Barcelona Ciutat Digital

Barcelona City Council Digital Plan

A government measure for open digitisation: free software and agile development of public administration services

The Open Digitisation Programme from Barcelona City Council's Office for Technology and Digital Innovation

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Executive Summary

In September 2016, Barcelona City Council embarked on an important digital transformation process announcing that public services must be provided through digital channels from the outset, following new guidelines oriented towards citizens and the use of open standards and open software and in accordance with an ethical data strategy that puts privacy, transparency and digital rights at the forefront.

The decision taken by the city government is based on the Barcelona Digital City Plan, a government measure approved in October 2016 and new Spanish Law 39/2015 on Common Administrative Procedures for Public Authorities. This Law states that by 2020, digital channels must take priority in the provision of public services in the Spanish State. The Barcelona Digital City Plan establishes a radical improvement in digital public services as one of its main objectives, with the aim of providing services to citizens on a 24/7 basis that are of higher quality and better adapted to their needs.

The Municipal Institute of Information Technology (IMI) is instrumental in enabling this transformation to be carried out. In 2016, Barcelona City Council created a Digital Transformation Committee, and the IMI put together a group for the promotion of Digital Transformation made up of professionals from various technological areas. Both of these mechanisms were set up to drive and govern this important process.

The Open Digitisation Programme: Free Software and Agile Development of Services, created by the Commissioner and the IMI in October 2016, following the launch of the Digital Transformation Plan, is the impetus behind technical innovation and excellence focused on the delivery of results. In addition, this programme promotes a culture of innovation, transparency and continuous development throughout the whole of the City Council, emphasising:

- The promotion of the development and delivery of agile, open and ethical digital services.

- The promotion of the development of internal design skills and capabilities focusing on users and agile methodologies, for the purposes of regaining control of digital services.

- Opening up public procurement, making it more transparent, simple and objective, while reducing the bureaucracy involved. Innovation in the procurement processes will also enable diversification in technology providers.

- The creation, through a digital market platform, of a diversified group made up of expert local providers.

- The promotion of the use of agile methodologies in digital services, both internally and in provider relations.

- The revision of procurement procedures for technology assets and services to reinforce technological and data sovereignty.

- The use of free and open source software in municipal systems, except in exceptional and justified circumstances.

• The establishment of technological practices based on open architectures and standards.

This government measure provides an overview of the transformation programme and the proposed incremental changes. It sets forth the structure how the transformation will be governed, its eminently practical orientation, based on establishing clear measures and specific deliverables, and provides a shared roadmap.

The measure will provide savings in resources and more efficiency through the implementation of agile processes, while providing citizens with the tools they need to interact with the local authority more efficiently. Through open data management and the use of free software tools, we will be guaranteeing universal access, improvements in transparency and laying the foundations for new initiatives based on harnessing data and creating a network of open source experts that will make the local authority more resilient and independent.

This measure focuses on the delivery of agile digital services, the process for accomplishing technological sovereignty and the migration to free and open software and open standards.

The annexes to this government measure contain documents that define the main standards and give guidelines for the core areas in the programme.

These documents include:

- The Digital Services Standard.
- The Code of Technological Practices.
- Agile Methodologies of Barcelona City Council.
- Technological Sovereignty Guide.
- Details of the Migration Plan to Open Source.
- Public Procurement of Technology Guide.

The responsible and ethical use of data is a key element within Barcelona City Council's Digital Transformation Plan, especially the Open Data and Data Commons strategies, "Data Driven" projects and interoperability based on open data formats. The corresponding directives and their implementation will be developed in a new government measure on the Strategy for Responsible and Ethical Use of Data in Barcelona City Council, where its technical details, processes and responsibilities will be detailed.

This government measure also explains how agile development methodologies will be applied in Barcelona City Council, by transforming vertical product teams into agile service-orientated work groups through flagship projects. That is why the IMI is putting an Agile Technical Office and an agile projects team into operation.

From a purely technological perspective, the objective is to create a public and open ecosystem and infrastructure composed of interoperable and reusable applications and services. So, the way in which the public authority operates must be changed through the use of open standards and free and open source software, by implementing open, public and well-documented application-programming interfaces (APIs) that provide access to the City Council's open data for the purposes of enabling the ICT sector, and even other authorities, to collaborate with the City Council to deliver agile, open and ethical applications and digital services.

The services which will be first to benefit from these changes include: the new citizen help and information portal, mobile phone services for citizens, the new calendar of events and facilities in the city, the open city dashboard for citizens, the technology providers portal and the new mobile digital identity service.

The formation of new agile teams will enable us to acquire the capabilities we need and to develop a recruitment plan and an internal-skills creation programme for promoting this transformation. At the same time, internal capabilities will be complemented with skills and services provided by the most innovative companies in the sector, brought in by the City Council, through innovative procurement and the creation of a digital procurement platform.

Digital transformation and innovation are not a destination or point of arrival but rather a journey, an endless process, where

steps are repeated one after the other until the desired result is reached. Digital products and services and their interfaces are evolving, like a living organism, in accordance with the needs of citizens and changes in technology. viu, d'acord amb les necessitats dels ciutadans i el canvi tecnològic.

The Agile Transformation Programme itself is continuously evolving and our ambition is to go ahead and do far more than what this government measure states, as it only establishes the bases for a process of continuous improvement.

1 Introduction and justification for the measure

The digital era is making profound and rapid changes to our society and, as a result, the model of citizens' relations with companies and public authorities. By bringing together digital transformation, citizen participation and transparency we are obliged to change the models used by public bodies so that they have the capacity to adapt to the new needs that are created. This transformation represents a great challenge for the City Council, with activities that are highly regulated by legal, economic and human resource requirements.

The Open Digitisation Programme: Free Software and Agile Development of Services at Barcelona City Council aims to provide guidelines focused on service delivery and technological sovereignty in order to revitalise the entire municipality, by consolidating the governance of digital services, by generating profiles and capabilities in free and open source software and the ethical use of data and by transforming public procurement. The implementation of this approach, based on agile methodologies and the use of open technologies, has demonstrated efficiency in performance and costs, which the City Council must take advantage of.

