotland is populated with examples of good progress in the adoption and crucially the shared deployment of ICT solutions.

At the core of ICT is wide area networking capability and the entire sector in Scotland uses the N3 broadband service centrally contracted and funded by the eHealth Division. A centrally led approach applies also to other provision and more recently within the context of the 2008/11 strategy there has been focus on a number of key national initiatives.

One of these is a new Patient Management System (PMS) which sponsored by the eHealth Division has been the focus of a consortium of five separate health boards. This system was procured under one contract and is now installed in separate instances in each of these five health boards. The application provides leading edge capability including electronic prescribing and medications administration. It will streamline in-patient and out-patient bookings, manage waiting lists and order and report tests and results. It will also enable staff to keep track of patient records and allow information to be communicated back to GPs and also easily and securely between health boards when a patient is treated by more than one board. The investment in the PMS was £44m.

A similar type of central coordination was involved in the GP IT Framework in Primary and Community Care which was established in February 2010. This involves contracts to replace the existing single and centrally hosted system (GPASS) with two more advanced alternative offerings, i.e. EMIS and VISION. The decision as to which system of the two to select and install locally is made by the individual health boards rather than by GPs who will then utilise the specific system being adopted by their own local health board.

Work is also progressing on a project for a Clinical Portal. An incremental approach is being pursued in development of this portal which will provide a single online entry point through which various elements of information related to a single patient can be accessed by authorised users. Centrally sponsored within the eHealth Programme three separate consortia of health boards have been commissioned to examine options for delivering the clinical portal. This is in line with views expressed by NHS Chairs that there should be no more than three developments across Scotland.

In these more recent eHealth developments the approach has been to have consortia of boards or individual boards bid for and win central funding to pursue alternative application system options. While this would appear to have advantages in progressing adoption of ICT solutions it is not obvious that it facilitates the sharing of hosted applications or avoids the continuation or growth of multiple data centre facilities.

Another underlying core project of great importance is the CHI-based patient record identification (Community Health Index). Use of this number allows elements of the patient's record to be reliably brought together and viewed by authorised clinicians. Although use of this national identifier in preference to local patient numbering has increased the eHealth strategy identifies full scale use of the CHI number as the primary identifier as a critical issue for the eHealth strategy.

The ePatient initiative being pioneered by Ayrshire and Arran Board involves patients volunteering to join this service and engaging in a programme of self-management of personal health.

As indicated above the NSS organisation provides a central service for a significant number of common applications used across the sector.

In fact the health service has 26 applications which are hosted and operated centrally by NSS in one single instance within the sector and for the sector. The extent of this use of common systems capability together with shared deployment is unique within the public sector in Scotland.

In addition the health service is strong in the area of outsourcing with these central data services and support activities being procured completely from a major information services company.

These 26 applications range from many that provide critical support to front line services such as, the Emergency Care Summary a vital 24x7 requirement, ePharmacy and Bowel Cancer Screening through to administrative systems such as Payroll and eExpenses.

The NSS organisation also centrally hosts and operates the system which gathers performance data from the 14 operational boards.

With this level of commonality of systems and central hosting it would seem that the health service is well positioned to pursue a more advanced shared services agenda.

New technologies and other advancements in techniques within the field of information systems offer the opportunity to reduce cost while often also significantly improving the quality of service.

An important example of this within the Health sector is the use of technology to support a telemedicine and telehealthcare programmes. This uses information and telecommunications to provide medical information and services. This could range from voice only communication through to the use of high speed broadband or satellite technology for video and other digital imaging techniques. It not only speeds up processes and brings faster outcomes but is of particular value in remote or rural situations where the use of videoconferencing consultation and communication can transform patient access and offer savings in time and transportation. The Telecare Development Programme with a £16m investment allows people to receive care in their homes by using a range of devices including sensors. Apart from supporting the personal independence of thousands of people the programme also avoids hospital admissions at a time when resources are stretched.

