



Wiltshire Council
ICT & Digital Strategy:
Digital Wiltshire 2022

A Strategy and Three Year Plan for April 2019 to April 2022

4 April 2019

Version 1.2

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1. Executive Summary

After the creation of Wiltshire Council as a unitary in 2009, significant effort and investment went into the creation of Information & Communications Technology (ICT) that would meet the needs of the unified organisation. This was seen as a successful exercise. In the years that followed, however, developments in ICT have been led primarily by the requirements of the separate business areas. This approach has created a complex variety of systems, a lengthening list of outstanding requirements for new business applications, and a burgeoning need to update the supporting technology. For the ICT Department to properly support the organisation, the council needs a sound ICT & Digital Strategy that matches and supports its strategic aims and enables it to keep in step with developing technology. This paper develops and presents such a strategy.

The council’s high-level strategic aims have been well-articulated, with the key priorities being:

- Growing the Economy;
- Building Stronger Communities;
- Protecting the Vulnerable;
- and in all this, being Innovative and Effective.

It is vital that all technology provision supports these core aims, and so **corporate plan alignment** is a fundamental principle of this strategy. The ICT & Digital strategy maps to these key priorities, as is shown in Figure One below:

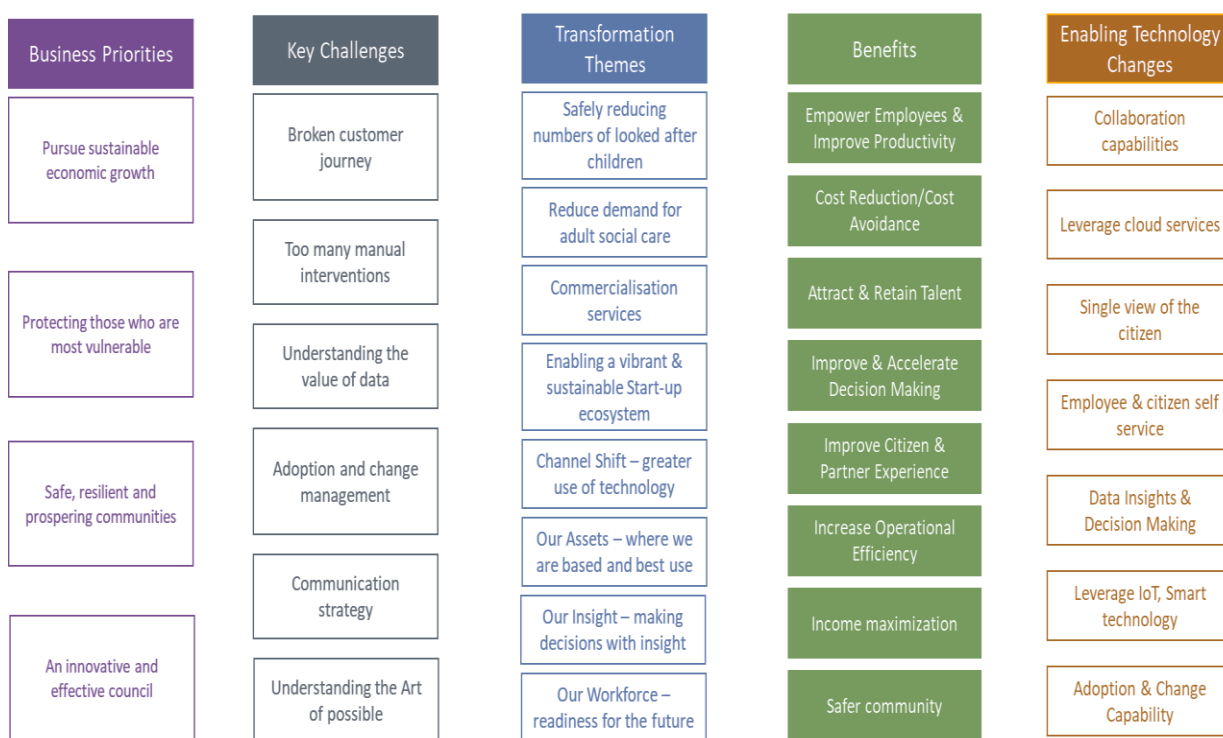


Figure One: Delivering the Business Priorities

At the more granular, departmental level, the council’s many functions support the corporate aims. As a unitary authority Wiltshire covers all local government responsibilities, through the provision of some 380 individual services within 15 Directorates, grouped under 3 Corporate Directors. These

rely on the daily use of ICT including the provision of laptops, email and other productivity tools, internet access, file storage, telephony, video conferencing, instant messaging, printing, and so forth, plus specialist cross-business applications such as SAP for finance and HR. Also, most functions have their own line-of-business software applications, sometimes supplemented by home-grown databases and spreadsheets. Ensuring the provision of the best possible corporate systems, and that they are used to best effect, while **rationalising and updating specialist line-of-business systems**, is a key part of this strategy.

Thus the council is wholly reliant on ICT, and as is typical in councils, around 70% of the ICT team's work involves keeping services operational. This is visible to end-users through such functions as the Service Desk, where they report incidents and make service requests, but most of this essential work remains unseen, being undertaken by a range of staff with specialist technical skills. Over a period of years, primarily due to austerity in the public sector, much of the technical infrastructure that supports the council's ICT has been under-invested in, and become aged, unreliable, difficult to support operationally, and hard to maintain in a secure state. Similarly, there has been a lack of investment in staff skills. **A substantial 'catch-up' programme of work is now essential**, built around sound architectural principles including **Cloud First** and **Software-as-a-Service**, and is proposed in this strategy.

Meanwhile, technology develops apace, and as an **innovative council** Wiltshire seeks to be at the leading edge in its adoption, and sees its importance in meeting its strategic aims. Of even greater importance than 'traditional' ICT is Digital technology. Digital is disrupting everything and providing unprecedented opportunities, and we are living in a time of enormous change. It has been said that change is happening 10 times faster and at 300 times the scale of the first Industrial Revolution—and thus is having a major impact. As Digital becomes ubiquitous, it is rewriting the way local authorities are delivering their corporate priorities and meeting business challenges. As Wiltshire Council continues to face austere times, the need for change has never been more important and the need for Digital transformation more relevant. It provides the opportunity to redesign our service delivery, to allow our residents to have more control over how and when they access their services, to collaborate efficiently with communities and partners, and to support a culture of innovation. The council therefore published a high-level Digital Strategy in 2017 (Ref 1), and launched a major Digital Programme in 2018 with Microsoft, aimed primarily at streamlining the way customers deal with the council, but also seeking to achieve internal efficiency improvements. It is the ambition of the council to be **'Digital by Choice'**, so that customers will choose to interact with us through digital channels, rather than by phone, email, letters or face-to-face, because digital interaction will be compellingly easy, quick, and convenient. **Digital enablement** will be important to this, achieved by ensuring high quality broadband coverage throughout the county, and helping and empowering those users (mostly but not exclusively older people) who currently lack digital skills. Digital enablement of the council's own staff is also a strategic need, and in addition internal **culture change** is a significant part of the current Digital Programme. This is an area that has had insufficient attention in the past, when it has been apparent that simply introducing a technology into the business has not always led to its successful adoption, or the realisation of anticipated benefits.

The current Digital Programme exploits developments in **Artificial Intelligence** (including 'robotic process automation') and **Business Intelligence** to improve the efficiency and effectiveness of the council's operations. As AI develops further, with self-learning systems emerging that can perform

more of the work currently done by people (but faster, cheaper and more accurately), the council will look to adopt this technology. To directly serve the needs of the vulnerable, the council will increasingly use TECS (Technology-Enabled Care Services), including easy-to-use, voice-activated systems, providing support within the home. Predictive analytics, which will involve making better use of the large amounts of data the council already collects, will be developed to enable **data-driven decisions**, to help social care and other areas to understand problems earlier, and to allow interventions that are both more effective and avoid greater costs downstream. There will be support at the local community level, helping people to use information and communications systems, including where appropriate the council's systems, to connect, communicate and share information, thereby assisting and empowering them in their self-support, and contributing further to the development of strong communities. These and other initiatives will also help the council meet the looming social care challenges of an aging population, living longer but not always in good health, and sometimes with the added burden of isolation and loneliness.

Other digitally-related technologies will come to the fore over the timescale of this strategy, and it is likely that the 'Internet of Things' will start to figure not only in our work on 'smart cities', but also in smart workplaces and smart homes, and these and other developments will contribute to the growth of the county's economy.

The council seeks to become more **entrepreneurial** to maximise its income, and ICT has an important role to play in enabling this too. Any business unit must understand its costs in detail, must plan resourcing and future workload, advertise its services over the web, monitor work in progress, invoice customers in an accurate and timely fashion, track payments and debt, and so forth. Many of these tools are readily available, either from existing corporate applications or as small-business cloud-based systems, and it will be possible to offer packages of business support tools to help what will be, in effect, internal business start-ups.

An examination of **best practice** in the sector, based on the recently-published ICT & Digital strategies of other councils, along with advice from central government, shows that in the proposed way ahead we are strategically-aligned with others. The vital importance of a sound ICT infrastructure is universally recognised (hence the proposed 'get-well' programme), and the technical approaches we espouse (Cloud first, Software-as-a-Service, a focus on cyber-security, etc.) have been adopted by all. The power of Digital and AI is driving innovation throughout the sector, and the need for enhanced digital skills within the community, and within the council itself are also recognised. The longer-term impact of AI on employment, and the need to prepare our residents for the jobs that will not be automated, is a consistent theme in both local and central government.

This strategy makes specific proposals in terms of end-user devices, service desk support, and the need to rationalise the 1200+ software applications in use. It defines the architectural principles we will apply, and outlines the future of the council's telephony, including mobile phones. It details essential improvements to the underpinning infrastructure (servers, databases, and information storage), and explains how security improvements (of which many are in hand) must continue. The need to better address Disaster Recovery is outlined. Better wi-fi for visitors is proposed, plus renewal of printing/copying facilities - and a move to a low-paper culture. Ways of helping users to make better use of existing technology are described, and the importance is stressed of achieving a 'virtuous circle' of measuring user satisfaction with ICT, acknowledging shortcomings, and acting upon them. This and other proposed means will help to **rebuild the relationship of trust** between

the business and ICT, which is anecdotally reported as being poor, but has not been objectively measured for many years, another issue that will be addressed.

The importance of good **governance** is outlined, covering both the BAU operations, but also projects for new ICT systems. Strong governance will allow progression from the current era of order-taking, with a long wish-list of projects to be done, into a new era of strategic planning, robust business cases with future savings factored into budgets, and a strong focus on benefits realisation.

The functions of different technical specialities within the ICT department are described, and it is proposed that a **future departmental structure** be formed along these functional lines (subject to consultation).

To bring together the above, a **‘Vision for 2022’** is proposed, describing a future state for ICT & Digital within the council, and this is summarised in Figure Two below:

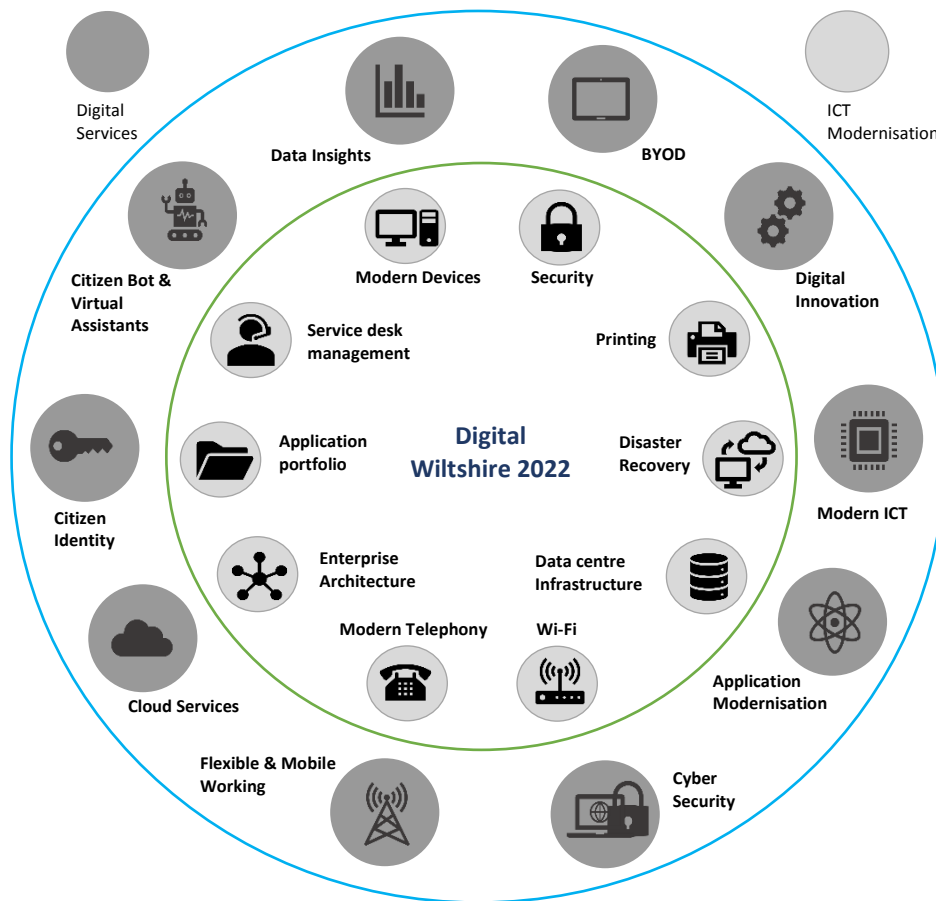


Figure Two: Summary of the Vision

This vision is ambitious but achievable, and will bring the council’s ICT into a state that will operate reliably, securely and cost-effectively. To achieve the transition from the present state to the 2022 vision, a **Roadmap** of key activities is proposed, along with indicative costs.

Importantly, it is proposed that ICT is **maintained** in a good state into the future, to avoid it once again falling behind. In the same vein, it is important that this ICT & Digital strategy document is periodically reviewed within the governance process (ideally at annual intervals) to ensure it remains correct and relevant, in terms of both evolving organisational needs and developing technology.

2. Introduction

Most organisations of any size rely totally on Information and Communications Technology (ICT) for normal business functioning, and soon discover in the event of ICT outages that they cannot operate effectively. As the world becomes more connected, workforces more distributed, and information increasingly held in digital form, the need for effective and reliable ICT becomes ever greater. Technology continues to develop apace, (the technical drivers for this are explored later), and the opportunities for more effective and efficient operation continue to develop.

In some organisations, the ICT department may be reduced to focussing on keeping the existing service operational, leaving it to the rest of the business to determine how they want technology to develop, what innovations to adopt, etc. This has occurred to a degree in Wiltshire Council, and experience in other organisations has shown that this 'order taking' approach is rarely effective, and typically leads to not only an overloaded ICT department with a backlog of new systems to implement, but also a fragmented landscape of local spot-fixes, incompatible systems across the organisation, duplicated functionality, and sometimes dead-end technology that soon needs replacing. The overloaded ICT department will meanwhile be encouraged to 'prioritise' the organisation's long wish-list, typically with limited success, while constantly fire-fighting and switching its focus to the latest, 'must-do' quick fix.

These problems normally occur in an organisation lacking an ICT Strategy. Sometimes, ICT specialists create what they believe to be an ICT Strategy, but is actually just their own wish-list of technical projects to keep the lights on and the costs down – server upgrades, network modifications, application upgrades, adoption of cloud services, and so forth. While very sensible and absolutely needed as a 'to do' list, this approach fails in that it does not recognise the central, indeed sole purpose of ICT – which is to serve the strategic aims of the business. Thus, any worthwhile ICT Strategy must start at that point, then work down from there. Of course, organisational goals are necessarily high level, and so the next step is to explore the goals of the departments that make up the organisation, and determine how technology can help them to fulfil them. Note that again, this must not be an 'order taking' process, but rather a discussion of both the 'art of the possible' that ICT enables, usually informed by what similar organisations are doing with their ICT in this area, and an understanding of current and emerging business needs, ideally expressed as requirements and opportunities, not technical solutions.