It is along these lines that the measure opens up public procurement and makes it more transparent, simple and objective, by creating the right conditions for participation from a diverse set of local-industry talent and encouraging the country's small and medium-sized businesses. Likewise, the current procurement processes are being reviewed to ensure technological and data sovereignty. Procurement procedures must also be transformed for the purposes of bringing them into line with the reality of the services offered to the public and making it possible for these measures to be applied.

To achieve the main objective and transform Barcelona City Council into a leading entity in the digitisation of the public sector, we will have to define the steps to be followed for advancing and building "digital by default" public services in Barcelona that are more open, simple, modular, interoperable and which aim to prevent blockages with proprietary solution providers.

2 Objectives of the measure

The measure sets out the Barcelona City Council's Open Digitisation: Free Software and Agile Service Development Programme.

This measure focuses on giving the City Council the ability to rapidly develop digital services centred on the real needs of citizens, achieving technological independence based on free software and the use of open standards, making data from Public Authorities available to citizens so that they bring them more value, and ensuring that they can access these services by safeguarding their right to privacy.

1. Focusing on a user-centred digital services model and greater collaboration to generate more value using the same resources.

2. Broadening and expanding agile methodologies for the construction of new digital public services.

3. Developing the internal capabilities for the agile management of public services throughout the City Council.

4. Opening up public procurement, making it more transparent, simple and objective.

5. Preferential use of free and open software, with the aim of its becoming mandatory in the future, to ensure technological and data sovereignty.

6. Establishing an open architecture and practices based on open standards.

7. Revising procurement processes so that these objectives and innovations can be incorporated into relations with the industrial sector.

8. Improving access to the authority's data, respecting privacy and evaluating the ethical risks of smart cities and large databases, including legal compliance with data protection regulations, by establishing an ethical code of technological practices and defining a data strategy.

9. Developing new technology-acquisition guidelines that will be integrated into the general framework of public contracts as well as followed and implemented by all the City Council's public contracts and civil servants.

Finally, we will present the flagship projects through which we will begin to achieve these objectives and implement the new practices that are necessary for this.

3 Governing the digitisation process

This transformation constitutes a lengthy process requiring the involvement of the local authority, as well as the ICT sector and society. The process must have a specific form of governance so that it can meet its objectives and keep to the established schedule.

Several mechanisms will be used for the governance of this process, including, notably, the Commissioner for Digital Technology and Innovation, the Barcelona Digital Transformation Commission and the Innovation Committee, not to mention other players in the city such as companies and representatives of civil society.

The main governance methods include:

• **Commissioner for Digital Technology and Innovation.** One of her missions is to go through a process of redesigning and reorienting Barcelona's technology and digital innovation strategies and policies through a process involving the active participation of key players in the city. Two of the main areas are the digitisation of public services and the promotion of an innovative digital ecosystem, which includes the relationship between public authorities, citizens, businesses and the academic world. The commissioner has an office available for monitoring and promoting projects intended to ensure municipal coordination and measure the impact of the implementation of this programme.

• **Barcelona Digital Transformation Commission.** This is a transversal municipal mechanism created to govern the definition and implementation of the Digital Transformation Plan and ensure its alignment with the City Council's strategy. Part of its main function for prioritising and coordinating the City Council's ICT initiatives will also involve analysing the situation and development of the digitisation programme and constituting a space for debate, discussion and proposals among the various municipal areas and sectors.

• **Digital Innovation Committee.** This is a cross-cutting municipal mechanism within the City Council's various areas, tasked with putting the design and implementation of the innovation strategy and policies into operation. Its function will be to ensure, among other things, the involvement and alignment of the various municipal areas in this process.

4 Context

4.1. Barcelona City Council

Approved in October 2016, the Barcelona Digital City Plan (PBCD) is a cross-cutting Plan which aims to guarantee a coherent, standard technology policy within the City Council, in the areas of Government and City, Enterprises and Social Entities and Citizens.

The PBCD must ensure that digital technology and innovation act as facilitators in the fulfilment of fair and efficient public policies geared towards covering better the needs of citizens and boosting their capabilities, to create greater-quality public services, with the optimum allocation and use of public resources and talent.

Three strategic areas have been defined within the PBCD, with the following objectives (Figure 1):

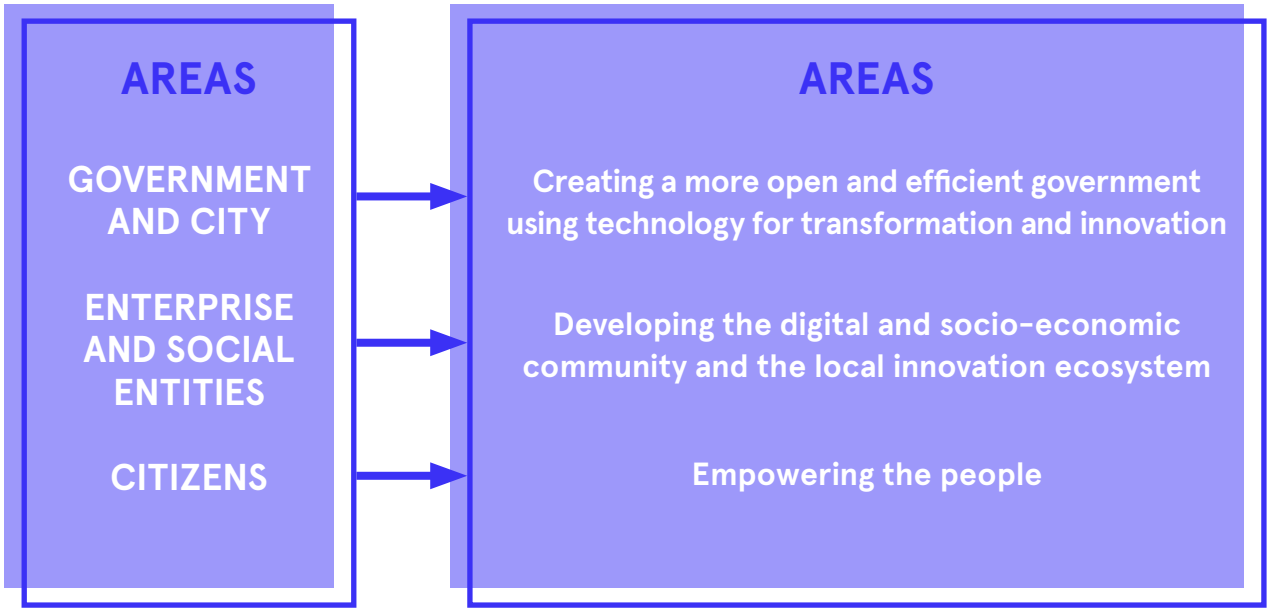


FIGURE 1

The Barcelona City Council's Digital Transformation Plan (PTDA) is the comprehensive roadmap for ICT projects for this term of office, and for each Manager's Office, in accordance with political priorities. This plan also includes projects for updating technology and adapting it to the new legal framework established under Act 39/2015 of 1 October, on Common Administrative Procedures for Public Authorities (LPCAP).