The health service is intensely interested in operational statistics and has taken a strong interest in "business intelligence" systems including the operation of a data warehousing capability which is centrally hosted by the NSS Board.

Another recent development is that of the Picture Archiving Communication System which through the use of digital technology allows the storage and transmission of images. Amongst its benefits this system has cut the time that patients have to wait for results of x-rays and scans.

Although there is evidence that ICT is playing an important role in the quality of service delivery there

is a lot of progress still to be made in facilitating electronic access for and engagement with patients and in particular the use of online internet capability for patient transactions is not far advanced.

Also there are major opportunities both from a citizen/patient perspective and from an efficiency viewpoint to further develop common processes and systems sharing in areas of overlap and interlock between the health service and local authorities.

Despite the progress and the landscape described above the health service, in keeping with other parts of the public sector, is still structured in a way that means that each board has its own standalone IT function including self-sufficient data processing facilities.

It is estimated that there are at least 1700 ICT staff in the NHS in Scotland. This staffing cost together with other infrastructure costs would indicate that internal spend is around £135m and if external procurement spend of £215m (2008/9) is added then the total ICT annual spend for the sector would be approximately £350m.

In this context there also seems to be a need for reconciliation and then clarification of the agreed approach on whether central hosting, regional or local hosting is most appropriate for common NHS applications. Review is also needed of the question of whether there should be single common applications or a multiple choice offering through developing a limited number of alternatives. Recent decisions on developing and hosting newer applications give rise to this uncertainty.

17.3 Landscape – Wider Scottish Government

There are more than 100 major separate units within the domain of the "Wider Scottish Government". This includes the integrated SG departments, agencies and non-departmental public bodies (NDPBs). Their interests, responsibilities and operations are quite diverse. These characteristics vary from organisation to organisation. Those of the Prison Service (an agency) are different from organisations such as the Directorate for Employability, Skills and Lifelong Learning (a Scottish Government directorate) or Scottish Enterprise (a NDPB).

Within the Scottish Government there is the ISIS Division which has a multiplicity of roles within this grouping and also for other parts of the public sector e.g. when interacting with the UK Government on ICT matters.

ISIS is the formal ICT services provider to the core Scottish Government departments and directorates and ten government agencies. It has its own in-house large scale data centre and fully skilled staff including the Scottish Government's Chief Technology Officer. The data centre is not yet fully utilised and capacity is being offered to other organisations across the public sector.

The directorate oversees a broadband network capability which is contracted with one of the large telecommunications providers.

In January 2009 ISIS published internally a technology strategy which set out a five year plan for the technical infrastructure needed to provide ICT services to the Scottish Government and associated public sector bodies. It recommended the increased use of thin client workstations, storage area networks, open source software, consolidation of servers and the use of more recent and emerging technologies such as video-telephony, voice over internet protocol and wireless.

It also addresses key factors and drivers such as functionality for cost, security, sustainability, standards, interoperability and the need for more sharing of ICT capability and applications.

The strategy emphasises the objective of centralising provision and management of services and the consolidation of hardware.

It points out that highly distributed ICT solutions are more expensive to support and maintain than centralised solutions particularly with advances in broadband network services offering higher capacity and performance and concludes that the key to reducing the cost of ICT is to centralise into as few locations as is feasible.

The strategy sees centralisation leading to reduced systems and support costs, server hardware costs and providing better data security at a lower cost.

ISIS also offers technical and other services to the wider Scottish Government organisations. One of these services is SCOTS. This is a fully managed and supported service that enables customers to access a set of desktop tools and other facilities. The other facilities include internet access and connection to the Government Secure Intranet (GSI), an IT helpdesk service and access to corporate applications. There is also a SCOTS lite network for organisations that don't require the security conditions necessary to be part of the GSI.

Another service offered is managed telephony which covers supervision and management of support including the management of suppliers, implementation of moves and changes and repair of faulty equipment and cabling. The service includes a central help desk, call logging services and billing for mobile telephone and handheld devices.