This must be set in the context of technological change, which continues apace thanks to a phenomenon called Moore's Law (see Appendix A), which shows that computing power doubles every two years or so. This has held good since 1970, and shows no sign of abating. The consequences have been, and implications for the future are, profound. Thanks to ever more powerful computers, the development of the internet, the adoption of mobile technology (85% of UK adults now own a smartphone), and much more, we are now living in the Digital Age, and that is changing our workplace and our daily lives. But there's more. Developments in Artificial Intelligence and robotics mean that many tasks currently undertaken by people will be open to automation. This brings its own opportunities and concerns, and these are discussed later. Suffice it to say that

technology marches on, at pace, and an ICT Strategy must take note of these impending changes and plan accordingly.

As a Local Authority, Wiltshire Council provides a wide range of services (far wider than most private sector organisations), and so employs a large range of different specialists, and – inevitably – hosts a range of different working cultures. ICT is one of those functions that works right across the organisation, and so must understand and respect those widely varying ways of working. ICT must also understand what is best practice in the sector, taking note of the successes (and failures) of others, while always seeking to be innovative, to the benefit of the business. Again, this highlights the crucial need for ICT to be in constructive dialogue with departments right across the business, and externally too.

It is necessary to take an incisive and realistic view of the current state of ICT in the organisation. This will help determine how fit-for-purpose the existing infrastructure, applications and end-user equipment is, how well the ICT team serves the organisation currently in terms of its structure, processes and relationships, and what shape the team is in to move things forward. Many ICT strategies focus only on the new and exciting projects to be done to move the organisation forward, but these must be built on a sound base if they are not to fail in the future, and an honest appraisal must be undertaken to understand what must be remedied, to underpin future success.

From all of the above, it is possible to create a vision of a desired future state, in terms of the use of information and communications technology across the business, and how it is supporting the organisation's strategic aims. This definition of the desired future state must be understood by all, and supported by all, so that the ICT department and the business can work together to deliver it. It will be a moving target – the world moves on, as does technology, and so it will need to be periodically revisited, typically on an annual basis. But if well-formed, and both realistic and aspirational, it will inspire and inform all those involved in its realisation. It will be the lodestar that guides all ICT activity.

The gap between ICT as it is, and ICT as determined by the vision, forms the basis of the plan of action. This is usually best expressed as a 'roadmap' – a graphical representation of what needs to be done, when, with any dependencies being highlighted. The roadmap – which must have some slack built in, to cater for the unexpected (be that central Government initiatives, or project delays), is now the definitive plan of ICT activity. It has been formed from the organisational and departmental strategic needs, and so replaces the former list of projects that had emerged, bottom-up, from the organisation. It does not need prioritising, it is already prioritised.

3. The Council's High-Level Strategy

The starting point for any ICT & Digital Strategy is the council's top-level business plan, which currently covers the period 2017-2027 (Ref 2). The council's vision is "To Create Stronger Communities in Wiltshire", which will involve building on past success in improving people's lives and helping businesses relocate to Wiltshire, working with local communities and partners, and investing in technology to make it easier for residents and businesses to engage with the council and resolve matters more quickly. That in turn breaks down into several key priorities:

- **Growing the economy:** including growing the skills of the local workforce, attracting and retaining high value businesses in Wiltshire, and doing so by having high quality education,

good transport links and employment sites, and sufficient housing in clean, safe, attractive environments.

- **Strong Communities:** whereby people take responsibility for their well-being, build positive relationships, and get involved in their communities, succeeding to the best of their abilities, and feeling safe where they live and work.
- **Protecting the Vulnerable:** so that all residents have a good start in life, and go on to live healthy and fulfilled lives through to a dignified end. This will include early intervention, prevention, and promoting community inclusivity. Health and social care will be delivered seamlessly and to the highest standards, and the council will work with health and the voluntary sector to provide appropriate, local, cost-efficient and good quality care packages, support and facilities.
- The council must be **Innovative and Effective** to deliver these priorities, taking where necessary difficult decisions, focussing on income generation and a more commercial approach, working with businesses for mutual benefit, and by doing so meeting rising demands.

These clearly-stated, strategic and enduring aims inform everything the council does, and as will be seen below, the ICT & Digital Strategy will both directly and indirectly support them.

4. Departmental Strategic Needs

As a unitary authority, Wiltshire Council covers the full spectrum of local government responsibilities, through the provision of approximately 380 individual services within 15 Directorates, led by 3 Corporate Directors. All functions within the council need access to high-quality, reliable ICT to perform their work, and this includes both generic services such as email, telephony, print, internet, etc., specialist cross-organisational applications such as SAP for finance/HR, but also specialist line-of-business systems dedicated to their own function. These services have to be accessed through the appropriate end-user devices (laptop, smartphone etc), there has to be support for mobile working, services have to be available 24x7, and information has to be accessed and stored securely. The applications in use have to be fit for purpose, and this involves constant attention by ICT specialists to keep them properly patched so that they are secure, bugs are fixed, and they continue to inter-operate as necessary with other ICT systems. (This normally means that the council must be using nothing older than the current or most recent previous version of the software system, a policy of “n-1”).

It is important that each department’s ICT needs are interpreted in the context of the organisation as a whole, its existing and planned infrastructure, and the architectural principles it has adopted (which are described below). Understanding departmental strategies and priorities, and translating them into ICT solutions in this organisation-wide context, helps to minimise the proliferation of spot-solutions, helps avoid investment in technology that is incompatible with other council systems or in dead-end technologies, and helps leverage the use of solutions that already exist within the council. The current estate of 1200+ applications is extreme, even for a council, and best practice elsewhere suggests that an estate of 200 or so is a realistic goal to aim for. This may require some compromises, but will be overall far more efficient and cost-effective for the council as a whole, will allow applications to be properly supported, and will assist in the provision of training and the recruitment of local super-users. As is also described below, any future investments in technology

must be based on full business cases, approved through the governance structure, and incorporating planned benefits realisation and the recouping of planned financial savings.

In the context of the opportunities offered by digital technology, it is useful to understand the alignment to the corporate and departmental strategies:

1. Growing the economy

- a. Superfast broadband infrastructure will be delivered through the Wiltshire Online Programme to households and businesses, so they can access goods and services online, use social media, interact easily with the council, and achieve the many benefits of the Digital age;
- b. We will support development of Digital skills within the community, and among council staff;
- c. The creation of internet infrastructure will facilitate the Internet of Things (IoT) technologies, and the smart city/workplace/home that will flow from it.

2. Strong Communities

- a. We will create opportunities for better joint working with partners, parish and town councils, and with local community groups, through the use of digital technology. This will include providing advice on what is readily available, and where appropriate providing secure access to council information systems;
- b. Our 'open data' policy will ensure that everyone will be able to access appropriately anonymised data to help generate creative solutions to local problems;
- c. Customers and communities will be able to self-service their requests on demand;
- d. Within the council, and working with partners, we will use data, AI and smart technologies to create multi-agency intelligence hubs to ensure safer communities;
- e. We will promote the use of community digital champions;
- f. We will provide easier access to advice and information;
- g. We will promote digital inclusion and accessibility for all;
- h. Our activities will help build 'social capital', which is proven to improve health and strengthen resilience to health problems (Ref 3);
- i. A community is "made up of people who have a common interest, to protect, serve and contribute to the common good" (Ref 4), and involves the creation of "solidarity, commitment, mutuality and trust among people" (Ref 5), and while digital technology and good communications will not necessarily bring that about automatically, the influence of technology as evidenced by the rapid growth of social media in recent years shows its potential at the community level, and we will promote this technology at the local level accordingly.

3. Protecting the Vulnerable

- a. We will leverage our data to understand and manage future demands on services and future needs of our population;
- b. We will improve interoperability and collaboration with partners (police, health services, town and parish councils, charities, community groups etc.) to allow better information sharing, decision making and resource allocation – improving support for customers;

- c. We will move from being reactive to preventative – for example using TECS (Technology-Enabled Care Services) to support vulnerable adults living at home;
- d. We will use technology to identify concerns early and act quickly to ensure more complex problems or difficulties don't arise, by providing the right interventions at the right time and right place;
- e. Where safely possible we will promote self-service and options for the citizens to use community resources;

4. Working with partners as an innovative and effective council

- a. In improving digital access we will achieve channel shift, driving more self-service which customers prefer, and which is cheaper for the council to deliver;
- b. We will seek to digitise services end-to-end, redesigning and automating where appropriate, to achieve greater efficiency, lower costs, the redeployment of staff to more appropriate tasks (cross-organisationally, as necessary), and the best possible customer service;
- c. We will increasingly use collaboration platforms for efficient internal and external (partner/communities) working, thereby improving immediacy, reducing email and other forms of asynchronous working, and improving teamwork and shared understanding of issues and working styles;
- d. Data will be used to inform decision making at all levels of the organisation, and by sharing data with partners we will contribute to better shared decision-making and improved outcomes for our customers;
- e. We will increasingly use data-driven models for demand forecasting, capacity modelling, and to drive departmental commercialisation strategies;
- f. Where possible we will remove manual re-keying, and data duplication;
- g. Data quality will be improved as customers will be able to update certain personal information held about themselves;
- h. The adoption of one citizen identity across all the council services will simplify digital interactions for our customers, and help in creating a 'single view of the customer'.

Figure Three below shows how common digital services across departments will help to deliver the council's digital ambition.

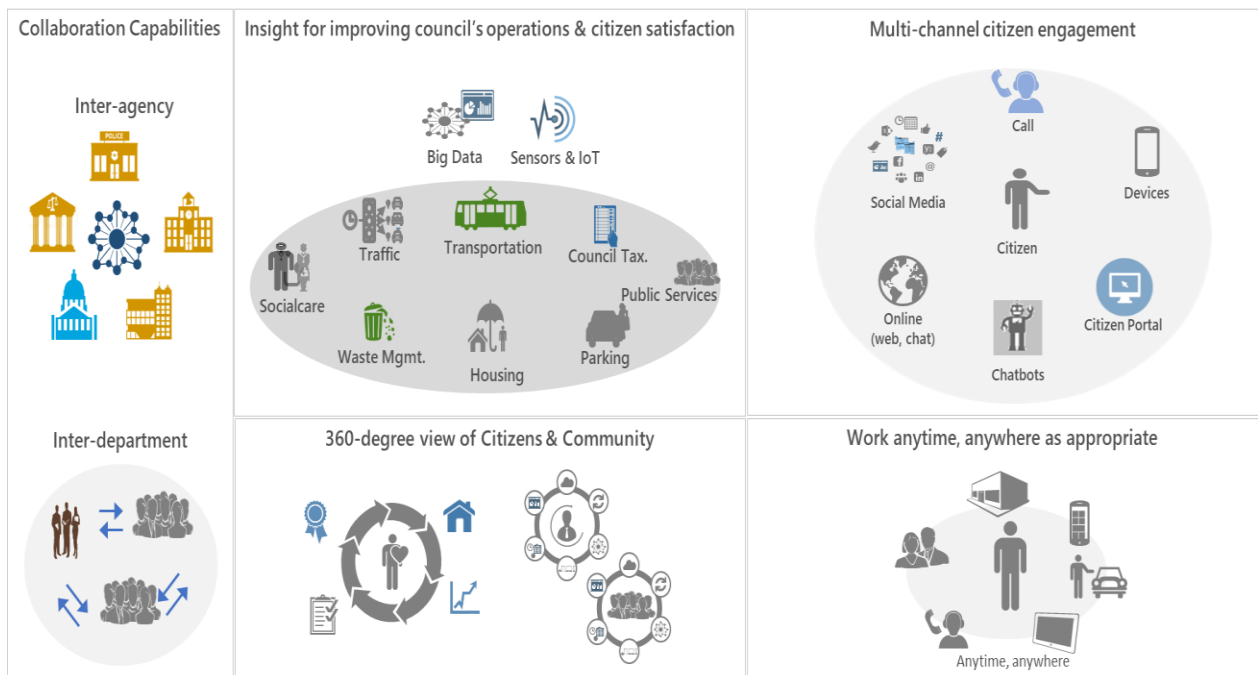


Figure Three: Common Digital Services Across Departments

5. Key Technological and Societal Trends

The pace of technological change shows no sign of abating. Fundamental drivers include Moore's Law (see Appendix A), the globalisation of production keeping hardware costs low, the consumerisation of technology, and the growth of internet usage for both business and leisure, which in turn stokes demand for connectivity (see Appendix B: Nielsen's Law), and the demand for cheap and ever-improving end-user devices. The Digital Revolution continues to change our lives. There are also emerging changes in technology, on a slightly longer timescale, which will undoubtedly bring about even more fundamental changes over the next 10–15 years. Thus, while predictions of the future are notoriously difficult, it is possible to get a reasonable understanding of likely developments in IT over the next 3-4 years, along with their applicability in the council. Along with technology trends, it is also possible to understand some trends within society that will affect the demand for services provided by the council.

Key technology trends include:

- Artificial Intelligence (AI), in particular machine-learning systems. (Consultants McKinsey provide a useful overview: Ref 6). These systems build a mathematical model using 'training data', and from this can progressively make predictions or decisions without being explicitly programmed to perform this task. While it is tempting to think that such systems will rapidly evolve to become super-intelligent, there are limitations, including the need for large amounts of high-quality training data before high performance is achieved, problems of bias in training data, and difficulties in generalising once a well-optimised system emerges (i.e. the AI is good, but at only a very limited task). Nevertheless, this is an area that is likely to have a major impact over the next few years, and longer term even highly skilled jobs, such as lawyers and doctors, could be replaced (or more likely supplemented) by AI (Ref 7:). AI is

having an influence in other technologies, including several listed below. Central Government is placing AI at the heart of its industrial strategy, stating in April 2018 that “Creating an economy that harnesses artificial intelligence and big data is one of the great opportunities of our age” (Ref 8). There is also a growing awareness that as AI grows in its capabilities, organisations must act responsibly in their application of it, and understand and plan for its impact. Thus, for instance, the Information Commissioner’s Office announced in November 2018 that it is sponsoring research into the impact of AI on data privacy (Ref 9), and there are concerns that AI will change the nature of work in quite fundamental ways (Ref 10).

- Autonomous things, including vehicles, drones, and robots (both physical devices, and those that automate processes). Self-driving cars are already being experimented with in the UK, and indeed the government has set up the Centre for Connected and Autonomous Vehicles, to ensure the UK is an early adopter of the technology (Ref 11). Drones for such things as parcel delivery, and even as personal transportation, are being experimented with, although there are clearly many practical hurdles to overcome, in terms of regulation, safety assurance, security, public acceptance, and so forth. (Ref 12). Robots have already revolutionized many areas of manufacturing, and in clerical work, ‘robotic process automation’ is having a growing impact in a range of sectors, and is predicted to spread rapidly over the next few years (Ref 13).
- Voice recognition and speech generation has progressed rapidly in recent years, largely thanks to AI, and now a market has emerged for ‘home assistants’ (also called ‘smart speakers’), which allow easy and natural interaction with both internet-based services and domestic smart devices. The Amazon Echo was first to market in 2015, with sales of 50 million to date, and more recent competitors such as Google Home and Apple HomePod are also selling well. This technology is also being used in chatbots, which will allow users to interact with council services in the future (this is part of the current Digital Programme), but potentially also in the area of Technology Enabled Care Services (TECS), where technology helps older people to live in their own homes for longer (Ref 14). Clearly, the use of a voice interface offers advantages over conventional controls, with no need to learn which buttons to press, no problems with seeing or pressing them, and so forth.
- Wearable technology is developing fast, with activity trackers (such as Fitbit) and smartwatches being increasingly adopted. These devices typically have a Bluetooth (i.e. short-range wireless) connection to a smartphone, which processes the data and has a larger screen for information display. The use of wearable sensors has real potential in TECS, for collecting biometric data such as heart rate and muscle activity, detecting falls, noting when a person has ceased to move about in a normal fashion, and so forth.
- The Internet of Things (IoT) is a concept that has been around for some time, and refers to a future state where large numbers of electronic devices, many of them simple sensors, will connect via the internet to enable someone, or something, to build up a larger picture and act upon it. This leads on to the concept of smart homes (where simple chores such as maintaining a shopping list are automated via the system detecting when consumables are used up, energy is better controlled depending on occupancy, or the welfare of an older person is monitored). Beyond that lies the concept of the ‘smart workplace’, where IoT and AI deliver new ways of working, scheduling resources, coordinating facilities (for instance meeting rooms), sharing information, collaborating, and of course using voice-enabled

virtual assistants of increasing sophistication. Beyond that lie smart cities, where data from multiple sensors could be used to manage transportation systems, power supplies, water supplies, waste management, law enforcement, etc. In fact, an IoT application is already in widespread use: Google traffic maps operates by sensing the geographical location of Android mobile phones, detects when a traffic queue has formed, and presents it on the on-line map. In-car satnav systems use a similar approach.