4.2. Legal Framework

Law 39/2015 of 1st October, on Common Administrative Procedures for Public Authorities (LPACAP), which comprehensively promotes digital administration - not just citizen relations but also the electronic management of administrative procedures, electronic documents and files, interoperability, etc. - defines a new legal framework which requires profound changes to be made in the provision of public services and, as a consequence, in municipal organisation and their information systems.

Note that in addition to compliance with the LPACAP, we can find other legal texts in the regulatory context of the EU and in Spanish and Catalan legislation that have to be responded to:

• The EU eGovenment Action Plan 2016-2020, that aims to remove existing digital barriers to the Digital Single Market and to prevent further fragmentation arising in the context of the modernisation of public administrations.

• The new EU General Data Protection Regulation (GDPR), approved in May 2016, which the entire public authority must adapt to and comply with.

• Act 19/2014, of 29 December, on transparency, access to public information and good government. The aim behind this Act is to provide citizens with information on the actions of regional public authorities and control and transparency in the destination of public money.

• Act 11/2007, of 22 June, on citizens' electronic access to public services, known as LAESCP. In this context, free software, open standards and open source technologies are considered the best option for the development of a technological model for e-Government, tailored to the specific needs and objectives of public authorities, based on the strategic criteria of transparency, control, security, interoperability, access and conservation of information, economics, reuse of data and cooperation between organisations, which closed technologies can hardly compete against.

• Royal Decree 4/2010, of 8 January, regulating the National Interoperability Scheme, which includes the security criteria and recommendations, standardisation and conservation of information, and the formats and applications that public authorities must take into account to ensure an appropriate level of organisational, semantic and technical interoperability for data, information and services that they manage in exercising their powers and to prevent discrimination against citizens on the grounds of their choice of technology.

4.3. New Trends in the development of agile digital services, technological sovereignty and ethical data management

Given the current situation where changes come about at an incredibly fast pace and changes within changes are occurring, we to develop and implement models for digital services that will help us to adapt to these transformations. This is even more the case in the information and communication technologies (ICT) sector, where speed and agility are essential in the face of change. Hence the appearance of agile methodologies, given the difficulties and occasional failures experienced with traditional methods of project management.

By "agile methodologies" we mean a group of methods, started under the "Agile Manifesto" of 2001, applied to the creation of software that bases its development on an iterative cycle, where needs and solutions evolve through collaboration between the various teams involved in the project. Agile methodologies promote a disciplined approach to project ma-

nagement that encourages constant revision and adaptation to the needs of the users and to the changes. These methods provide an organised system that allows and facilitates teamwork and self-organisation and helps to reduce development times.

As for technological and data sovereignty, we can confirm that free software is "technically feasible, economically sustainable and socially fair"[1]. This is reflected in specific benefits to the local authority.

• It is **technically viable** because it allows us to reuse existing free software projects, reducing the implementation efforts required to cover our own needs. Every IT company, regardless of its size, depends on free software to some degree. The fact that the local authority wishes to make direct use of this is a logical step.

The freedom to choose tools also means the freedom to choose the provider for maintaining and developing them. Working with open formats and standards does away with the need to depend on large companies and enables permanent access to the information generated.

Participating directly in the community provides access to the consolidated knowledge of other entities, enabling them to contribute through documentation, code or shared experiences implementing projects in the authority.

• It is **economically sustainable** because it removes the requirement for user licenses and cuts down on costs. Such a reduction in costs does not mean a loss of quality or security. On the contrary, it can enable projects that would not be possible with proprietary software, and keep systems up to date and protected at the lowest possible cost.

These cost savings can be reinvested in suitable hardware for new tools or items that require additional resources. Thus the local authority is showing responsibility towards public money and responsibly managing it.

Freedom to select providers without restrictions can boost the reinvestment of public funds into the region while benefiting the local economy. Generating a virtuous circle where any SME, cooperative or freelance can offer their services, under equal conditions. In a country where 90% of businesses are either small or medium-sized, this opens up a large window of opportunity.

It also provides freedom to choose the municipal management of the IT infrastructure, without the need for expertise in exclusive, high-cost tools. The public and private jobs generated will be available to more of the territory's professionals.

• It is **socially fair** because it guarantees the fundamental rights of citizens. Access to the source code and its collective control helps us to know what it does and to ensure that it does not have any gateway or security vulnerabilities. Data privacy and security are ensured.

Such benefits either do not exist or require much higher economic and social costs with proprietary software.

Royal Decree 4/2010 (see more in section 04.2) has existed since 2010, and makes it mandatory for Public Authorities to use open formats when sharing information with citizens. The list of formats is not a choice for each public entity, but rather a list of standards that is specified and regularised for interoperability. As such, Public Authorities will use open standards to guarantee independence in the choice of technological alternatives made by citizens and public authorities, preserving documents over time, and adaptation to progress in technology.

Where appropriate, documents, electronic services and applications made available by public authorities to citizens and other public authorities will be displayable, accessible and functionally operational, under conditions which support the principle of technological neutrality and avoid discrimination against citizens on the grounds of their choice of technology.

Data were of little and limited interest until recently, although computer processing capacities have reached the stage where we can now

[1] *Jordi Mas in his namesake book (Col·lecció "Manuals i Formularis" [Collection of "Manuals and Formulas"], 15)*

harness and reuse data. At the same time, there has been an exponential growth in the amount of such data. For security reasons, this situation makes it crucial both to control and release these data, for the purposes of boosting their reuse, with the conviction that public data can generate business and social improvement for the entire population. Combining free tools and open data puts us in a whole new ball game, where transparency and a willingness to share and work on a community basis create a new organisation of public administration.