Electronic records and document management (eRDM) is the Scottish Government's system to manage official records and related documents electronically and this service is also offered by ISIS to the wider Scottish Government bodies.

The vitally important area of data handling and information assurance is addressed by a central offering from ISIS that covers the core departments, executive agencies and NDPBs. The organisation also provides a national security vetting service for individuals who due to the sensitive nature of their work require certain security clearances.

The ISIS organisation and its officers play a key role in representing the Scottish Government at a UK level and participating in UK-wide Councils and Fora. They have been especially active in interacting on the subject of the UK ICT Strategy and have initiated their own work and encouraged that of others in support of the UK Public Sector Network project. ISIS also leads a Scottish CIO Council bringing together ICT and other stakeholders to review cross sector national issues and opportunities.

The Central Enquiry Unit is operated by ISIS. This operation provides a gateway service for telephone calls by referring callers to the most appropriate unit within the Scottish Government.

The ISIS organisation has scale and competence and its services are widely used especially by the units within the core Scottish Government. However, NDBP's are not consistent in their use of ISIS services and adoption of ISIS as their ICT provider is certainly not their default mode.

A number of NDPBs have indicated that they believe it appropriate that they should receive additional ICT services from ISIS provided the cost of the service demonstrates the value of sharing and also that an appropriate provider/customer model can be developed. In this context it should be noted that the ISIS data centre is not fully utilised.

For a number of years the Scottish Government has operated a Shared Services Unit and its responsibilities have include support to ICT sharing across the public sector and also a central ICT policy role for the Scottish Government. The decision on that responsibility sought to link ICT policy to the cross public sector shared services agenda. Through this Unit investment has been made in many different projects across the public sector including a number orchestrated by the Improvement Service for local authorities. The Improvement Service projects are referred to elsewhere in this report.

One of the most notable and beneficial shared ICT services across all parts of the public sector in Scotland is the eProcurement service and its supporting IT application. This capability is well established and is now utilised by nearly all individual public sector bodies and 47 universities and colleges. It is centrally hosted in one single instance thus avoiding the cost of providing this capability many times over.

In a similar way the Scottish Government invested in an information hub for expenditure with suppliers. This externally procured application interrogates all payments made to suppliers and after analysis and processing makes a central repository available to hundreds of users across the whole public sector.

These two initiatives developed and administered by the Scottish Procurement Directorate already exercise concepts that are technically similar to those being developed behind the label of "Cloud Computing".

This same directorate has also developed and established the Public Sector Contracts Portal which allows thousands of suppliers to access a single portal and thus have knowledge of potential business to be bid for and won through public sector contracts.

Although NDPB's do not participate to a significant level in shared ICT services they are reasonably advanced in the adoption of ICT for the conduct of their own operations.

Learning and Teaching Scotland is a NDPB, and one that has shown outstanding leadership in the use of ICT in pursuit of its mission of supporting teachers and schools.

Glow was the reputedly the world's first national schools intranet providing a range of tools and resources for pupils and practitioners. These include game based learning, video material and communications via social media.

Skills Development Scotland has led a consortium of NDPBs in developing a joint contract with an external service provider. This organisation working collaboratively with Scottish Enterprise and Highlands and Islands Enterprise and a number of other bodies has sponsored a single core network and service platform. This has substantially reduced the ICT resources within the various organisations and delivered significant cost savings.

Skills Development Scotland has also developed and recently launched a new digitally based approach that supplements the existing work done in the area of careers advice and guidance.

This offering labelled "My World of Work" provides online support and easily accessible information including the use of video and has links planned to other learning- and career-related sites.

Visit Scotland makes a valuable contribution to Scotland's economy by supporting the tourist industry. In recognition of the advantages that ICT can bring to this important sector it is planning to deploy a new "open platform" website. The site seeks to connect with millions internet users across the world and assist them in engaging with Scotland's 26,000 tourism businesses.