- Blockchain is a technology that is thought by many to be about to have a major impact. Blockchain enables the creation of a secure, tamper-proof, distributed electronic ledger, and has the capacity to be both more cost-effective and more secure than traditional, centrally-held electronic records systems (Ref 15). Governments are experimenting in its use to hold data such as patient records, electoral rolls, land registry details, visa applications, and so forth. Estonia, which is forging ahead in digital government, is adopting it across government for numerous applications, being especially attracted by its resistance to cyber-attack (Ref 16). The state of Dubai has announced that it plans to become the first government in the world to conduct all its transactions using blockchain (Ref 17).
- Predictive analytics is the branch of advanced analytics which is used to make predictions about future events (Ref 18). The process for building up to predictive analytics is understood, and basically involves first creating the necessary infrastructure to hold and analyse the data, then collecting, cleansing and organising the data, using it to understand what has happened in the past, and then experimenting in its use to predict what will happen in the future. This involves observing the reliability of those predictions, refining the prediction process, and then using it in practice.

Note that in technological predictions made only a few years ago (Ref 19), the emergence of cloud technology was seen as new and important, and yet it is now regarded as absolutely standard. Similarly, 'Software as a Service' (SaaS) was seen as an exciting new development, freeing organisations from the burden and cost of hosting software in their own datacentres, and again this is now regarded as standard. Other once leading-edge trends such as flexible & mobile working, occasional homeworking, and hot-desking, are now widely adopted. On the other hand, some technologies seen in 2014 as emergent in government by 2018 have failed to gain much traction, including gamification, gesture control, and enterprise 3-D printing (Ref 20).

Some other key technology trends, as predicted by Gartner on their well-known 'hype cycle', are shown in Figure Four below (Ref 21).

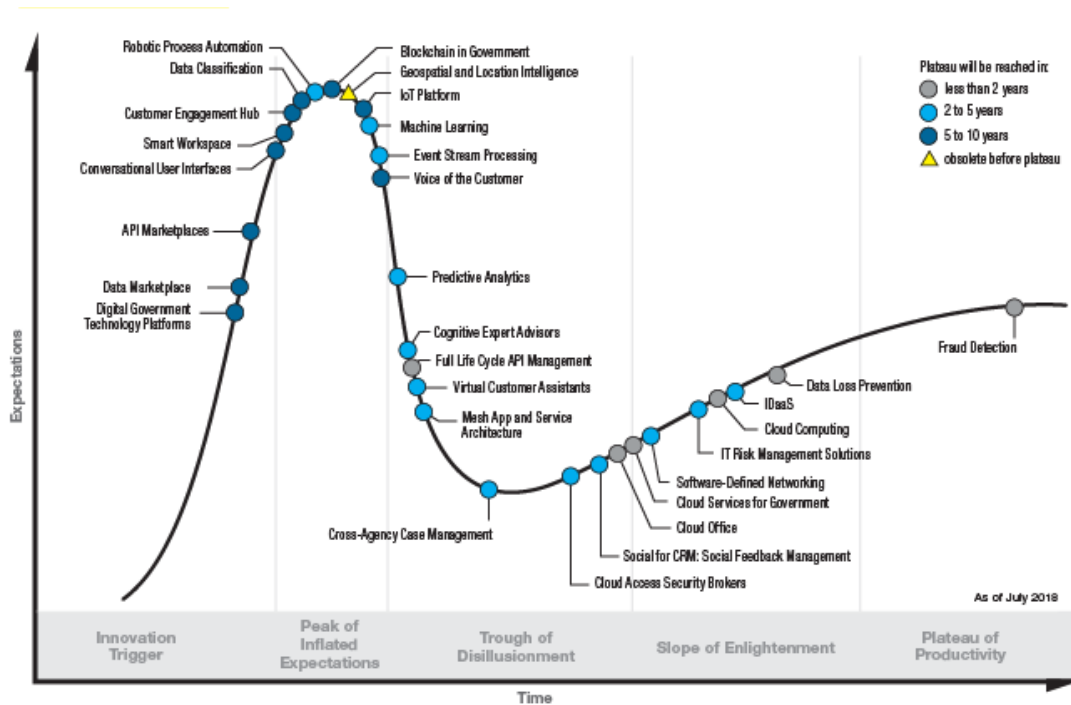


Figure Four: Gartner Hype Cycle for Digital Government Technology, 2018

Some keys societal trends are as follows:

- The aging of the baby-boomer generation will continue to have an impact over the next decade, as this population bulge moves into its seventies and beyond, resulting in an increase in demand for health and social services. This effect will be compounded by medical advances keeping people alive longer, but not always in the best of health.
- As we have an older population, living in their own homes but often alone, there will be growing problems of loneliness, which can adversely affect both physical and mental health. (Ref 22). Technology will have a part to play, although many older people do not use the internet: the latest Office for National Statistics data shows that just 44% of those over 75 use it (Ref 23). They do not therefore enjoy the advantages of social media, invaluable for keeping in touch with family and friends if they do not live nearby. It may be that council-led initiatives, held at a local level (village halls, etc.) could encourage older people to attend sessions to learn how to use the technology, while in the process interacting with others in those sessions. These volunteer helpers might include tech-savvy younger people, keen to help the older generation. Indeed, as society becomes increasingly transformed by digital technology, and the High Street loses banks, shops and Post Offices, there is an increasing need to help older people in this way, if they are not to risk becoming increasingly isolated.
- The shortage of resources in local authorities to provide social care for older people means that there will, inevitably, be more reliance on individuals, families and communities (Ref 24). Technology has a part to play in this, through in the words of the King’s Fund: “the use of technology to assist people to live with more control, and (its role in) preventative action required to avoid or delay need”. Thus TECS, plus increased contact with loved ones through social media, video and other technological means, and the use of data analytics at both the big data level, and the individual level, will be potentially invaluable. In this way,

both monitoring of issues as they arise, and early prediction of problems, along with prompted support from family, friends and the local community, can all help to bring back some of the benefits that communities enjoyed in the days of extended rather than nuclear families.

- Potentially, the impact of AI and automation will change employment patterns, with less demand for lower-skilled knowledge workers (including drivers, as self-driving cars and trucks appear), and as these roles are increasingly taken by machines, it will be essential to recognise and plan for these changes, so that those who would have performed these tasks are equipped to continue to play a productive role in society.
- Nevertheless, the overall impact of AI on the economy is seen as strongly positive, with PWC predicting in 2017 that by 2030, UK GDP will be 10.3% higher as a result of AI (Ref 25).
- As technology alters employment opportunities, and society changes accordingly, larger employers have a role to play. For instance, the major US telecoms company AT&T realised in 2016 that, due to digital disruption, nearly half its 250,000 staff lacked the skills that would be needed to keep the company competitive, and so started retraining them, primarily in the STEM (science, technology, engineering and maths) skills they lacked, and the company needed. It expects to complete the process by 2020. (Ref 26). For the council, this role extends into both education of upcoming generations in schools, in offering the right opportunities to apprentices, and in workforce planning and staff re-education.

6. Best Practice in the Sector

A sample of the ICT & Digital strategies produced by a range of other councils over the last year was analysed, to understand the areas they were addressing, the policies they were following, the areas they proposed to invest in, and so forth. There was a high degree of consistency between them, with the following themes being common:

- The need for a sound and resilient ICT infrastructure was acknowledged in all ICT strategies.
- Many councils see the need to make better use of existing tools, thereby leveraging investments already made.
- Digital: every council is embracing the power of digital, to provide better services for customers, while simultaneously seeking to enhance customer focus within the organisation. Digital is seen as the most important means of enabling channel shift (thereby saving costs as well as providing a better service). The challenges of digital inclusion are noted, and in one strategy the GDS-identified barriers to public digital access were quoted: access, skills, motivation and trust. (GDS, the Government Digital Service, is widely viewed within councils as a source of digital best practice).
- The need to build digital skills within the council workforce figured in most strategies.
- The need to build digital skills within the community was also acknowledged, not merely to enable better access to council digital services, but in the longer term to enhance employability. (Several strategies quoted the recent prediction by the Department for Education that within 20 years, 90% of jobs will require digital skills (Ref 27).
- The value of a first-class council website is widely acknowledged, to ensure that customers have a good experience when using council digital services.

- Robotic process automation is an emerging theme for many councils, who see the potential of this technology to relieve staff of the burden of repetitive tasks, thereby allowing them to perform work that better matches their talents.
- Artificial Intelligence (AI), in many cases anticipated to be first experienced through Chatbots, is a common theme.
- Cloud migration remains a direction of travel for councils, with 'cloud first' the near-universal policy, and the use of SaaS (Software as a Service) a common theme. Microsoft Office365 is also widely used, and most councils are moving to Windows 10.
- IaaS (Infrastructure as a Service) is also being increasingly used, where a council wishes to run software applications themselves, but hosted within the cloud.
- The economic and social benefits of broadband rollout are well recognised, and the possibility of using 4G (possibly 5G, in due course) to infill hard-to-reach properties is a theme for several rural authorities.
- A number of authorities have ambitions for public wi-fi, in many cases to be transmitted via lamp standards.
- A number of councils propose to use their libraries as centres for digital innovation, and to help seed digital start-ups in their communities.
- Cyber security and the growth of cyber threats is a consistent theme, and ISO27001 compliance, or at least alignment with, an aspiration of many authorities. (ISO27001 is the international standard defining policies and procedures to cover an organisation's information risk management processes). At a simpler level, the government's Cyber Essentials Plus initiative is useful, albeit being aimed at small and medium-sized businesses. Going through the accreditation process ensures that all the basics are properly covered, and provides independent assurance of the security of an organisation's systems.
- The power of Business Intelligence to improve efficiencies and enhance decision-making is a consistent theme.
- The importance of good ICT Governance is recognised by most local authorities, and many refer to the importance of strong business cases to enable investment decisions. Benefits realisation is also a growing theme.
- Flexible, mobile, and agile working continues to be a priority. To assist this, some councils allow the use of privately-owned devices, provided they have council-installed security software on them.
- The need for application rationalisation, and for process improvement throughout the business is a theme in many council ICT strategies.
- Roadmaps of the major applications in use, their future upgrades/replacements etc. is a useful feature of many council ICT strategies.
- The growing challenges facing adult social care are noted in most council ICT strategies, and the potential for technology to help in keeping people in their homes longer, and to achieve more holistic treatment by integrating care systems with the NHS, is highlighted.
- The use of a high-quality electronic document and records management system is a common aspiration, along with the better use of information assets, and the creation and maintenance of a 'single version of the truth' within the organisation.

An understanding of Best Practice is also helpfully informed by reference to some central government guidance. This includes:

- The Government Transformation Strategy, published in February 2017 (Ref 28). This builds on the 'Digital by Default' approach first outlined in the 2012 Government Digital Strategy, and highlights the need for process improvements in departments without public-facing services, now that those with public-facing services have been largely addressed. In our context, it highlights the need for end-to-end digital transformation, not merely at the public-facing end.
- The National Cyber Security Strategy created in November 2016 is still of vital importance (Ref 29), and its principles will continue to inform our cyber security work.
- The GDS design principles first created in April 2012 remain important (Ref 30) and will be used in the design of the council's revamped public website, as will the Design Service Standard, expressed as the Local Government Digital Service Standard (Ref 31) and the Technology Code of Practice (Ref 32).

7. Current ICT Provision and Areas for Improvement

As with every organisation, the state of the Council's ICT is a mixture of reasonably current, and somewhat behind, although the balance tends to the latter. Few organisations achieve a situation where every aspect of the ICT operation represents current best practice; the important thing is to achieve a good match with organisational needs, and also to have a direction of travel and specific plans that meet the way the organisation is seeking to develop.

There has been no recent independent benchmarking of the organisation's ICT; the most recent assessment by Socitm (the industry body that provides independent advice and assessments to public sector organisations) was in 2008, and since then many changes have taken place, including the creation of the council as a unitary in 2009, at which time significant investments were made in technology. It is anecdotally reported that, at that time, ICT provision was in good order and user satisfaction levels high. Since then it would appear that provision has fallen behind, and this of course has aligned with the extended period of austerity under which local authorities have operated.

We can assess provision under a number of headings:

7.1 Devices

The council has moved to a laptop-only way of working, to support hot-desking and flexible & mobile working. Currently only one size/power of laptop is available, and yet most councils provide an extended choice, adding a lightweight laptop (for workers who spend a lot of time travelling, and those requiring lower weights for health reasons), and a large-screen, more powerful model for those needing to view large diagrams, use computationally-intensive applications, etc. While this involves supporting three laptop builds, the burden is not high in relation to the benefits it gives. Thus, an appropriate device strategy is required, which must be refined in consultation with users.

Desks are currently fitted with docking stations and monitors, with plug-in keyboards and mice available, so that users can sit at any desk, plug in their laptop, and get to work quickly. This has worked well for some years, but the recent refresh of laptops and the concurrent migration from Windows 7 to Windows 10 operating systems has been problematic. Although investigation of applications was undertaken to verify their compatibility with Windows 10, the situation was not

reached whereby all those still in use were compatible with Windows 10 by the start of the rollout. Slow progress by suppliers (who will all ultimately have to move to Windows 10, since Windows 7 will go out of extended support on Jan 14th 2020) then meant that as the rollout progressed, some users could not migrate, and that included some with old and failing laptops. Clearly, this is a situation that must be resolved promptly. In addition, laptops that work with the existing docking stations (many of which are fitted with dual monitors) are no longer available, and to avoid having a mixed estate (unhelpful for flexible working), it will be necessary to remove the old docking stations, and create a new, universal solution.

The council uses Windows mobile phones, which was a sound procurement decision at the time it was taken but has since been overtaken by events, as Microsoft have now dropped the technology. A re-procurement of phones and move to Android would be a straightforward next step, and is necessary as the current supply contract has expired. Note that Apple's iOS software and the iPhone it runs on are superior, but expensive and hard to justify. As at present, users will be able to use their personal devices (Android or iOS) and securely access their email and calendar.

7.2 Support to Users

The council's Service Desk works reasonably well, although it lacks a high-quality service desk application, and so it is not easy to extract performance data, nor is it possible to use it to create an online service catalogue (a list of pre-packaged offerings, with on-line ordering and work-flowed approval) for users. In addition, the technology that would allow users to reset their own passwords has not been implemented, and this would allow a large proportion of the calls to the desk to be eliminated. (With most service desks 40-50% of calls are simple password resets). Clearly, a good quality service desk application is needed, along with self-service password reset.