4.4. Agile methodologies and free software in other public authorities

AGILE METHODOLOGIES

While Agile methodologies have mainly been implemented in private enterprise, their use is not unknown in public administration. Since 2012[2] the British government Has been promoting them, as well as the US Department of Defense. A good example is the development of a new British service to manage vehicle inspections (MOTs).

Closer to home, the Regional Government of Andalusia in 2010, put out to tender the service for the development of the website entitled "DEVELOPMENT OF THE CONSUMER RESPONDS WEBSITE", using the Scrum agile methodology, certainly the most popular of the agile methodologies in software development. In 2010, the regional government of the Canary Islands also put out to tender the maintenance service for the IT records system in the field of tourism using these methodologies.

Vitòria-Gasteiz City Council published an invitation to tender in 2013, for "the procurement of a redesigned municipal website using adaptive design". The technical specifications stated that the methodology to be used was SCRUM.

March 2017 saw the Provincial Council of Badajoz commence procedures to procure development and implementation services for new functionalities and the technological evolution of its current management applications, also using the agile SCRUM methodology.

Public-private institutions including the Thyssen Museum, Hospital Clínic de Sant Carlos in Madrid and its Smart Health Lab and the Tax Agency are starting to use and apply agile techniques such as Lean Government.

Barcelona started introducing agile methodologies in 2013 for the development and management of municipal websites and it will now be the first big city in southern Europe to launch and implement this type of methodology on a global basis within the City Council.

OPEN TECHNOLOGIES

Regarding experiences in free software at a local level, public authorities have for a long time now started implementing Open Technology policies and deploying free and open-source based services. Regionally, we have the example of the University of Lleida (UDL), which is a pioneering public university in the use of free software in Catalonia, together with the Open University of Catalonia (UOC). It has been using free systems for years, yielding excellent results. A new team, one of whose goals was to promote the use of free software, took over the vice-chancellor's office in 2003 and commenced a migration process for all the systems. In 2006, the Generalitat of Catalonia published its own Free Software roadmap.

The University of Murcia signed up for the Open Academic Environment (OAE) in 2014,an international initiative to create a free software platform which allows the development of an open collaborative academic network. This project is headed by the University of Cambridge, and the University of Murcia was the first Spanish university to take part in it. The university star-

[2] *https://www.gov.uk/service-manual/agile-delivery*

ted migrating its computers to Linux in 2015. This resulted in savings of €100,000 in user licenses and another €300,000 by not having to renew equipment. Recently Barcelona City Council released the code of Sentilo, its sensor data management platform, as free software and won an EU award for Sharing and Reuse.

The government in Brazil launched several digital-inclusion projects in parallel in several areas, based on the installation of call centres, whose aim was to reduce digital exclusion, increase professional skills, distribute free software and increase public participation in new technologies. Free software has played a fundamental role in the creation of these centres and is enabling those who have just arrived in the digital world to do so with legal software.

On a European level, Germany's Foreign Ministry started migrating its 11,000 computers to GNU/Linus and free software applications in 2003. This enabled a considerable reduction in costs compared to those of other ministries. The aims are for 230 embassies and consulates around the world to migrate to open technologies. The Gendarmerie Nationale's IT team decided to review their existing Microsoft-based environment in 2014 so it could offer a responsible and profitable service at a national level and reduce its growing IT infrastructure costs. It migrated to OpenOffice and Firefox and its PCs were upgraded to Ubuntu. This resulted in savings of 2 million euros annually in license rights alone as well as a drastic reduction in hardware expenses.

In 2014, Italy chose free software as the first choice for its public administration. It created a document titled, "Guides for comparative assessment (of software)", which teaches people a method to follow to make the right decisions when choosing software. The Italian example is very important as it is concerned with not just regulations but also their implementation. The guide developed by the Italian Digital Agency was drafted with both the Free Software Foundation Europe and representatives from several proprietary software companies taking part.

Open technology policies for the European public administrations are supported by the action of the European Commission, that publishes to his own free licence for Public Administrations, the EUPL, and centralises efforts in his "Join Up" platform where one finds literally hundreds of experiences of migration or development of free software for the European public authorities.

At an international level, the Brazilian government initiated in parallel several projects of digital inclusion in different areas, based in the establishment of telecentres, the aim of which was to reduce digital exclusion, increase professional capabilities, disseminate free software and increase popular participation in new technologies. Free software has played a fundamental role in the creation of these centres and is allowing that those who are just arriving in the digital world to do it with legal software.

Malaysia's public administration launched its Master Plan on 16 June 2004 to promote, adopt and develop the use of free software in the public sector. The Open Source Competency Centre (OSCC) went into operation. The OSCC became established as a national benchmark centre for managing and supporting the application of free software within the administration. More recently, in December 2013, India invested in computers with free software (Ubuntu) for its students. This is one of the most important programmes in the world for government-endorsed laptops, installed on 1.5 million laptop computers.

As regards open data and standards, on 23rd June 2006, the Belgian Council of Ministers in Brussels approved the decision to require all document exchanged between services provided by the Federal Belgian Government to take place in open and standard formats. So only OpenDocument (ODF) was expressly accepted as such a standard in this decision.

The Open Data BCN project was created in 2010 and its portal installed in 2011, the main objective of which was to take full advantage of the public resources available, displaying information generated or held by public bodies, allowing access to and the reuse of data for the common good and for the benefit of the people and entities concerned. Part of

the Barcelona Digital City strategy, the project is based on the main international standards and recommendations, adopting the features of open data by default, quality and quantity of information, data for everyone, data for the improvement of the governance and the promotion of innovation.

As we have seen in the examples described above, authorities have been undergoing a process of transformation towards agile methodologies and free software for years. Some of these have already demonstrated clear benefits, not just in financial savings and mitigating technological obsolescence through the implementation of free software but also in improving productivity and adaptation through agile methodologies.