Also the public sector organisations associated with promoting enterprise and economic growth are collaborating to provide a single portal to private sector companies seeking support to develop and grow their businesses.

As indicated earlier the Scottish Government and its associated bodies have within their grouping a wide range of characteristics. Different bodies have alternative structures and provide different services or support and as a result the pattern of proportion of income spent on ICT varies widely from organisation to organisation.

However, overall, it is estimated that the wider Scottish Government's and associated bodies spend

on ICT per annum is in the region of £280m including an external procurement spend of £185m.

17.4 Landscape – Universities and Colleges

Although universities and colleges in Scotland are autonomous bodies and not legally part of the public sector, the majority of their funding comes from the public purse and the funding agreements in place with the Scottish Funding Council (SFC) include the requirement to demonstrate that best value is being delivered.

Institutions and their representative bodies have readily accepted this principle and have worked to pursue and also demonstrate their commitment to it.

The university sector in the UK including Scotland's universities have for many years participated in central ICT offerings provided by the Joint Information Systems Committee (JISC) and its associated organisation Janet. These organisations are funded by the Higher Education Funding Council for England, the Scottish Further and Higher Education Funding Council, the Higher Education Funding Council for Wales, the Welsh Assembly Government and the UK Government.

Janet is an association which manages the operation and development of a network linking the UK's educational and research organisations to each other. It is used by all of Scotland's universities and now by colleges so that in the area of broadband there is in effect a shared service approach. The combination of JISC and Janet services adds other education and research applications to the menu available to user institutions.

In addition to sharing this network and the applications that it supports there is also general use across all Scottish universities of the UK-wide UCAS system which deals with learner applications for places to study at institutions and carries through to managing the placement process.

There are also five regional broadband networks within Scotland which are contracted (with SFC financial support) with regional network operators operated under the Janet structures. These are in Edinburgh, Dundee, Glasgow, Aberdeen and at the UHI in Inverness.

The total investment by the Scottish Funding Council in the JISC/Janet structures was £8.6m in 2007/8 and £6.1m in 2008/9[18].

The adoption of ICT solutions and their use as productivity tools is quite advanced both in business operations and also in electronic-based learning.

For example our universities and colleges are effective adopters of "virtual learning environments" which include a range of different applications and technologies.

In the area of business systems every college and university has a modern application for its financial processing and although generally procured and operated separately there is some commonality in the usage of these standard applications.

A recent survey showed that 15 colleges used the same package and the next most frequently used application featured in ten further education institutions. Also across 17 of the higher education institutions there were only four different standard financial applications in use.

Also in colleges only two different student record systems account for a large majority of the usage of this type of ICT capability.

The Advance Procurement for Universities and Colleges organisation has been developing its involvement in ICT procurement both in being involved in unique projects and also in facilitating

[18] Figures verified by the Scottish Funding Council and are estimates for the cost of networking only.

central contracts for some externally provided applications including learning tools.

However, in other areas of ICT such as shared applications or data processing facilities the situation is similar to the public sector in that nearly all institutions have their own dedicated ICT support and data processing facilities running their own standalone applications. The deployment of shared services in ICT is still relatively low and less than a third of the institutions had at least one shared service.

It is estimated that universities and colleges have a total annual ICT spend of around £150m including more than £100m of external procurement spend.

In recognition of this opportunity the Scottish Funding Council in 2010 provided financial support to a project being led by the University of Stirling on behalf of the Higher Education Information Directors Scotland (HEIDS).This is studying the feasibility of opportunities for"collaborative above campus shared ICT services". This work will be complete in the first half of 2011 and will cover all aspects of ICT activity.

In addition the SFC has funded a project involving collaboration between St Andrew's University and Robert Gordon University for research in the area of creating high-value cloud computing services.

One of the most important elements of the corporate plan of the Scottish Funding Council in recent years has been working with institutions on general collaboration and merger activity.