The council does not use ICT Service Level Agreements, and so users do not have their expectations set in terms of when incidents will be resolved or service requests fulfilled. Similarly, Service Desk management cannot objectively show how their performance is or isn't meeting expectations, since none are set. A further problem is that, while incidents are assessed in terms of their priority, far too many are rated as Priority 1, meaning that there is actually no real prioritisation.

The solution is not simply to create a raft of SLAs, since as is well known, this can lead to perverse behaviours in working to targets rather than really meeting user needs. Nevertheless, users need to be informed, in terms they can relate to, of the service they can expect to get, in terms of quality and timeliness, and how the ICT support staff are performing in relation to these expectations. This is usually achieved with 'Service Descriptions', which explain to end-users how ICT operates, and what they can realistically expect as service users.

Many organisations use a walk-up service desk, and given that users have laptops, there is much to be said for this model of support as a supplement to telephone and email channels, since it can avoid some of the misunderstandings that can occur during phone calls about problems, and it also shows the 'human face' of ICT, which end-users generally appreciate. Organisations with multiple sites (like the council) may not be able to staff a full-time walk-up service on every site, but providing it during defined hours on smaller sites is often seen as helpful. Implementing this will of course require appropriate training and changes in processes within the ICT department.

7.3 Applications

The council has (reportedly) some 1200 applications in use, which is an extraordinary number. This represents a huge challenge in simply keeping them fully patched and secure, and it represents a major cost in maintenance fees to suppliers, and a challenge for the ICT staff to support. The fact that there is no definitive list in place is itself a concern. The current financial structure also places the financial burden of support on the ICT Department, which means that business departments using these applications have no financial incentive to cull them.

There is no existing policy to ensure that all applications are on either the current release or the last release (hence, 'no older than n-1'), and this is a concern as older versions may not be provided with security patches, and suppliers will often not fix bugs in older versions, saying the problems are fixed in the newer releases. A policy of n-1 is therefore required.

While a major programme of application rationalisation and upgrades will be necessary, and will be the subject of a detailed plan of action, it is worth noting that the council's SAP system is out of date and in need of significant upgrading (and a move to cloud hosting), the core Northgate systems (Revs & Bens, Planning M3, Public Protect M3 and Information at Work) are currently receiving attention, the MITEL switch has recently been updated (a long list of changes had been help up pending this), and the GIS system is in need of refresh.

There are still a few home-grown Microsoft Access databases in use. Although Access is fine for personal, domestic use, it does not scale (it will only work with a small number of concurrent users), and is notoriously difficult to maintain. Also, Access databases created on older versions (new versions of Access have been released every three years, over a long period) will not work on later versions of Windows. Therefore use of Access should be discouraged in the council.

Thus, while the proposed application rationalisation exercise should significantly reduce the number of applications in use, it is helpful to map out the replacement dates of those applications that are likely to remain, and factor the costs into the council's long-term financial plans. While this has historically been a matter of departments planning changes and independently making the appropriate business case for their chosen applications, finding the funding locally, then asking ICT to undertake the implementation, it is better that this is planned strategically by ICT in conjunction with departments. Appendix C includes a list of applications that will need replacing over the next 4 years, along with indicative costs for budgetary purposes. Note that this list may change as a result of the application rationalisation process.

The council currently uses the rich and highly capable Office365 system for its productivity suite, which is of course cloud-based, and this ensures that there are no issues around old versions of the software. This highlights the merits of using applications that are Software as a Service, and the move to the cloud is a key principle of this strategy.

7.4 Architecture

For some years the council has lacked a coherent approach to its ICT architecture, and while some architectural principles have been followed, based on a shared if largely unspoken understanding among ICT professionals of current best practice, the department has lacked skills at the Enterprise Architecture level. This has now been remedied, and there is an experience Enterprise Architect in post. The council's newly-articulated ICT Architecture Principles are outlined in Appendix D.

7.5 Telephony

The council has a fixed line, Voice-over-IP (VoIP) telephone system from MITEL. VoIP telephony uses the computer data network as the bearer for the phone calls, and avoids the need for separate telephone cabling. For a range of reasons, VoIP was cheaper than the previous generations of analogue telephony, which used their own specialist on-premise automatic exchanges – the ‘PABX’ of yesteryear. VoIP technology has however moved on since the council’s MITEL system was installed, and the era of having telephone handsets on the desk is ending. With Skype for Business, users plug a headset or desk-top speakerphone into their laptop, and make voice or video calls, with individuals or groups. (The laptops in use all have built-in cameras). Calls within the organisation are simply carried over the corporate network, but external calls must break out to an external network. People who, in their private lives, make voice or video calls from their mobile phone using WhatsApp or similar applications incur no phone bills, since they are using the internet to connect directly to the other party, and are not using the world-wide telephone system. (They do of course use up some of the data allowance they pay for, with their mobile phone provider). This may work fine, or may be subject to delays and drop-outs, since this data is competing with other data heading over the same routes. The public telephone network, however, provides an uninterrupted data path and hence a good call, but the service is run at a charge by the telecoms providers (BT etc.). As it stands, both the MITEL and Skype for Business systems in the council break out over ISDN lines to the public telephone network, but ISDN (Integrated Services Digital Network) is old and expensive technology, dating from the late 1980’s; BT have announced it will be switched off by 2025 (Ref 33). ISDN has been superseded by SIP (Session Initiation Protocol), which is much cheaper in operation, and of course does not have a looming out-of-service date. It will be necessary to move to this technology, by installing some SIP Trunks to replace the current ISDN lines. (This work is currently under way).

It will also be appropriate to move off the MITEL system at some stage. While desk phones are no longer needed with Skype for Business, the call centre requires functionality that will have to be recreated in Skype, and it will be necessary to test the feasibility of this. Similarly, some functions in the council make heavy use of telephone hunt groups (whereby an unanswered call moves on to another extension, and so on until answered), and again it will be necessary to ensure this works well with the council’s Skype for Business system, or appropriate alternative ways of working found, before fully moving away from the MITEL system.

7.6 Infrastructure

Much of the ICT infrastructure is in need of upgrading. A large number of the council’s servers currently use the Microsoft Windows Server 2008 operating system. Mainstream support for Server 2008 ended on January 30th, 2015, and extended support (which includes security patches) ends on January 14th, 2020. This is a critical date, and all server operating systems must be updated by then. As ever, this is not a simple matter, since it will be necessary to ensure that all applications are compatible with the new version (Windows Server 2016 is current, and will have extended support until November 1st, 2027).

The majority of the council’s servers are virtual (that is, where multiple servers are created in software, on a smaller number of powerful physical servers). This is the industry-standard approach, in successful use for many years. The technology used is primarily Microsoft Hyper-V, again industry

standard, although there is some legacy use of VMware, now in need of updating for security reasons. Meanwhile the direction of travel is towards the Microsoft Azure cloud.

Some server hardware will also need updating, although this will be tempered by the policy to move to the cloud wherever possible. Note that cloud migration is not a simple process, and there will be a period of transition, when (as now) some services will be cloud-based, and some on-premise, but with a progressive move towards cloud.

Many of the council's applications sit over industry-standard databases, and the most-used are Microsoft SQL Server and Oracle. Significant work is required to bring these up to date, in order to ensure that they are both supportable and secure.

The council has a SAN (storage area network) system, which is a high-performance, high-availability disk storage system. This is the industry-standard approach, and is essential for the operation of both the virtual servers and those mission-critical software applications that are internally hosted. While the direction of travel is towards cloud, it will be some while until the SAN is no longer needed, and meanwhile some essential upgrades to the system will be needed during 2019.

7.7 Security

As a public sector organisation, the council's ICT infrastructure has to connect into, and be compliant with, the government-wide PSN (Public Services Network), including its security standards. A defined process is undertaken on an annual basis to ensure this compliance, involving an IT health-check and other steps, leading to the award of a compliance certificate. Note that Penetration Testing is not compulsory, but is good practice and is recommended for the future. Wiltshire Council is not currently compliant, and this has been a major concern both internally and with Wiltshire Police, who use the same network. Thus, a project has been running for some time to remediate this, involving upgrading or replacing many infrastructure components, ensuring patching is up to date at both the server and PC levels, updating software, and so forth. While this is well in hand, and the most serious issues have now been resolved, it is perhaps a measure of the level of 'technical debt' (see below) that has built up in the council that this situation was reached in the first place.

There are other aspects of security that also need addressing, including better automated analysis of system logs, so that ICT staff can detect more rapidly when untoward things are happening from a security point of view, plus the introduction of better system scanning and reporting tools. All of this is not to say that the network is currently insecure, but rather that significant work is required to keep it secure into the future, against threat levels that are rising.

7.8 Security Marking

The council has not yet fully adopted the current, government mandated, security marking classifications for its information (Ref 34). These replace the old six-level system (Unclassified, Protect, Restricted, Confidential, Secret, Top Secret) with just three: OFFICIAL, SECRET, TOP SECRET (all normally written in capitals). Note the absence of an unclassified level. Councils only ever work at OFFICIAL, and all documents created are automatically classified at this level, and need not be marked as such. Sometimes given the sensitivity of their contents it is necessary to handle documents with extra care, when they must be prominently marked OFFICIAL-SENSITIVE. The same ICT standards still apply, however. Given that the new classification system came into force in April

2014 (with minor updates in May 2018), it is high time it is fully adopted throughout the organisation. This will be primarily a case of educating users, although some older systems may also have the old classifications built into them, and will need updating accordingly.

7.9 Business Intelligence

The use of Business Intelligence software is not yet widespread in the council, although it is in use in some area. It is widely acknowledged that this is one of the areas where local authorities can readily achieve improvements in business efficiency and planning of future operations, along with valuable insights into its customer base, and indeed predict where early interventions could be of value. Improvements in this area will depend on the quality and timeliness of data collected, and changes in business practices to allow decisions to be more data-led, and thus improvements will require business change initiatives, as much as the development and deployment of technology.

7.10 Disaster Recovery

Every organisation that relies on ICT for its successful operation needs to plan for disaster scenarios, when the ICT fails on a large scale. The traditional view of the risk was that the data centre would be taken out of service by fire, flood or some similar catastrophe, and this risk was remediated by duplicating the data centre, with good arrangements for data mirroring and rapid fail-over. Alternatively, a commercial provider would be contracted to provide access to a number of servers in a data centre, at very short notice, and the ICT staff would re-create the IT environment from stored server images and securely backed-up data. As the world moves to cloud, reliance on in-house data centres is declining, and cloud providers guarantee availability, made possible by their own multiple redundancy of data centres. Over time, then, as the council moves to cloud, the need for traditional disaster recovery (DR) will decline, and the issue will be ensuring that connectivity to cloud services is suitably resilient.

The council has not yet made the full journey to the cloud, and while it is heading in that direction, there is some way to go, not least since it uses many applications that are not available as Software as a Service. The current data centre arrangements will therefore continue for some while, and appropriate DR must be in place. The loss of a UPS (uninterruptible power supply, a battery-based power backup system) at the secondary data centre in Chippenham during 2018, and the loss of some systems for several days, showed that current DR arrangements are not fit for purpose. A comprehensive review of DR, and the creation of an appropriate solution, is therefore a priority and must form part of the programme of essential technical improvements referred to below.

7.11 Wi-Fi

The council has a comprehensive wi-fi system, which allows staff to work anywhere in its buildings without plugging in a network cable. (The same facility is used by members of Wiltshire Police, and is a key benefit to them). The wi-fi system is now in need of updating, however, to both remain secure and to continue to give a good service, and at the time of writing this work is under way.

The council provides free wi-fi to visitors, but is out of step with current practice in that users must register in advance before gaining access. Most organisations, including government departments, run a separate sub-network for visitors and provide the access password freely, simply requiring users to agree to an acceptable use policy. It is proposed that this is provided in future, as a courtesy to visitors, and to bring the council's operations into line with prevailing norms.

7.12 Printing

The council's current print solution is nearing end of life, and needs to be replaced. The costs of this technology are steadily dropping, and it should be possible to achieve lower costs per page than in the past. This is, however, an opportunity to move further towards a low-paper way of working, now generally possible given the widespread use of laptops. It is proposed that fewer multi-function devices (which combine printing, copying, scanning etc.) should be procured, so that many users will have to walk some distance to make use of them, which will tend to discourage their use. Low-paper working is of course both cheaper and more environmentally friendly.

7.13 Other IT-Related Systems

There are a number of systems around the council that have not fallen within the remit of the ICT department historically, but have instead been procured, maintained and replaced on a local basis. Given that this is a whole-council ICT & Digital strategy, it is helpful to identify them and determine when they will need replacing (or rationalising), ensure that in future they align with the architectural principles within this strategy, and factor the costs into the council's long-term financial plans. Prominent among them are:

- The library self-serve kiosks, which allow users to check books in and out without the help of an assistant. They use RFID (radio frequency identification) tags within the books, and are the standard way that all public libraries operate. The kiosks are now old, and use outdated software that cannot be updated, representing a security risk to the network.
- The council has equipment that records and broadcasts its meetings, which is an important part of its democratic accountability to the citizens of the county. This equipment is now old, out of support, and becoming unreliable. It will have to be replaced fairly soon.
- The council has a duty to support the Coroners Courts, and this includes providing a legal CMS (content management system) and portable devices, currently iPads. Both the software and hardware are aging and due for replacement.
- A full list of these formerly non-ICT-managed systems that need replacing is outlined in Appendix new E, along with indicative costs and timescales.

7.14 Measuring User Satisfaction

As noted above, overall user satisfaction has not been independently measured since 2008. Anecdotal reports collected by Microsoft consultants during the current digital programme include such criticisms as "inconsistent process and performance", "silo working with no single view", "unclear priorities and poor communication", "there is a lack of confidence in the IT service", and more. Note that these do not represent a proper sample, and not are they intended as a criticism of a clearly over-stretched team, supporting infrastructure that is outdated and unreliable, an excessive number of applications, a backlog of requested projects, and so forth. Measures are taken of satisfaction with service desk performance, but this is a separate matter, and involves polling a biased sample of users, who will (in most cases) have just had a problem solved. Most service desks achieve a score of 4 on a scale of 1-5 in these cases, and while the service desk in the council uses a 7-point scale, similar levels are achieved. The council's recent biannual staff survey specifically highlighted IT systems as an area where the council needs to do better (Ref 35). What is best practice, however, is an annual survey of all users, with if necessary some incentives to respond (entry into a prize draw usually works), monitoring overall satisfaction with the ICT service, and also

checking on issues that are believed to be problematic. In practice, many users have issues that do not warrant a call to the Service Desk, but nevertheless make their working lives harder than necessary. This baseline is also important to enable assessment of whether subsequent investments are achieving the hoped-for benefits. In addition, if the annual survey uses the standard Socitm user satisfaction question and 7-point scale, it is possible to benchmark against other councils.

Many organisations also do periodic surveys (monthly or quarterly) of a sample of users, checking on satisfaction levels in terms of key variables, again concentrating on areas where there may be issues. In all surveys, free text feedback should be sought, so that users – who are often very insightful – can let ICT know what they really think, make constructive suggestions, and so forth. It is also important that ICT feed back to users what they are being told, and what they are doing about it. This cycle of “you said, we did (or plan to do)” is a key part of building a better relationship with service users.

7.15 Helping Users Make the Best Use of Technology

Much of the technology provided in the council is rich in capabilities that users do not make use of, or even know about. While it should not be the mission of ICT to get users to know and use every feature of every system, it is not enough for ICT to simply roll out the technology and let users find, by chance, what it can do. As explained elsewhere, in any project delivering new technology, it is essential that ‘benefits realisation’ is a fundamental part of the project plan, and this will involve ensuring that users are taught how to use relevant functions in new systems. There is also a need to do this for systems in current use, and a good example is Office365, which has many capabilities that could be of real value to the organisation. It is proposed that there be an initiative to explore these capabilities with the supplier, expose them to samples of users in different parts of the council, determine which are of value, and then help users to become familiar with them. This can be wrapped into existing change management work within the Digital Programme, and with sufficient focus and repetition within project and programme plans, eventually become embedded within the culture of the organisation, so that the council always does what is necessary to properly exploit the technology it invests in.