5

The open digitisation and agile service-delivery programme

5.1. Mission statement and principles

Public services currently must be designed to be "digital first", putting citizens at the centre of the design process and contributing more public value. Services must be constructed in a more agile and open way and must be simpler, more modular and more interoperable. At the same time, we must avoid creating dependencies on vendors and suppliers of specific proprietary solutions, hence the need to promote the development, use and reuse of free and open source software and open standards. Services must be usable and accessible to everyone, including citizens with low levels of digital skills and people with disabilities.

The **Open Digitisation and Agile Service Development Programme** provides a focus on digital services to revitalise the City Council as a benchmark for technical innovation and excellence. It will bring quality digital services, adapted to the needs of citizens and orientated towards safeguarding citizens' right to privacy (data privacy), services which, by making use of free and open source software and open standards, will end the dependency on proprietary formats, products and solutions (technological sovereignty).

Digital public services need to become true assets of today's society, with their reuse made possible in other cities. That is why initiatives are needed in the area of public procurement of technology which can foster a more mature approach to the provision of technology to the public sector, by proposing multi-supplier contracting models that promote competition and diversity of suppliers, enable the adoption of new innovative technologies and move away from big contracts, by creating a new market for open and collaborative SMEs.

What's more, the programme generates profiles and capacities in user-centred design and agile methodologies, to bring the flexibility to and accelerate the development and delivery of these services, while opening public procurement and increasing its transparency, simplicity and objectivity, thereby providing a route to technological and data sovereignty.

The programme will establish a framework for an open architecture and designs based on open standards, through a series of incremental changes with a clear governance structure, results orientated, with clear measurements and indicators and a shared roadmap.

As a starting point, the programme defines the basic principles to guide the way for developing new services. These principles are contained in the Decalogue titled "Our Digital Service Standards" (see Annexe 12.1):

- **Multi-disciplinary teams for services:** Setting up a multidisciplinary sustainable team that can design, build and operate a service, led by a qualified senior service manager, that has decision-making responsibilities.

- **Beginning with the needs of users:** Users' needs have to be understood and research carried out to develop more knowledge on who the service users are and what this means for the service design.

• **Using agile development methodologies and iterative building methods.** Building the service using agile and iterative user-centred methodologies.

• **Reducing the burden on citizens.** Existing information will be used in the municipal systems during new interactions with citizens, with interoperation with other public authorities to gather the required information and avoid having to ask the citizens to provide it again. Unnecessary documents will be removed in the digital version of the service and the City Council will ensure that citizens give their consent for their personal documents to be used.

• **Following the guidelines on visual design and accessibility.** A coherent service will be built based on the experiences of users of the rest of Barcelona City Council, in terms of existing visual design and accessibility guidelines.

• **Having a plan available for people who need digital assistance.** Use of digital services will be encouraged among all users and plans made for people who cannot access digital services for whatever reason without support. As for the provision of essential services, the City Council will need to ensure that it adapts to citizens who do not have digital devices.

• **Considering security, privacy and ethical aspects.** An assessment will be made of which user data and information will be provided or stored in the digital service, taking into account the level of security, legal obligatoins, privacy issues and the risks associated with the service. (consulting with experts if necessary).

• **Open source software and open standards will be used.** Open source software and open standards will be used whenever possible. Likewise, all new code will be open source and reusable so that it can be published under appropriate licenses.

• **Having a plan available for digitisation.** We will ensure that all digital services provide citizens with the digital means to produce, sign and authenticate their documents. In the event that there are citizens who do not have their own digital resources, we will have to ensure there is a service available at the City Council for digitising these documents.

• **Making a plan for going off-line in case of unforeseen circumstances.** A plan will be available in case the digital service is temporarily down, as users expect an online service to be available 24 hours a day, 365 days a year.

• **Tools, systems and services will be evaluated.** Assessments will be made to ensure that the technological code of conduct is followed and the associated technical risks are understood.

• **Reusing the existing infrastructure and shared functions as far as possible.** A coherent service experience will be created that enables time and resources to be saved by eliminating the need for existing functionalities to be rebuilt.

• **Defining a plan for managing the change for the transition of the service.** There will be continuity service plans to facilitate the transition between the current non-digital service and the new digital service. Any interruption to citizens' access to the service has to be avoided.

• **Feedback and continuous user assessment.** A plan will be implemented under which we will be continuously open to feedback from users and carrying out usability tests to gather users' opinions continuously and thereby be able to improve the service.

• **Measuring and publishing the service's results.** Performance indicators of the service will be identified, establishing a reference point for each measurement and making a plan for enabling improvements.

• **Making a maintenance and servicing plan for the digital service.** There will be a "response and escalation" plan to minimise service interruption when incidents occur.

Barcelona City Council has published an information poster with further details for publishing our digital service standards. This poster can be seen in Annexe 12.1 accompanying this measure.

5.2. Priorities and methods for creating digital services

The following four main action areas have been identified for the purposes of the digitisation programme's optimum development and obtaining open, interoperable, ethical and agile digital services for the public:

- Agile methodologies in the delivery of digital services
- Technological Sovereignty (free software and open standards)
- Sovereignty and the responsible use of data
- New public procurement model

While the programme is transversal, and both the IMI and City units are involved, each area of action will be led by a different team. It is based on our services standards and a new code of technological practices supported by a guide for the introduction of agile methodologies, and a guide for the transition to free and open source software (software, hardware, systems), The guides on open public procurement and of innovative procurement complete the documentary framework supporting the programme. The next government measure will set out the management of data for the City of Barcelona and will express the strategy of responsible and ethical use of data and its concrete implementation.

This is an internal transformation so the process must be led by the City Council itself, involving its own staff, working to develop the capacity for acquiring skills and results. Support will occasionally be necessary from external experts in the sector who, along with training and experience from the new agile team, will provide help in understanding the skills and competencies that will be needed in the immediate future. A procurement plan and a skills-creation programme will be implemented to meet these needs and keep the transformation alive. This process will lead to major internal involvement.

The whole transformation process will be carried out under the same agile philosophy. So, the programme will begin with a discovery stage followed by successive iterations that will gradually allow the new culture and new practices to be introduced.

New practices will be developed and refined based on real projects, which we will call exemplary or flagship projects (described in section 08 of this document). The new methodology will gradually extend to all projects where such practices are applicable.