Recent and current mergers proposed by institutions and financially supported by the SFC include: University of Paisley and Bell College forming the University of the West of Scotland; Falkirk and Clackmannan Colleges forming Forth Valley College; University of Edinburgh and Edinburgh College of Art; Glasgow Metropolitan College, Glasgow College of Nautical Studies and Central College forming the City of Glasgow College.

In addition, there is other work still in process that involves a number of other colleges in collaboration or federation projects.

In all of these collaboration and merger arrangements there has been within the business cases recognition that sharing ICT services can offer benefits including worthwhile financial savings.

17.5 Landscape – Police and Fire

Scotland's Police Forces have already progressed along the shared services route. In 2007 the Scottish Police Services Authority (SPSA) was established. This unit combined the support resources from the eight regional forces into a shared services organisation of 1600 staff with a current budget of around £100m. The services it provides ranges from forensic capability and related resources through to ICT support to the eight forces.

The sharing of ICT services is a key priority and since formation the SPSA has saved an important proportion of its peak ICT resources.

At the Scottish Fire Service there is a sound policy of ICT adoption. There is also a "virtual" central procurement organisation within which a selected lead authority focuses on specific categories of spend on behalf of all the others. ICT is one of these categories. While individual fire services are not opposed to sharing there are at present no major projects in the area of shared ICT.

It is estimated that the overall annual spend on ICT by the two services is approximately £95m including external procurement spend of £50m.

18 Glossary

APUC	Advanced Procurement for Universities and Colleges
CHI	Community Health Index
Cloud Computing	Location independent computing, whereby shared servers provide resources, software and data to computers and other devices on demand
COSLA	Convention of Scottish Local Authorities
eExpenses	Web system for electronic processing of expenses claims
ePharmacy	Electronic transactions between prescribers and pharmacies
eRDM	Electronic records and document management
Ethernet	A protocol that controls the way data is transmitted over a local area network
EU	European Union
Fibre Network	A communications network using fibre optic cable that is capable of delivering very high-speed internet connections
Gbps	Gigabits per second
GCSX	Government Connect Secure Extranet
Glow	The Scottish Schools Intranet
HEIDS	Higher Education Information Directors Scotland
ICT	Information and Communication Technology
ISIS	Information Services and Information Systems Division
IT	Information Technology
Janet	UK-wide network dedicated to education and research
JISC	Joint Information Systems Committee
Kbps	Kilobits per second
Local Loop Unbundling	The regulatory process of allowing multiple telecommunications operators to use connections from the telephone exchange to the customers premises
LTS	Learning and Teaching Scotland
Mbps	Megabits per second
N3	The national broadband network for the NHS
NDPBs	Non-departmental public bodies

NEC	National Entitlement Card
NHS	National Health Service
NSS	NHS National Services Scotland
Ofcom	Office of Communications – the UK's independent telecommunications regulator and competition authority
PBX	Private Branch Exchange
PMS	Patient Management System
PNN3	Police National ICT Network
PSBA	Public Sector Broadband Aggregation
PSN	Public Sector Network
SDS	Skills Development Scotland
SFC	Scottish Funding Council
SMART Homes Technology	The application of technology within the home to make household appliances and devices function in a more automated way
SMEs	Small and Medium Enterprises
Socitm	Society of Information Technology Managers
Solace	Society of Local Authority Chief Executives
SPSA	Scottish Police Services Authority
Telecapability	The capability to interact or transact by audio-visual means supported by modern ICT
Telecare	The remote care of vulnerable people, providing the care and reassurance needed to allow them to remain living in their own homes
Telehealthcare	The delivery of health-related services and information using telecommunication technologies
Telemedicine	Technology to support the application of clinical medicine by audio-visual means
UCAS	Universities and Colleges Admission Service
UHI	University of the Highlands and Islands
VOIP	Voice Over Internet Protocol
WAN	Wide Area Network

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