In general, with all applications, use should be made of local ‘super-users’, enthusiasts who take the time to learn all about an application, and serve as a local source of advice to their colleagues. Similarly, ICT staff (or super-users) could run periodic ‘masterclasses’, demonstrating to users helpful features that they may not have known about, or made best use of. Short videos could be made, along the lines of the numerous ‘How Do I?’ videos available on-line, but tailored to council users and their specific needs. In all of this, the key is making it easy for users, who have busy day jobs and can invest little time in exploring how to make the best of their ICT. Thus, while few staff can afford the time to attend lengthy training classes, anything that is quick and easily absorbed is far more likely to find an audience.

7.16 Technical Debt

It is clear from the above that the council has run up a significant degree of what is sometimes called ‘technical debt’, meaning that the technology in use has become aged, and in many cases expensive, unreliable, and hard to maintain. If this base level of technology remains at a poor standard, the significant and admirably forward-looking investments that are being made into Digital technology will be at risk, since the infrastructure they sit upon will be old and crumbling. A significant degree

of remediation is therefore now required, to bring technology up to date (noting that not everything is in poor shape), and it will then be necessary to keep it up to date. Some organisations go through a cycle of big investment, followed by neglect, followed by more investment, and this is not a sensible approach. Better to come up to date, and stay there, through a continuous process of review, and judicious, well-governed, steady and planned investment. Thus, it is proposed in this strategy that a ‘get well’ programme of technical remediation be created, covering the infrastructure and applications referred to above, plus a range of issues that are too technically detailed to cover here. This will be a substantial body of work, which will bring the ICT underpinnings, which most users are not aware of until they go wrong, up to date and into good order. Note that this is absolutely not an attempt to ‘gold plate’ the ICT, but simply to bring it up to a good serviceable standard, in line with current industry best practice, and then – crucially – keep it there. This will require a significant capital investment programme to achieve the catch-up, and a steady and planned level of investment thereafter. A separate and detailed plan will be created to outline how this programme of work should be conducted. In addition, a number of best practices referred to above should be adopted, to bring the council’s working practices up to date.

7.17 ICT Department: Structure, Processes, Culture

The current structure of the ICT Department needs to be reviewed, since it does not map well to its functions, and the challenges of the digital era (Section 9.2 and Appendix F discuss this further). Similarly, there needs to be greater clarity in terms of responsibilities, and better processes need to be in place to undertake many of the routine tasks expected of the department, as well as the challenges of implementing new technology. Performance information is lacking at both the team and individual level, and this means that a well-focussed, performance-led culture cannot be promoted within the department. None of this is a criticism of the current staff, who work hard and are dedicated to their roles, but rather it highlights the need to undertake a full review of a department that has endured years of austerity and funding cuts, while supporting technology that has progressively aged and suffered a lack of investment. If a simple definition of culture in an organisation is “the way we do things around here”, it is clear that we need some changes in culture and ways of working, if the department is to meet the organisation’s needs.

8. ICT Governance

It is important to define how the ICT department and the work it does should be governed, and to do this, is it helpful to know what functions it performs.

8.1 ICT Functions

An ICT department has two major functions:

- **Business as Usual (BAU).** This involves maintaining the service, responding to incidents and user requests, and a host of mainly invisible activities that ‘keep the lights on’. Accepted wisdom is that this is around 70% of an ICT department’s workload. Good practice in this area is well understood, and expressed in a standard approach named ITIL (IT Infrastructure Library), which originated in the Cabinet Office, but is now used around the world (Ref 36). It is recommended that ITIL serves as the blueprint for the way the department conducts its BAU operations. More details on the key BAU functions of an ICT department are given in Section 8.4 below.

- Change, i.e. Project Work. This involves work to introduce new systems or upgrade existing ones, and represents the other 30% of the workload. ICT staff sometimes mistakenly see these projects as purely technical activities, but in reality most ICT projects involve changes in business and working culture, which must be properly handled if benefits are to be realised. Good practice in this area is well understood, and there are widely adopted methods for project management (PRINCE2), programme management (MSP), portfolio management (MoP) and, crucially, management of change (Kotter, ProSci). Note that while most projects involve change within the business, there are internal ICT projects too, sometimes purely technical in nature (network upgrades, etc), but sometimes involving new processes or departmental structures, and these too must employ appropriate techniques for successful management of change.

8.2 ICT Governance - Definition

A key element of successful ICT is Governance. The well-respected organisation Gartner organisation defines IT Governance as (Ref 37): “The processes that ensure the effective and efficient use of IT in enabling an organisation to achieve its goals”. They divide this into two elements:

- IT Demand Governance – **what** ICT should work on, that is the process by which organisations ensure the effective evaluation, selection, prioritisation and funding of competing IT investments (which is a business management responsibility), and
- IT Supply-Side Governance – **how** ICT should do what it does, that is how IT operates in an effective, efficient, compliant manner (which is a CIO responsibility).

Thus, with effective ICT governance in the council, we have ICT being governed in terms of what it works on, and properly overseen in the efficiency and effectiveness of its operations. As noted earlier, ICT in the council has in recent times been mainly demand-led, with too little strategic oversight to help determine what projects it should be working on. Similarly, it has not been sufficiently closely monitored in terms of the efficiency and effectiveness of its operations.

To determine a desirable future state in terms of operations (BAU, Change, Governance), we need to bear the above in mind, and again return to our principle that every function in the organisation, including ICT, works to achieve the organisation’s top-level goals.

Note that the overall governance of Wiltshire Council is well-defined, with the Cabinet being responsible for most day-to-day decisions, and overview and scrutiny committees supporting the work of the Cabinet and the Council as a whole. Officers give advice, implement decisions, and manage the day-to-day delivery of services. (For further details, see Refs 38 & 39). The proposed ICT Governance below therefore sits within, and is subject to, the constitutional arrangements referred to above.

8.3 How Project Governance Should Work

- We need each department within the organisation to have a clear understanding of what it needs to achieve in the coming years, and what ICT is needed to support that. This will only be achieved if the department maintains a close relationship with ICT, so that ICT helps them understand the ‘art of the possible’, established and emerging technologies, and best practice elsewhere. The department in turn informs ICT of their business needs and

ambitions, and how they see technology playing a part. From this constructive dialogue, a vision of the role of technology in the department emerges, in terms of better exploitation of existing technology, investments in new technology, and an understanding of how benefits will be fully realised. Within the ITIL framework, the ICT role is known as BRM (Business Relationship Manager), and indeed there is a Business Relationship Management Institute in the US, which had developed a BRM Maturity Model (Ref 40). The council has ICT Business Partners (equivalent to BRMs), but these are relatively new in post, and working their way up the maturity model, a journey that must be encouraged and supported.

- ICT must not be simply an 'order taker'. Any ICT project that originates in the business (in line with BP input, as outlined above), or indeed within ICT, must be undertaken only on the basis of a robust and approved business case. Note that a true business case is not a sales document, designed to get approval for a course of action already decided upon, but rather a dispassionate and logical examination of the range of alternatives (including 'do nothing') in response to a problem or opportunity. Any ICT project represents an investment, and must achieve a return. Thus, the business case must define all the costs associated with the different options (including effort previously seen as 'free' – from ICT, legal, HR, procurement, etc), the whole-life costs of the solution (including hosting, software maintenance, upgrades, staff costs to manage, etc), a clear definition of the benefits, both financial and non-financial, and the costs of achieving the benefits (since benefits realisation must be an explicit and fully planned part of the project). The benefits must be measurable, and the business case must define how they will be measured. There must be a clear understanding that if a business case is approved, then the promised savings will be removed from the base budget, and the department also held to account in achieving any proposed non-financial benefits.
- In terms of projects, there needs to be a clear 'gateway' process for their adoption. This process can evolve over time, but it is initially proposed that it be a two-part process, with an outline business case coming first to the Digital Operational Board, where it would be examined in terms of its technical merits (and alignment with the council's Architectural Principles – see Appendix D), examined as to whether an existing or proposed system would (largely) meet the need, and what dependencies there would be on other systems or initiatives. Costs and risks would also be discussed. If the Outline Business Case were approved by the Digital Operational Board, a Full Business Case would be prepared, and presented to the IT & Digital Board, which would then approve, ask for modifications, or reject the proposal. Note that decisions taken by this Board would be within the framework of the council's normal financial planning cycle and approvals process.
- The measurement of performance on projects and programmes is well understood, and will typically involve monitoring against plans in terms of the quality of deliverables, timescales, and spend against budget. What is often less well measured, but should be, is the achievement of planned benefits. ICT programmes can be the worst offenders, since ICT specialists often see the world in technology terms, and feel that once a system is delivered and signed off as working properly, the job has been done. It is important, then, that the council builds the benefits realisation phase into all project / programme plans, and addresses that phase with all the rigour applied to earlier phases. Ultimately, a programme is only successful if the benefits are fully realised, and that may be some while after the technology is first introduced into service.

8.4 How BAU Governance Should Work

- Before going into detail on how BAU governance should work, it is helpful to look in a little more detail at **what an ICT Department does, in BAU terms:**
 - Service Desk (SD): the team that takes telephone calls from users (or via emails or face-to-face) to handle incidents (i.e. where something has gone wrong), or service requests (where something new is requested, for instance a laptop for a new starter). The SD is referred to in the ICT world as first-line support, and the intention is to resolve as many incidents as possible at this level: around 60-70% is typical, while 80% is very good.
 - Second Level Support: the team that handle the incidents that SD cannot resolve immediately. Second Level are more technically proficient, and work closely with other technical teams outlined below. Conventionally, Third Level support is provided by software or hardware suppliers. (Some ICT departments work to four levels, but the same principles apply).
 - Deskside Support Team: the team that deal with all aspects of procuring, configuring, distributing and fixing the large number of laptops in use in the organisation. (Note that most modern organisations will have few desktops, since staff need equipment to support flexible & mobile working).
 - Network Team: the staff that manage the organisation's data networks, both the internal network (LAN: local area network), the wi-fi (with numerous its Wireless Access Points), and the external network (WAN: wide area network), plus connectivity to the internet. Significant elements of this team's work revolve around network security.
 - Server & Storage Team: the staff that manage the on-premise servers in the data centre (typically a diminishing number, as organisations move to the cloud, for both application hosting, and Software as a Service – SaaS), along with the high-availability SAN (storage area network) data storage system. This team will also manage cloud servers, where the organisation is responsible itself for hosting applications in the cloud – a practice known as Platform as a Service (PaaS).
 - Applications Team: the staff that maintain the large number of software applications in use in modern organisations, resolving issues, ensuring applications are 'patched' (which involves applying periodic software updates from the supplier, to fix security vulnerabilities, bugs, or improve functionality), and being involved in periodic major upgrades or replacement projects. Specialists such as database administrators (DBAs) will normally sit within this team, since most line-of-business applications are based around a complex database.
 - Architecture and Strategy Team: these are technical specialists who maintain a high-level view across the entire ICT ecosphere, formulate and enforce standards, and also maintain a strategic view of the future of the technology and its use across the organisation.
 - Telephony Team: where an organisation has an in-house telephone system (although many are now moving to mobiles only), this must be maintained, starters/movers/leavers catered for, hunt groups modified, and so forth. Similarly, if a Skype for Business system (formerly known as Lync) is in use, maintenance is required.
 - Security Team: this function may be embedded in one of the above teams, but has specific responsibility for ensuring that the entire ICT ecosystem remains secure, to a level appropriate to the organisation's data confidentiality and the threat environment.

- Web Team: the staff that do the technical maintenance of the council's externally-facing web presence, and usually the intranet too. Note that as the corporate website moves to increasingly become the primary channel for interactions with the council, this function becomes increasingly important. (Typically, a separate function in the council will deal with corporate comms, both internally and externally, using the website and other channels).
- Other technical functions will typically be embedded within ICT's teams, or may sometimes be in teams in their own right, including those specialising in business analysis, in software development and integration, in testing, in training, in change management, in planning technical innovation, etc.
- In addition to all the above, an ICT function needs to develop, maintain and test a DR (Disaster Recovery) capability, to handle circumstances where most or all of the IT service fails. Traditionally, this meant having multiple data centres (since the failure of a data centre, due to perhaps fire or flood, was seen as the most likely disaster). As organisations move to the cloud, which is inherently far more resilient, other disaster scenarios such as cyber-attacks are higher on the agenda.
- Quite separately, all parts of the business – including ICT – should have their own well-developed BC (Business Continuity) plans, to cope with multiple scenarios, including failure of ICT, loss of buildings, severe weather, disease pandemic, etc. This is especially true of a council, where vital functions such as service delivery to vulnerable people cannot be subject to significant disruption.
- Looking now at **BAU governance and reporting**, it is clear from the above that an ICT Department performs a great deal of work, much of which is not visible to end users. All of this requires proper management and oversight through the organisation's governance function, to see that it is performing properly, in line with the ICT strategy, and is delivering good value for money.
- Most end-users only care about BAU ICT when something goes wrong, and then they want a speedy resolution to their problems, and if that is not possible, an understanding (updated as necessary) of when it will be achieved. Ideally, users should be able to see the latest progress on the incident they have reported, and modern SD Management Tools allow users to log in, using the unique incident number they were given when they first called, and see the actual record of progress being used by the ICT staff who are working on the incident.
- Note that a Service Desk will, as referred to earlier, normally rate an incident in terms of its severity, and prioritise it accordingly. Thus, a Severity 1 (sometimes called a Priority 1 or P1) will be considered urgent, with all necessary skilled staff attending to it, delaying other work as necessary. In well-run organisations, P1's are rare (maybe once a month) and only rated as P1's if very serious. A VIP being locked out of their laptop is of course important to them, but not a P1 incident. Lower severity incidents will be handled once any P1 is resolved. Sometimes, organisations use a Service Level Agreement (SLA) as a way of setting expectations and monitoring performance in an organisation. This can lead to unhelpful behaviours, such as working to meet the deadline so as to achieve good statistics, rather than striving for great service in response to the organisation's current needs. It is now accepted that a better way is to explain how both incidents and service requests will be handled (in a prioritised way), and then report on prevailing levels of performance, with all being done on a best-efforts basis. Performance must be accurately reported, in terms that

end users can relate to, and if it is unacceptable in terms of business needs, discussions may be held on how to improve it (although this may involve higher costs, trade-offs in priorities, or resetting expectations). An explicit SLA (or equivalent) is however useful in some circumstances, so for instance ICT might say that, to provide a laptop and mobile phone for a new starter, they need 10 working days' notice, which in turn encourages the hiring department (or HR) to organise their working practices so as to give that notice.

- For service requests, users want an easy way of making the request (and an online Service Catalogue, with work-flowed approval to the relevant budget holder, is currently regarded as best practice), an expectation of when the request will be fulfilled, and updates if there are any unexpected delays.
- In all of the above, it is important that the business has clear visibility of performance. Some of this will be routine information on numbers of incidents of different severity, time to resolve, information on service request fulfilment, extent of any backlog, and so forth. Similarly, information on the performance of applications is important, since end users want their applications to be not only available, but working properly (i.e. not running slow, or frequently crashing). The end-user's experience of internet access is also important, since slow or non-existent access will affect their work. Some of this reporting will be for ICT's internal management purposes, to ensure that a satisfactory service is being delivered, to track trends and understand looming problems, to plan for seasonal variations in demand, and so forth. Nevertheless, information should be reported both upwards, for Governance purposes, and also made freely available to end users via the intranet, typically in a summarised and easily-understood form, with the ability to drill down into reports to see things in more detail.
- Periodically, it is helpful to comprehensively benchmark the service, and this is best done independently, and with external comparisons. Socitm, the Society for IT Management, offer a service which most councils use every year or two, to benchmark costs, service levels, and so forth.
- As previously noted, user satisfaction must be measured, as in as much detail as possible. This should include both satisfaction with the Service Desk (a score of 4 on a 5-point scale is normal), and general user satisfaction, polling all users annually, and a subset periodically. In addition, ICT should create a virtuous feedback cycle with users, gaining feedback, articulating it, acting on it, and reporting on improvements made.
- Performance of ICT BAU should be formally governed by a suitable group including business-wide representation, so that ICT are held to account in terms of their performance, informed discussions can be held in terms of the service levels being achieved, trends can be tracked, user satisfaction levels reviewed, and so forth. This body (called the Service Review Board) would report to the Digital Operational Board, and could also (through the governance process described above) present business cases to support investments that would achieve better performance, if deemed necessary.
- In assuring that ICT is doing the right things, and doing them well, the last line of defence is a robust Internal Audit function, run by specialist IT auditors. Internal Audit will hold ICT to account, highlight any practices that are slipping, and serve as a 'critical friend' and advisor on best practice. Their input is to be welcomed, even if it is sometimes uncomfortable.