5.3. The current Situation

The discovery stage in Barcelona City Council began in September 2016, with support from external experts. Four work groups were created in which more than 40 workers from several municipal areas participated. These groups worked for 4 months with help from 4 external experts to generate a base that would help to drive change.

Throughout 2017, as many as 3 sessions were held with the sector (free software and open technologies, agile digital services and public procurement of technology), involving more than 200 representatives of the City and industry. Internally, between April and June this year, within the Transformation Plan, four workshops were organised (tools workshop, management workshop, training workshop and an organisation workshop).

In the first quarter of 2017, the agile methodology was applied to its first real project,

the municipal management dashboard. This was used for defining the actions for introducing agile methodologies to the City Council, choosing the most appropriate projects to begin applying them, identifying the necessary external support needed and defining the internal training plan and the organisation and necessary tools for new practices.

Between 2016 and 2017, the City Council launched **Decidim.Barcelona** and **Sentilo**, applications that hace been developed as its own free software.

- **Decidim.barcelona** is the most advanced free software to be developed by Barcelona City Council and has enabled one of the biggest open, transparent and traceable participatory processes in the world among its citizens in the collective construction of the city's strategic plan. Its mission is to provide support, open up and broaden participation and democracy in Barcelona in the coming years, by advancing towards a greater ability for collaboration between the City Council and citizens, greater decision-making freedom for people, with particular emphasis placed on the collective dimension, and ultimately, in creating and delivering social power. Principles that are still in force today in many free software communities. Decidim is deployed in 9 cities in Catalonia and the Basque Country, as well as the French Commission for National Debate.

- As regards Barcelona's sensor platform, **Sentilo** was fully developed with free software and is made available globally through the Sentilo Community. As with Decidim, this platform is already being used in several cities and by various public authorities and a large number of cities and companies have also expressed their interest in trying it out and creating technologies that are compatible with Sentilo. The main objective of Sentilo is to provide a functional, interoperable and easily extendible platform to every city in the world that so wants it, by sharing public investment in development under the free software model. Sentilo is the first experience of Barcelona in creating a community around a free software project, a place that also aims to be a meeting point where cities and companies can collaborate to enhance the platform, provide support and develop business around Sentilo. Organisations besides Barcelona currently using Sentilo are: Terrassa, Reus, Cambrils, Barcelona Provincial Council, the Catalan Water Agency (ACA), Barcelona Metropolitan Area (AMB) and the Dubai Municipality.

In the field of open data, the Open Data BCN portal, the open data service of the Barcelona City Council must be highlighted. It is a multi-language and easy-to-access space, where users can find a data set (dataset catalogs) that the Barcelona City Council makes available in a reusable way. The information is classified into 5 major issues (administration, population, territory, economy and company and city and services), each with its corresponding sub-themes, allowing filtering. Since the beginning of July 2017, it has the "reusers" section, a community space aimed on the one hand at developers, to facilitate the work of this more technical group in the use of data, and on the other, "views and applications", a section that gives visibility to projects carried out with data from the Portal. Barcelona already has experience and has started the path indicated by the Digital Transformation Plan, exceeding expected benefits. The moment has come to reinforce and formalize it. This measure and its expression through various documents that are the result of this discovery process, clearly establish the foundations, standards, and main processes of open digitization and the rapid development of services:

- The digital services standard (see Annexe 12.1).

- The code of technological practices (see Annexe 12.2).

- Agile methodologies in Barcelona City Council (see Annexe 12.3).

- Technology Sovereignty Guide (see Annexe 12.4)

• Action plan for free and open source software (see Annexe 12.5).

• Guide for the public procurement of ICTs: Technology Acquisition Manual with ethical and open clauses (see Annexe 12.6).

• Guide for innovative public procurement.

The guides, which accompany this government measure as supporting documents, will be published as a comprehensive body of work and continuously improved throughout the process of agile transformation during this term of office.

As indicated above, the guidelines on data will be developed through a future specific measure on the use of data in the City Council, giving it the importance it deserves.

6 Themes and objectives

If the objectives of the Open Digitisation: Free Software and Agile Service Development Programme are to be achieved, work must be carried out to deliver agile digital services centred on users, through three main action areas:

- Strengthening **technological sovereignty**, through the adoption of free software and open public procurement
- Adopting agile methodologies, introducing an agile work framework
- · Improving data governance, through a new data strategy

This will be achieved through a series of actions in each of the areas that make up the programme (Figure 2)