8.5 Overall ICT Governance Structure

The proposed governance structure for ICT is shown in Figure Five below. The **ICT & Digital Board** is the senior board governing this area within the council, and reports in to CLT. This board, composed of both Officers and Members, and chaired by a Corporate Director, would have oversight of and give direction to all major programmes of work within the council with significant ICT/Digital elements. It would be responsible for monitoring the execution of the ICT & Digital Strategy, and its periodic (proposed annual) review. It would approve all business cases for significant investments in ICT/Digital projects, after their initial review and approval at the Digital Operational Board (see below).

Some organisations have a 'Futures Board', which is periodically briefed on new technology, considers its merits and relevance to the ICT & Digital Strategy and the council as a whole, possibly commissions further investigations, and so forth. It is proposed that, rather than having a separate board, this function be included as one of the duties of the ICT & Digital Board, to be addressed periodically (perhaps quarterly), with presentations from invited speakers or council officers. This would ensure that the Board remained up to date with emerging technologies and the 'art of the possible', technological breakthroughs, best practice elsewhere, etc, and would inform the supervision of the ICT & Digital Strategy and its periodic review.

The **Digital Operational Board** is responsible for the execution of the current Digital Programme, and is composed of Officers with technical and managerial expertise in the ICT/Digital areas. It ensures that the Digital Programme is on track, approves any changes within its delegated tolerances, and reports progress to the senior board, also seeking approval for any significant changes as necessary. Given its expertise, it also serves as a reviewer and initial approver of outline business cases for proposed projects and programmes with ICT/Digital content from across the council, and ensures that any proposal complies with the council's architectural principles, is technically feasible, is financially sound (at the outline level of detail), and so forth. It therefore filters and quality assures business cases at this level, before the creation of detailed business cases that are then presented to the higher-level ICT & Digital Board. The Digital Operational Board would be chaired by the council's CIO.

Every Programme of work within the council will have its own Programme Board, in line with the MSP methodology, and below that Project Boards, in line with PRINCE2, as described in Section 8.1 above. Programme Boards will report in to the ICT & Digital Board, unless that Board delegates that governance duty to the Digital Operational Board, which it may wish to do for smaller programmes.

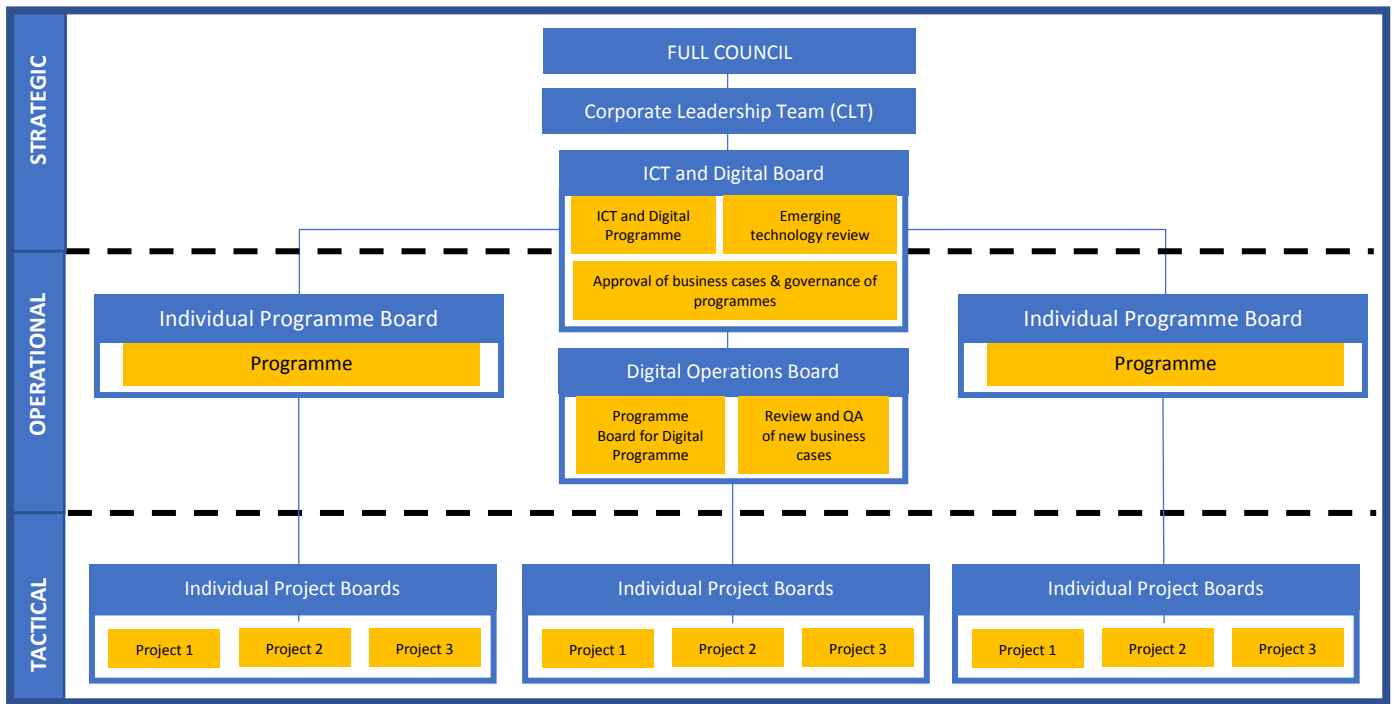


Figure Five: ICT and Digital Governance Structure

9. A Vision for 2022

It is notoriously difficult to see the future with any certainty and that is especially true of ICT, where (as previously noted) the pace of change is fast. Nevertheless, it is helpful to cast a vision of where ICT could realistically be by the year 2022, to allow planning of activities, changes in structures and processes, decisions on which technology improvements to pursue, and so forth. The proposed vision is as follows.

9.1 Digital

- The current Digital Programme with Microsoft will have achieved its planned benefits, including the creation of a digital platform based on Dynamics CRM to hold a ‘single version of the truth’ about the council’s interactions with its customers. There will be a new website and mobile phone app (both designed for usability and accessibility), and between them they will have led to major channel shift away from phone, email, postal and face-to-face contact, achieving the council’s ‘Digital by Choice’ ambition. There will be a single ID for citizens, and a single ID for staff. The council will have achieved greatly improved business intelligence, leading to not only better performance data, but real insights in areas such as social care (building on continuing efforts to share data across agencies), potentially allowing beneficial earlier interventions. The use of virtual assistants (VAs) will be pervasive, and many clerical-like processes will have been automated. Technical support for the VAs will be efficient, and the VAs will be reconfigurable rapidly, as the systems they interact with, or the processes around them, are changed.
- As part of the Digital Programme, there will have been a renewed focus on the efficiency of back-office processes. While VAs will help, in many cases the need for process re-design will have been highlighted, and the need for being ‘digital end-to-end’ will be well understood.

- The next phase of the council’s Digital Transformation will be under way, combining Robotic Process Automation (the technology in the VAs) with ‘cognitive computing’, which will combine natural language processing with machine learning. This technology, sometimes called “Robotic and Cognitive Automation” will enable the next generation of VAs to process unstructured data such as text and speech, extract meaning, and then work within defined processes as required (Ref 41). These systems cannot do this ‘out of the box’, they need to be trained, and so will at first have to draw on test data, but over time they will (rather like trainee staff) become progressively better at tasks that currently need a degree of human interpretation and judgement. This will move the VAs further up the value chain, and will enable further service and efficiency improvements for the council. Timescales are hard to predict, but it is likely that the first applications will be coming into use by 2022.
- Ethical considerations in the use of Artificial Intelligence will be on the agenda, with advice being taken from such bodies as the UK Government’s newly-created Centre for Data Ethics and Innovation (Ref 42). Longer-term considerations for the future of employment in the county, the implications for education and training, and the role the council can play directly in training in the use of AI will no doubt be under consideration.

9.2 ICT Department

- This will be a restructured and much improved department, justifiably confident in its abilities and well-regarded within the council and by its peers elsewhere. It will employ staff who are clear about their duties, have the skills and tools they need to do the job, understand their career development options and how they wish to improve their skills, and are supported in doing so. Its reputation will assist in staff recruitment, as the council will be seen as an ICT ‘employer of choice’ within the area. (Appendix F gives more details on how the department should be structured).
- An important change that will have taken place within the department will have been a significant increase in customer focus, along with better relationships with the business at all levels. This will be characterised by a noticeable ‘can do’ attitude among the staff, along with a willingness to engage and help, and to find solutions to problems. (Note that this is not an implied criticism of current team members, more a reflection of the high levels of workload they experience due to supporting aged technology and large numbers of applications, pressure they currently experience with a backlog of projects, and so forth).
- Users of ICT within the council will periodically feed back to ICT their satisfaction levels with the service, and will have the opportunity to provide suggestions on how things might be improved. This information will be collated and acted upon, forming a ‘virtuous circle’ of feedback and improvement. Effective and timely communications will be a key part of this, including easily-absorbed messages along the lines of “you said, we did”, to demonstrate that the department both listens and acts. ICT’s BAU performance will be well governed, and service maintained at levels consistent with the organisation’s needs.
- Customer satisfaction with the council’s website will also be tracked, with a view to continuous improvement.
- Those aspects of ICT that are not readily visible to end users, but which ultimately affect the service delivered, will be undertaken efficiently and effectively. Having gone through a significant ‘get well’ programme, ICT will be in a good state, with no significant ‘technical debt’, and with all the functions, processes and controls in place to ensure it stays that way.

A combination of good governance, firm management and robust Internal Audit activities will assure that this remains the case.

- The Service Desk will be properly equipped, and users will easily see progress on the resolution of their incidents and service requests. High levels of first-time-fix will be routine, and password self-service reset will have been put in place (if passwords are still in use, see below), thus easing the load on the Service Desk and making life easier for users. Improved Service Desk software will make performance reporting and trend analysis much easier than at present.
- A well-designed Service Catalogue will allow users to request, and gain rapid budget-holder approval for, services and applications. For instance, they might need access to a piece of specialist software, and having requested it on the intranet-based Service Catalogue, a work-flowed request would go to their manager for budgetary approval (including revenue costs into the future, if there is an ongoing cost), and ICT would then install it remotely, and advise the user on where to access online training, the name of their local super-user, etc.
- A well-designed starters/movers/leavers process, created in consultation with HR, will ensure that new starters get the laptop, applications, phone etc. they need on the day they start, and will be signposted to on-line training, local super-users, etc. Movers will have their access to line-of-business systems added or removed as appropriate. Leavers will return their equipment to ICT on their last working day, access rights will be removed immediately, and devices recycled. (Departments will not be allowed to hoard devices, not least for GDPR compliance reasons).
- All staff in ICT will have been trained in ITIL to at least Foundation Level, and those in some roles to higher levels. Note that ITIL v4 is imminent, and has been revamped to meet the current focus on Digital in the ICT world. It will be necessary for all staff to be trained in the latest version, in due course. There will be particular focus on what ITIL calls Service Transition (change management, service asset and configuration management, release and deployment management), and Service Operation (including service desk, application management, incident management, problem management & root cause analysis, and identity management). No change to the operational environment will occur without CAB (Change Advisory Board) approval, or before consideration of business impact, consulting with the business as necessary. All changes will be formally approved and recorded.
- The Business Partners will have developed their relationships with the relevant parts of the council, and will be working at BRM Institute Level 4 (trusted advisor) or Level 5 (strategic partner) (Ref 43).
- The CMDB (configuration management database) within ICT will have an accurate and up-to-date record of all end user equipment, and to whom it is allocated.

9.3 Equipment

- All council staff in roles that require it will have a good quality laptop, appropriate to their needs (and this will probably include both lightweight and larger-screen models), with the then-current Microsoft operating system (probably Windows 10, but this may have changed by then), Office 365 running the latest version of Office (Word, Excel, PowerPoint, etc.) and all the applications they need for mobile, home and office working. Note that the longer-term vision of Microsoft is shaping up to be totally cloud-based, and so it is possible that

Windows will eventually disappear in favour of browser-based access to cloud-only services, but probably not within the timescales under consideration here.

- Biometric authentication for log-in will have been evaluated (fingerprint or facial recognition), and if found both reliable and acceptable to users, adopted as an alternative, or possibly, depending on prevailing security considerations, as 'second factor authentication' to supplement passwords.
- Each desk in the council's hubs will have an ultra-wide screen (the equivalent of dual screens), and users will be able to plug in easily, and if they wish also plug in a keyboard and mouse.
- Internet access will be suitably fast (having grown in line with Nielsen's Law (see Appendix B), internet connectivity will be suitably resilient, and monitoring will be in place to ensure there remains sufficient capacity.
- Users will have an efficient process for unblocking websites which they need to access for their work. Similarly, visitors will have easy access to a good internet connection, without the need to pre-register and obtain special permission.
- All staff who have a clear business need will be supplied with a mobile phone, either when they start, or through the Service Catalogue process, if their needs have changed. Note that the current Windows phones are no longer supported by the supplier, and will have been replaced by Android phones. Those wishing to use their personal phones will, as now, be able to access email and calendar securely on them.
- ICT will maintain a stock of ready-built laptops and spare mobile phones, to replace lost/broken devices promptly.
- The council will have moved away from the current MITEL wired phone system for general use, using instead Skype for Business via laptops, but only if those teams that need features such as hunt groups are satisfied it meets their needs. The feasibility of moving away from MITEL for the call centre will have been explored, and if possible, this will have also moved to Skype for Business.

9.4 Applications

- Applications will have been rationalised, so that the 1200+ applications reportedly in use across the council in 2018 will have been significantly reduced (most councils aim for around 200). Those in use will have been tiered (with the top 15-20, vital to major business operations, each having an 'application owner' who will take the lead on all aspects of their operation and periodic upgrading, keeping in touch with the supplier, and planning the future of the application, including eventual replacement). All application versions will be no older than n-1, and all security patching will be up to date, with other patching completed, or scheduled. Performance on top-tier applications will be actively monitored, so that any performance issues are promptly addressed.
- Wherever possible, applications will be Software as a Service, that is cloud-hosted and run as a reliable service by a reputable provider, correctly patched, regularly updated, and operating to the National Cyber Security Centre cloud security principles (Ref 44).
- Any new line-of-business applications will have been through the full Business Case process, ensuring that the investment case is coherent, the approach compliant with the council's ICT architectural principles, costs understood, benefits realisation planned, and so forth.