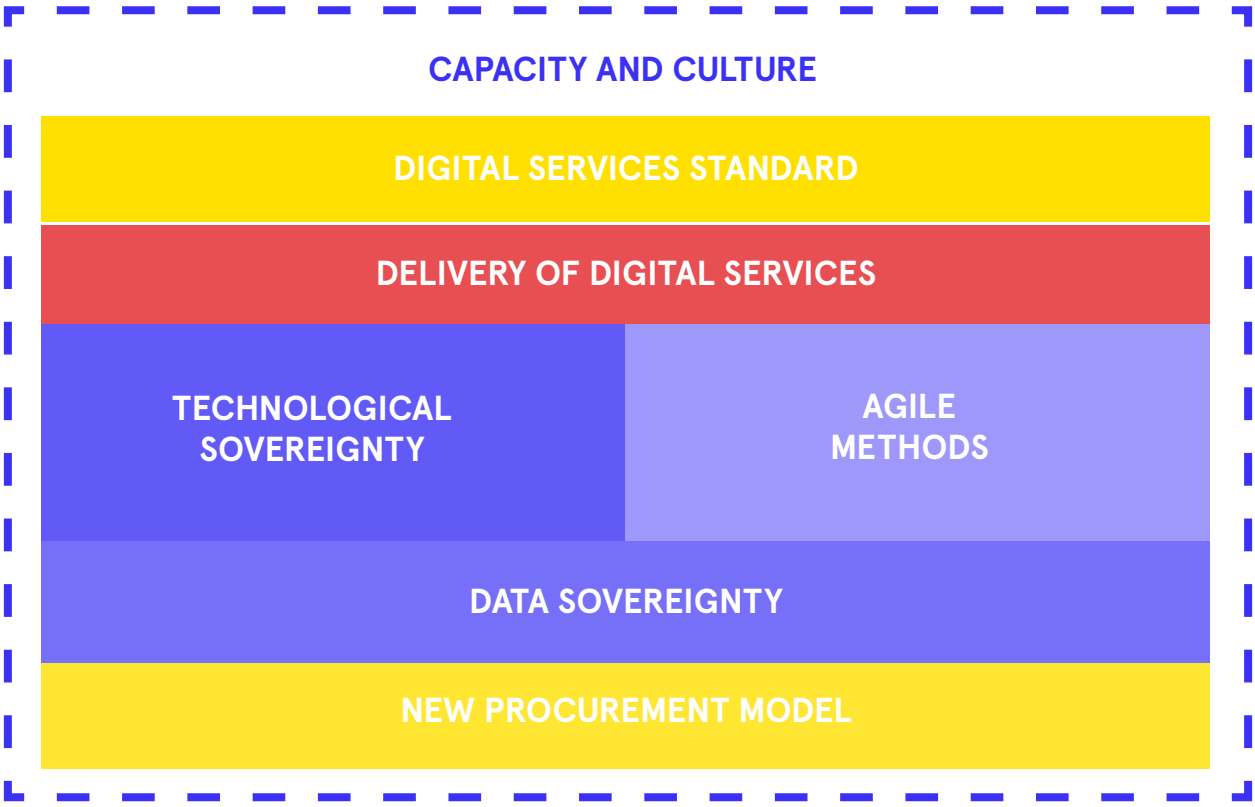


FIGURE 2

6.1. Agile and user-centred digital services

We need to change the way we design and build new public services, by considering them as digital from the outset, in other words, "digital first". They need to be designed by putting the citizen at the centre and built in an agile and gradual way to reduce waiting times for their launches. Municipal workers who are responsible for the service, as well as citizens, have to play an active role in the design, construction and maintenance of these services. This process of change, inspired by the examples of Anglo-American administrations, will provide new public services that are better adapted to the real needs of citizens, while reducing development time.

Agile digital services form the starting point for achieving the objectives of this digitisation programme. These services allow citizens, businesses and organisations to interact with the city government in an easier, faster and more economical way. These simple, fast and interactive services will be available at all times and anywhere and which will have been designed to satisfy the needs of citizens and municipal workers. We will develop services considered digital from the outset and easily adaptable to new needs.

Please consult the Digital Services Standard (Annex 12.1) as the reference document on this topic.

6.2. Agile Methodologies

Agile methodologies will provide the tools needed for designing, building and delivering digital services to citizens and municipal workers in a flexible and efficient way.

The introduction of an agile working framework will require:

- The creation of multi-disciplinary teams
- An global overview of the entire service life-cycle
- The gradual introduction of agile methodologies
- The involvement of the whole organisation
- Carrying out of pilot projects
- Continuous improvement based on contributions from all the parties.

Starting from these action lines, as listed in point 07, we will be able to:

- Put more focus on the end-user and empower users in the decision-making process.
- Shorten development time and simultaneously improve technical quality.
- Increase the frequency of improvements and implement continuous improvements. Deliver more frequently and reliably, to advance the return on investment, and standardise continuous improvement based on short monitoring and adaptation cycles.
- Put the focus on collaboration and transparency.
- Increase the orientation towards value by keeping control of developments, being more flexible and delivering more value to end-users.

The total budget for the flagship projects in this area is 7 million euros. The timetable for these projects runs from the middle of the second quarter of 2017, up to the end of the second quarter of 2019.

These projects are:

- Municipal Management Dashboard.
- Citizen Help and Information Portal.
- Mobile Municipal Services.
- Decidim.Barcelona.
- Information system for social rights.
- ASIA.
- Municipal Sports Institution's Information System.
- E-Government.

The reference document for this topic is the Barcelona City Council's Guide to Agile Methodologies (see Annexe 12.3).

6.3. Technological sovereignty and Open Technologies

Barcelona requires technological sovereignty, and is decisively tackling the transition to free software and open standards for this purpose. The best practices in this area are being studied and a migration plan will be designed and a code of best practices on open technologies established to guide internal transformation and promote third-party reuse and sharing of software and the development and/or use of shared government solutions. The transition to open source software and open standards is aimed at reinforcing technological sovereignty (see Annex 12.5).

Systems based on free software and open standards offer multiple benefits:

- **Transparency:** the source code can be examined and audited by anyone who has sufficient technical knowledge, without the explicit permission of the developer or the City Council. Without this property it is difficult to rely on the neutrality and security of an increasing number of governmental and administrative processes that are implemented through software, such as voting processes.

- **Interoperability:** the use of open formats and standards allows different systems, possibly from different manufacturers, to work together without any legal and technical obstacles. This opens up possibilities for integration between different systems, for example to reuse data and improve processes. It also guarantees that citizens are not obliged to use technological solutions from specific providers to interact with the Administration.

- **Sovereignty:** transparency and interoperability greatly reduce dependence on commercial strategies of manufacturers. The user, in this case the City Council, can decide with greater freedom what systems to evolve, resize or replace, as well as establish its own policies regarding security, privacy, updates and access to systems. In the case of organizations, sovereignty also fosters control over their own processes and the generation and conservation of knowledge.

- **Flexibility:** systems can be better adapted to the needs of users and users, and can be adapted and extended as these needs evolve, without depending on any particular provider. Not only is development more flexible, also the evaluation of alternatives is easier and cheaper, and the conditions of operation and maintenance can be modified more easily.

- **Sustainability:** interoperability allows you to replace those parts of the systems that need to be renewed without the data being ever useless. Greater sovereignty also implies a lower risk of obsolescence of any part of the systems, including hardware. Collaboration (between people and entities) that promote free licenses can be a great help in making a system more stable and lasting.

• **Efficiency:** factors such as the cost savings associated with the payment of licenses, increased competition among suppliers, a lower risk of obsolescence, and the possibility of sharing costs with other users and entities, make free and standard-based open source software the best option to guarantee the efficiency that the law demands from the Administration. The huge base of existing combinable software allows us to reach solutions in many domains that are adapted to end users with a low use of resources.

• **Reliability and security:** the independence from commercial strategies makes users able to demand higher quality services and take advantage of all the corrections and improvements provided by a community of users and developers of each tool.