- ICT will have worked closely with social services colleagues to support moves to Technology Enabled Care Services (TECS) across the county (Ref 45), which will help older people stay in their own homes longer (which they much prefer), and will also reduce costs for the council.
- The use of electronic signatures will have been enabled, reducing the need for staff who work in the community to come back to base to print documents, return to their customers to get wet signatures, return to base to scan the documents, and so forth.
- The range of tools available within Office365 will have been explored with users across the council, and those found helpful will have been publicised, and users trained appropriately.
- SAP will have been updated, to bring it up to the current version, to allow its provision as SaaS, and to ensure it better meets the organisation's needs in respect of both finance and HR.
- SharePoint Online will have been fully introduced into the council as the default document management system, and Microsoft Teams (which sits over SharePoint) will be in widespread use as a system to facilitate team and project information sharing.
- For all commonly-used software tools, and also specialist line-of-business systems within departments, super-users will have been identified who will offer ad hoc advice and support to staff in their area. In addition, users will have access to short 'How Do I?' videos, well-written user guides, and periodic masterclasses run by ICT and super-users at lunchtimes.
- There may well be increasing demand for the use of simple, on-line collaboration and other tools, and ICT will have a process for approving their use. The Information Governance team will be included in this, and costs will be clearly understood, as well as security and privacy issues, but the intention will be to approve the use of such systems where they add value and are genuinely helpful to business operations, are relatively cheap, and are not simply a substitute for something already available in the council.

9.5 Security

- With increasing reliance on cloud computing, and a threat level that continues to grow (Ref 46), the security of the council's data and operations will be a major area of focus. To meet this, ICT will have a strong security capability, and will ensure that all aspects of the council's operations meet the prevailing standards for data and network security, and best practice advice from the National Cyber Security Centre. The principles of ISO27001 (the internationally-recognised information security standard) will be applied throughout. A robust Disaster Recovery capability will be in place, and will be periodically tested.
- With services and corporate data is migrating to the cloud, new challenges will emerge around user access and data sharing methods. To address this, there will be a focus on providing simplified, flexible and secure Identity and Access Management to Wiltshire employees, including:
 - o security challenges across user identities, devices, data, Apps and platforms: on-premise and in the cloud;
 - o one protected common identity for secure access to all corporate resources: on-premises and in the cloud;
 - o data protection through Microsoft Data Loss Prevention and Rights Management (see below);
 - o data encryption at rest and in transit;
 - o Bring Your Own Device (BYOD) opportunities, where effective Mobile Device Management solutions can be deployed.

- Note however that the imposition of appropriate security safeguards will always be balanced by business needs. An excessively locked-down ICT environment may be ultra-secure, but the business still needs to operate efficiently, and so the ambition will be to create strong security that is unobtrusive and does not impair normal business operations.
- Security is not simply a matter of technology, it also crucially involves having staff act appropriately, and as part of this council staff will be given updated training on basic cyber security principles, such as the types of threats now prevalent, how not to be the victim of phishing attacks, what to do if a ransomware attack occurs, etc.
- The current secure email system, GCSx, will have gone out of service in 2019 and been replaced by a secure Microsoft Office365 solution, giving end-to-end encryption. ICT will also have introduced Microsoft's Information Rights Management, which enables the blocking of printing, forwarding or copying of information by unauthorised people.
- Similarly, Microsoft Direct Access (which allows users to securely access the council's network from any location, via wi-fi) will have become end-of-life and been replaced with Always On VPN, thereby maintaining the ease of working enjoyed by council staff.
- To ensure the council's network and applications remain secure, all server operating systems will have been upgraded. Note that Windows Server 2008, still in use at the time of writing, is already out of mainstream support and all remaining support (including security patching) will cease from 14th January 2020. While invisible to users, the upgrading of this technology (and others, including database environments, the VMware server virtualisation environment, and the SAN) is vital.
- Wiltshire Police, for whom the council provides ICT services, will be well down the road to implementing the National Enabling Programme, which will enhance and standardise digital technology across all police forces. In some instances, this will require a divergence from local authority standards and practices, and while Wiltshire Council and Wiltshire Police will continue to work closely in respect of shared ICT, some changes will have been made. This will have included the segmentation of the network, to allow different security policies, but there will have been other changes too.

9.6 Other

- The provision of superfast broadband across the county will have been completed, and building on it, activities will be well under way in the creation of 'smart cities' in one or more locations.
- The ICT needs of community groups will have been addressed, by ensuring that they have access to such council systems as SharePoint Online, to allow them to securely share information with the council and among themselves, and that they have access to (free) Skype to allow them easy communications via voice and video. The use within community groups of old council equipment such as laptops will also have been explored.
- The council will have moved further towards a low-paper regime, where users do not routinely print papers before meetings, but instead read them on their laptops. Printers/copiers will be fewer in number, and many users will have to walk some distance to access them, which will further discourage their use. ICT will monitor use, and excessive users will be identified and their management informed, to verify genuine business need.
- The room booking process will have been automated, possibly by use of a chat-bot. Screens outside meeting rooms will show who has booked it. No-shows will result in the booking

freeing up, after a to-be-agreed time (probably 10 minutes). No-shows will be logged by ICT, and repeat offenders 'named and shamed'.

- The council seeks to become more **entrepreneurial** to maximise its income, and ICT has an important role to play in enabling and supporting this too. Any business unit must understand its costs in detail, including the true costs of labour, materials, and overheads. It must plan resourcing and future workload, advertise its services (over the web, and by other means), qualify its sales prospects and model its future workload, monitor work in progress, track billable time and materials used, invoice customers in an accurate and timely fashion, keep an accurate record of payments made and due, and much more. The development of the relevant skills in staff undertaking this work is beyond the remit of ICT, but tools to support many of these routine tasks are readily available, either from existing corporate applications or as small-business cloud-based systems, and it will be possible to offer packages of business support tools to help what will be, in effect, internal business start-ups.

10. Roadmap

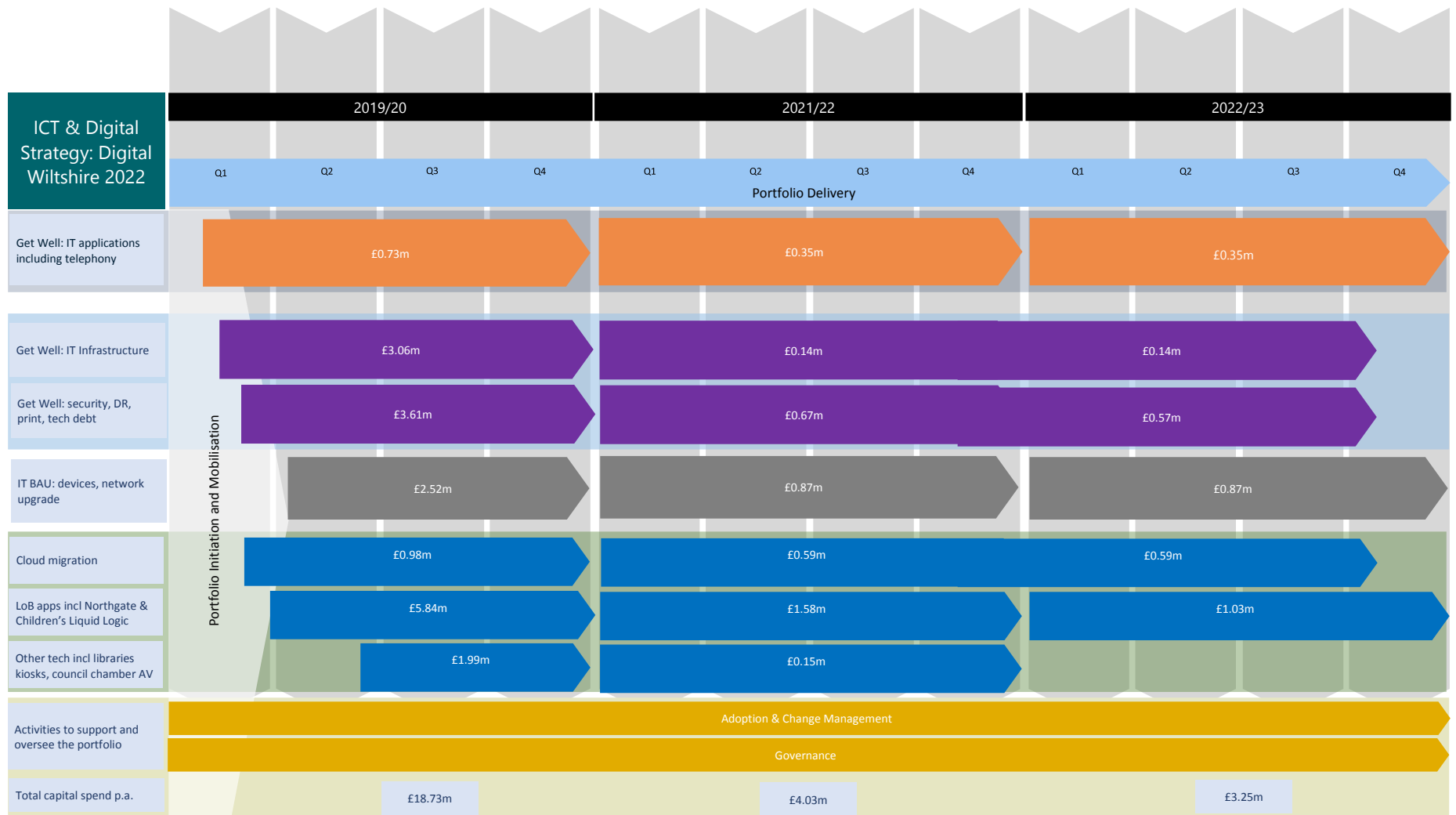


Figure Six: Roadmap Timescales and Costs

Figure Six above is a high-level representation of the range of work proposed over the course of the following three financial years. Shown within it is the 'get-well' work which is required, and the scale of the capital investment required, which is within the envelope of the capital programme currently proposed. A detailed Programme Business Case and Programme Plan will be prepared for this work. Figure Six also includes for completeness the IT 'business as usual' expenditure, which would have been required irrespective of any 'get well' investment, and this includes such things as routine replacement of laptops, routine replacement of elements of the data network, and so forth. The cloud migration investment is broken out separately, to indicate its scale and duration. The costs of replacing Line of Business applications are also indicated. These are substantial, and include such major investments as the programmes to replace Northgate M3 system (Planning and Public Protection), and the Liquid Logic Children's case management system, which will bring the council onto one, cloud-based application for both Adults and Children. Finally, again for completeness, the costs have been captured for technology systems not normally managed by ICT, including the AV (audio-visual) system that allows council meetings to be broadcast to the public, now due for replacement, the self-service kiosks in the county's 30 libraries (now in urgent need of replacement), and so forth. The intention is to allow proper long-term planning for all such capital costs.

Appendices C, E and G have more detailed listings of all of the above.

11. Next Steps

ICT is, as explained in the introduction, of material importance to the future of the council, the achievement of its strategic goals, and the smooth running of its operations. It is therefore important that all stakeholders understand what is being proposed, have had an opportunity to influence and contribute to the strategy, and are prepared to actively support its realisation over the next three years.

Beyond that business-wide consultation process, this report should also be taken through the governance structure as described above, both for its approval, for the oversight of its delivery, and for annual review and updating as necessary.

The Roadmap outlined above must be translated into a number of programmes of work. Each should be re-evaluated for its relevance at the time (technology and business needs evolve), fully costed, and approved only on the basis of a full, independent business case. As described above, each business case should be taken through the governance process, with costs, benefits, risks, dependencies clearly understood, and the benefits realisation process properly defined.

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13. Appendices

Appendix A: Moore's Law

In 1965, Gordon Moore, one of the founders of the Intel Corporation, made the prediction that every 2 years or so, the number of transistors that could be fitted to an integrated circuit would double. This is highly significant, since transistors are the fundamental building blocks used in integrated circuits (or 'microchips'), and integrated circuits are used in all modern electronic devices. This doubling rule applies universally, to everything from microprocessors, to memory chips, to the sensors in cameras, to the components that make a smartphone operate. The implications of Moore's Law have been profound, with chip development powering all modern electronics, and hence the internet, computing, consumer electronics, smartphones, innovations in healthcare, transportation, education, and indeed almost every aspect of modern life. As processing power grows, developers typically use that power in ever more sophisticated applications, and so the demand for the next, faster generation of processor emerges, and the spiral continues.

Thus, in part because of the hardware/software spiral, and in part because the microprocessor industry actually now plan to follow Moore's law, it still holds today, although there have been many occasions over the years when its demise was predicted. Moore's Law is not of course a law of physics, merely a prediction of technological development, which cannot of course continue indefinitely – although it shows little sign of tailing off. Figure A1 shows transistor counts against time, with details of the microprocessors launched during that period. Note that the vertical axis is on a logarithmic scale, to render the exponential growth as a straight line.

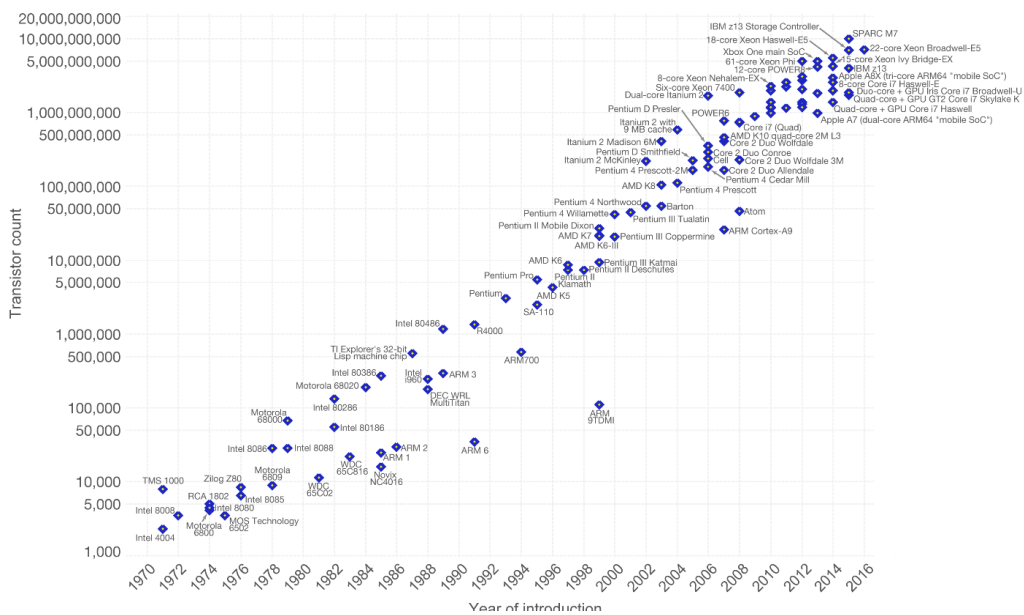


Figure A1: Moore's Law

Appendix B: Nielsen's Law

Jakob Nielsen (a well-known technologist and web usability consultant) made a prediction in 1998 that users' consumption of internet bandwidth (that is, the rate at which data could be downloaded over an internet connection) would grow by 50% per year. Clearly, this is driven both by technological developments occurring, and users choosing to download data at those rates (and in the case of the highest rates available at any time, generally paying a premium to do so). In 2018, he checked how well his prediction had held, including calculating growth back to 1983, and found it still to be true (Ref 47).

Figure B1 below shows the rate at which a high-end user (one paying extra to get the highest speeds) could obtain internet data, over the years, from the earliest 300bps modem of 1984 to the 300Mbps available in 2018):

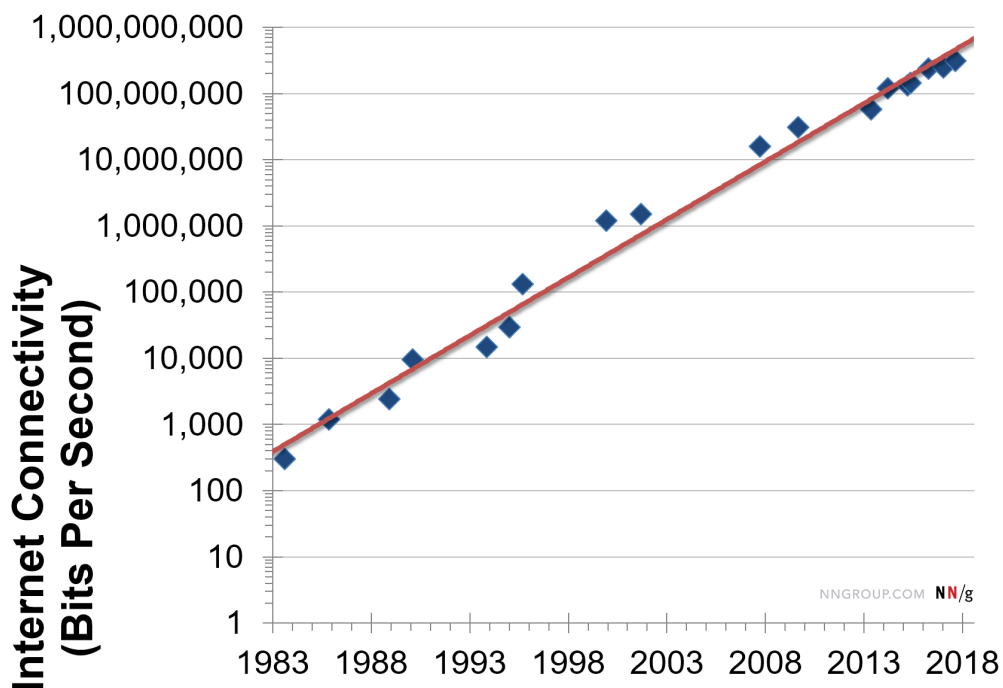


Figure B1: Nielsen's Law

Thus, with minor variations, Nielsen's Law has held true for 34 years. There is no guarantee it will continue to hold true, but for the purposes of this strategy document, it seems like a reasonably reliable prediction for the period to 2022.

Appendix C: Applications to be Replaced

The table below lists applications to be replaced, with dates and indicative costs. Section 7.3 explains the background.

Application	2019/20	2020/21	2021/22
AFD	£79,680		
Bibliotheca Annual Support/Maintenance	£12,234		
Blancco ADV Support 3Year Agreement	£24,948		
Blancco Man Console3Year Agreement		£3,912	
Blancco Drive Eraser HMG 3Year Agreement		£3,186	
Buchanan (Accsmap and Parkmap)		£19,200	
CIPFA (Asset manager.net (hosted))	£32,760		
Corpweb (Trustmarque Solutions)		£13,476	
Databox	£108,390		
DMZ (Trustmarque Solutions)	£29,974		
Documotive (Castleton Technology PLC)	£60,000		
Dolphin Supanova	£50,000		
EPI	£14,400		
Fibonacci		£30,427	
Hague (Hagueprint)		£49,200	
IDOX (Argonaut & Voyager)	£7,500		
Iken	£33,126		
Keysoft (AutoCAD) - (autoturn Multi KS37429)	£167,450		
Keysoft (AutoCAD) (ENT KS36954)	£7,560		
Limehouse (Objective Keystone LTD)	£31,686		
Lorensberg	£20,598		
Misco VMWare	£108		
Modern mindset (modern.gov)	£30,000		
(Rapid 7) Nexpose & Metasploit	£64,500		
Nexsan (Christie data)		£128,148	
Omnibus	£8,929		
QAS address lookup licence for W	£80,815		
Shuttleworth	£10,000		
Silversands	£11,598		
SolarWinds network config manager	£76,536		
Stopford	£29,970		
Trapeze	£12,000		
Trustmarque UTM SW WEB Protection		£195,636	
Trustmarque UTMSW WEB Premium support	£19,667		
Yotta Street Lighting	£7,918		
Insight email			£93,231
(Active Documents (DocuShare/) Wisenet	£56,022		

XN			£188,970
IYSS	£44,036		
HIAMS			£176,400
Axiell (Spark)			£62,400
Axiell (Calm)	£21,108		
Abritas	£25,602		
WhiteSpace	£62,400		
CGI (SAP Support & Maintenance)	£2,300,000		
Northgate	£31,608		
Civica (Icon hosted)			£176,400
ESRI		£926,700	
Northgate (R&B & remote support)	£84,503		
OLM		£179,360	
oracle (licenses and support)	£167,405		
Phoenix Software Ltd (Captivate 2019, Corel, Claroread, Adobe, Sophos AV)	£235,314		
Northgate M3 replacement	£1,000,000		
Children's Case Management system (Liquid Logic)	£785,000	£27,800	£329,100
TOTAL	£5,845,347	£1,577,045	£1,026,501

Appendix D: Architectural Principles

It is important that the council has a coherent view of its preferred ICT & Digital architecture. It is sometimes possible to see a technical solution to a particular business problem or opportunity, which appears perfect in terms of the local needs, but if the council's entire ICT system is to operate in harmony, and be supportable by an ICT team of the size the council can afford, it is important that technological divergence does not take place (to avoid excessively broadening the range of skills needed to provide technical support), and it is also important to avoid technological dead-ends. For these and other reasons, any proposed technology changes must be approved by the ICT Department's Enterprise Architecture function, in line with established architectural principles. This applies to any new projects with an ICT element, and of course to the major ICT remediation plan that is proposed above. These architectural principles are:

- **Cloud First:** The cloud offers an opportunity to procure ICT services at lower cost and with a reduced impact on support and maintenance costs, by comparison with on-premise hosted services. Where cloud is used, Software as a Service (SaaS) is the first choice. Thus, the supplier hosts the application, fully maintains the infrastructure, ensures that everything is up to date, secure, available, and so forth. A good example is Microsoft Office365, a comprehensive service to users which requires very little maintenance from council ICT staff, just adding and removing users, etc. SaaS should be used in preference to Platform as a Service (PaaS), a form of cloud computing that provides dedicated hardware and software to allow the user to build, test and host applications. This in turn should be used in preference to Infrastructure as a Service (IaaS), where cloud-based hardware is provided and managed by an external provider. Thus, the higher up the service stack a service is chosen, the greater the value derived.
- **Digital by Choice:** Where new services are required or current business processes are selected for automation then those services should be digitally aligned. Thus, the principles of customer self-service, and a standardised approach using common platforms with a common experience should be adhered to.
- **SaaS as first option:** see Cloud First.
- **Flexible and Mobile Working is to be supported:** Any new service must, as far as possible be agnostic to the location or technology used to access the service, thus allowing users to work from anywhere, at any time, and where appropriate with the device of their choice.
- **Use Existing Services wherever possible, even with some compromises:** Customising systems adds cost and complexity to service delivery, complicates Commercial Off The Shelf (COTS) product upgrades and leads to higher Total Cost of Ownership (TCO). IT vendor products tend to be developed to meet existing market requirements, and often reflect existing best practice. The council should only consider building or customising systems in areas where there is a compelling business reason to do so, or where there is no COTS product that is suitable. In general, it is better to alter business processes to suit COTS products, rather than customise COTS products to suit business processes.
- **Systems and Data to be Secure (while proportionate to the risk):** Open sharing of information and the release of information via relevant legislation must be balanced against the need to restrict the availability of classified, proprietary, and sensitive information. The state of data should also be considered to ensure that there is not the opportunity to misinterpret data that has only been partially processed.
- **Data is to be Shared (with the necessary safeguards), and open where possible:** The assumption should be to share data unless policy and/or legislation prevents doing so. Data

is a valuable resource and has real, measurable value in the support and execution of business processes. The purpose of data is to aid decision-making.

- Data is to be Correct: Accurate, timely data is critical to accurate, timely decisions. Data and the insight it provides is the foundation of decision-making and at the heart of everything the council does, so we must also carefully manage data to ensure that we know where it is, can rely upon its accuracy, and can obtain it when and where we need it.
- Microsoft is the Preferred Technology Partner: Much greater value can be derived from exploiting the value of an integrated vendor product-set through the deployment of single vendor/single system solutions. Data exchange between systems is easier within product-sets than it is across them. The council has selected Microsoft as the provider of a range of products, and deploying in this large footprint enables it to get on with the business of delivering business value, rather than distracting resources to integrating different systems. *(Note that the alternative to using Microsoft Windows for desktops and servers would be to use Open Source software, and operating systems based on Linux (such as Ubuntu) are available free of charge. They are however very basic, and have achieved limited market penetration. In terms of a desktop productivity suite, the most viable alternative to Microsoft Office365 is Google G Suite, which has rather less capable equivalents of Word, Excel, PowerPoint etc. The lower level of functionality, the need to retrain staff who have had years of experience in Office, and above all the lack of integration with other systems make this a poor alternative. Thus, Microsoft remains the preferred technology partner, and Microsoft software is procured by the council through re-sellers, and via a tendering process which ensures the best value.)*
- Aligned with guidance from the Government Digital Service (GDS) and proven industry best practice, including with TOGAF (The Open Group Architecture Framework, the best-practice approach to IT architecture) and ITIL (the widely-accepted set of practices for IT service management): GDS has conducted extensive research into the use of digital services by the public, and has built an extensive library of best-practice, reusable and shared services that can be built upon to provide the public with a consistent, empathetic and easy-to-use journey through the often-complex interactions they must undertake when engaging with government organisations. This library of best-practice and shared services has been proven and refined through central government's digital journey over the last decade. The council should exploit this repository of knowledge and experience to ensure it interacts with its customers in as clear and consistent a way as possible. The use of industry best-practice approaches to architecture and service management exemplified by the TOGAF and ITIL frameworks will save the council time, effort and cost by not reinventing the wheel in terms of business processes, and will also provide a common framework of understanding for engaging with other organisations as well as obtaining, developing and retaining talent.

Appendix E: 'Non-ICT Systems' to be Replaced (Capital Costs)

The table below outlines those systems that have not historically come within the remit of the ICT department, and the dates and indicative costs of replacement. (Section 7.13 goes into more detail).

System	19/20	20/21	21/22	22/23
Libraries RFID kiosks	£500k			
Democratic services AV equipment	£750k			
Coroners Court software & hardware	£175k			
Cranbourne Chase AONB IT eqpt.	£100k			
Parking Services (Chipside to SaaS*)	£100k			
Waste management automation	£100k			
HR careers website	£100k			
HR new inhouse apps	£60k			
HR TalentLink/Grow retender		£150k		
Finance (making tax digital)	£20k			
Print unit	£6k			
Service desk	£80k			
Total	£1991k	£150k	£0k	£0K

*SaaS revenue costs to be determined, but estimate £20k pa

Appendix F: How ICT Should Be Structured

- To understand how an ICT department is best structured, it is helpful to consider the skills needed within it, and also the tools required to perform the work. The functions outlined in Section 8.4 must be performed by appropriately skilled and qualified specialists – ICT is no place for the amateur – and indeed the British Computer Society, the professional body for ICT, has its SFIA framework (Skills Framework for the Information Age), defining categories of ICT skills, and the levels in each that ICT specialists must achieve as they pursue their careers (Ref 48). SFIA enables employers and ICT practitioners to identify career paths, and plan training and development. ICT staff must be encouraged to continue developing their professional skills, and be supported not only in formal training, but in self-study, the achievement of appropriate qualifications, and of course learning on the job, from more experienced colleagues. In a well-performing department, it is a matter of pride among ICT staff that they remain at the leading edge, and this sentiment should be nurtured.
- An ICT department must also be appropriately equipped, and thus for instance a key tool is the software that supports the Service Desk. ServiceNow and BMC Remedy are the market leaders, and between them hold 50% of the market. It is important that an appropriate system is put in place in the council's ICT Department (the current tool is poor), to allow both efficient functioning and appropriate reporting.
- How best to structure an ICT department? The architect Louis Sullivan coined the phrase 'form follows function', referring to the entire natural world as well as the world of architecture, and this is just as true for an ICT Department (Ref 49).
- Most ICT departments are structured along the lines of the functions outlined in Section 8.4, with each team being managed by someone who is skilled in that function, understands it in detail, commands the respect of his/her staff, and has also gone through some management and leadership training, so that they are able to perform the principal management functions, summarised by Henri Fayol over a century ago: planning, organising, directing, coordinating, controlling (Ref 50). It is proposed that the ICT department be reorganised along these functional lines.
- In addition, ICT needs the services of technical project managers. As it stands, project and programme management staff are located with the council's PMO, and while this generally works well there are occasions when project managers with specific technical expertise are required. These will be funded from the project budget (as explained above, all future business cases must cover all project costs), and how these will be sourced will be a matter for future discussions. The obvious options are to locate them within the ICT department, within the PMO, or to bring them in as contractors as required. The way ahead can be decided as part of the ICT department restructuring process.
- Note that the restructure of the ICT department is a serious undertaking, and must involve a period of consultation with staff at all levels, to receive their input and understand their viewpoints. This input is valuable, since staff will know from daily working practice what does and does not work, where the pinch points are, what has been tried and failed in the past, and so forth. On that basis, a structure based on the functions above would be a starting point, but subject to change based on this input, and also feedback from the wider business, via the Business Partners and other channels.

Appendix G: 'Get Well', BAU and Cloud Migration Capital Requirements

Get Well: IT Applications incl Telephony	2019/20	2020/21	2012/22
Replacement ICT Service Desk	£80,000	£20,000	£20,000
Application rationalisation project	£200,000		
External SAP hosting	£300,000		
Skype	£150,000	£15,000	£15,000
TOTAL	£730,000	£35,000	£35,000

Get Well: IT Infrastructure	2019/20	2020/21	2012/22
H/W Upgrade (servers & VMware)	£800,000		
Various network renewal	£129,800		
New network contract (implementation)	£1,200,000		
Consultancy/support on projects	£33,882		
Storage Replacement	£400,000	£40,000	£40,000
Backup Replacement	£500,000	£100,000	£100,000
TOTAL	£3,063,682	£140,000	£140,000

Get Well: Security, Tech Debt, DR, Print	2019/20	2020/21	2012/22
Staff for specialist technical project work	£456,860		
PKI	£100,000	£10,000	£10,000
Load Balancers	£100,000	£10,000	£10,000
DHCP upgrade	£100,000	£10,000	£10,000
PHP system	£500,000	£100,000	£50,000
Remote access	£300,000	£30,000	£30,000
Sophos UTM	£50,000	£5,000	£5,000
Software asset management	£100,000	£10,000	£10,000
SIP trunks	£100,000	£10,000	£10,000
Stock control	£100,000	£10,000	£10,000
GIS	£200,000	£20,000	£20,000
Oracle/SQL	£182,000	£10,000	£10,000
Secure portal	£50,000	£5,000	£5,000
Infrastructure resilience	£300,000	£50,000	£50,000
Security monitoring	£180,000	£180,000	£180,000
Network access control (security)	£500,000	£50,000	£50,000
ICT DR	£40,000	£40,000	£40,000
Wi-Fi upgrade	£50,000	£5,000	£5,000
ICT service improvement project	£100,000	£50,000	£50,000
Printing replacement project	£100,000	£10,000	£10,000
TOTAL	£3,608,860	£665,000	£565,000

ICT BAU	2019/20	2020/21	2012/22
Staff for specialist technical project work	£185,777		
300 laptops	£240,000		
200 desktops & monitors	£160,000		
Keyboards & mice	£53,000		
Monitors	£635,750		
Monitor stands	£7,400		
People's Network: 200 desktops/monitors	£160,000		
People's Network domain: refresh project	£200,000		
Annual replacement laptops	£440,000	£440,000	£440,000
Annual replacement monitors		£51,975	£51,975
Replacement staff phones	£85,800	£8,580	£8,580
Consultancy for network	£250,000	£250,000	£250,000
Consultancy (other)		£95,000	£95,000
Innovation	£100,000	£20,000	£20,000
TOTAL	£2,517,727	£865,555	£865,555

Cloud Migration	2019/20	2020/21	2012/22
Server & appn cloud migration	£500,000	£500,000	£500,000
W10 Evergreen	£25,000	£2,500	£2,500
Identity & Access Management	£250,000	£70,000	£70,000
IT Service Management for cloud	£200,000	£20,000	£20,000
TOTAL	£975,000	£592,500	£592,500