• **Innovation:** transparency, and a fortunate combination of collaboration and competition, make free software an enormously fertile ground for technological, social and process innovation. This production of knowledge directly benefits producers and users, and indirectly the whole society.

The main points we need to work on are:

• Implementing a migration plan and the gradual development of free software.

• Publishing and sharing Barcelona City Council's software and contents under free software and content licenses.

• Making changes to public procurement to boost the creation, use and reuse of free and open source software.

• Requiring the use of open standards for the city's technology, data and other information.

• Identifying development and/or migration opportunities to open architectures and systems in the short term.

The reference document for this topic is the Guide to Technological Sovereignty (see Annex 12.4).

6.4. Responsible Data Strategy

Data are becoming increasingly important for cities because they enable cities to devise better public policies to combat social disparities, promote development and improve the quality of life for citizens. The exponential growth of data and rapid evolution of technology promotes new service models to appear and causes profound changes in habits. This context requires ICT organisations to take a flexible but constant approach to adapt and to how they manage the data they handle.

A new stage has been entered, where data are of considerable importance in the municipal and city environment, and there is a clear need for defining and operating a new municipal government data model that acts with sovereignty and which is cross-cutting across the entire City Council. This involves organisational changes, as well as changes to functions and responsibilities, making it necessary to create a position with the City Council for a data manager or Chief Data Officer (CDO).

The main aspects to be examined further in this area are:

• New rules for data governance.

• Open architecture for data.

• From data to information, from information to city indicators.

• Ethical and responsible uses of data for innovation.

• Privacy and sovereignty.

The "Data Directive" for the City will be published with the next government measure on data management in Barcelona, where the policy for responsible and ethical data management will be established in a transversal way, with the municipal structure of data management, a Data Office and data managers, etc., and it will also include the processes and obligations for maximum compliance with the regulations for data protection and improving security.

6.5. Transformation of Public Procurement of ICTs

As a cross-cutting policy to help the above-mentioned objectives and topics to be achieved, the usual processes and practices in purchasing technology must be changed to adapt to the agile methodologies to be implemented, to the transition to free software and open standards and to the new data strategy.

The new method for procuring technology will be open, transparent and more agile. It will extend the range of providers that can access it, facilitating the procurement of solutions based on open source and open standards. In addition, it will consider the aspects of data ownership and privacy, while observing compliance with legal regulations on data protection, including assessment of the ethical risks implied in using data. As a result, we will have new procurement processes, technology acquisition guides and new digital services not just for potential providers but also for citizens and municipal procurement teams.

New approaches, rules and tools will be developed in order to have:

- Simpler procurement processes.
- Open procurement with more transparent processes.
- Guides for the procurement of solutions and services based on open technologies and the development of agile methodologies.
- A digital market platform to facilitate access for small and local suppliers.

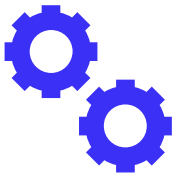
The reference documents for this topic include the Public Procurement of Technology Guide (see Annex 12.6) and the Innovative Public Procurement Guide (see Annex 12.7).

6.6. Capability, culture and management of organisational changes

This transformations will help train and develop existing teams, turning them into well-prepared internal teams with skills and capabilities to take full possession of the city's digital services, data and architectural and procurement decisions.

These skills and capabilities will be supported by a series of behaviours and practices (organisational culture) and an service oriented organisational structure, facilitating team collaboration with prompt support from external teams that can complement and enrich the knowledge of internal staff while opening up new professional opportunities.

Figure 3 below shows the more important results that have already been achieved in the aforementioned areas:



Technology Code of Practice
A set of criteria to help Barcelona select appropriate open technologies and define the commitments to open source software, open standards, interoperability, security and transparency.

Technology Buying Handbook
A set of guidelines to help Barcelona to select appropriate open technologies and technology services and thereby avoid vendor lock-in caused by proprietary solutions and closed architectures.

Data Strategy
An approach to handling the city's data with ownership, privacy, sovereignty and ethical use & innovation at the core. Defines a city-scale data architecture and infrastructure for Barcelona.

New Procurement Framework & Digital Marketplace
A new procurement instrument optimized for buying agile services from pre-evaluated suppliers. This will allow more efficient procurement cycles and reduce supplier risk.

Digital Service Delivery Standard
A set of criteria to help Barcelona create and run good & agile digital services. Services will be consistent and of high quality.

Capability Plan & Hiring
A proposal to develop and maintain the skill and capabilities required for delivering digital services and a staffing approach for securing new skills in the short term.

7 Lines of action

Lines of action have been established for each of the topics mentioned in the previous section which will be elaborated upon below, together with their associated actions.

7.1. Agile and user-centred digital services

The introduction of agile development methodologies is essential for the development of user-centred digital services.

The following actions were carried out during the first quarter of 2017:

4 workshops were organised (tools, agile management, skills acquisition, culture and organisation) with internal employees from the IMI, developers, service managers, sectoral managers and directors.

By implementing these methodologies, we will achieve the agreed lines of action:

- BCN will transform 209 new digital services following the Digital Service Standards and the Technology Code of Conduct (all the new services are listed in section 0.8).
- We will focus more on the end-user, giving them a leading role in decision-making.
- We will reduce development times and simultaneously improve technical quality.
- We will offer more public value while maintaining control of the developments.

Based on the lines of action identified, we will be able to:

- Transform the organisational culture, promoting collaboration and transparency, while being more flexible and delivering more public value.
- Implement continuous improvement by implementing practices in the organisation that require system-based processes to be improved.

7.2. Technological sovereignty and migration to free software

Technological sovereignty will be achieved through migration to free software, the deployment of open standards, changes in public procurement to promote open source software and the identification of migration opportunities to open architecture in the short term.

The lines of actions here are:

- Ensuring that 70% of investments in new software developments go towards open source software.
- Making 10 solutions developed by Barcelona City Council available to other municipalities and administrations.

• Incorporating open corporate workstations which function using open systems and programmes into the municipal systems.

During the first half of 2017, the following actions were carried out:

• Identify opportunities for development and / or migration to architectures and open systems in the short term.

• Preparation of a migration and development plan for free and open source code.

• Definition of guidelines for publishing and sharing software and content of the City Council under free software and content licenses.

• Introduce into public procurement processes the promotion of the creation, use and reuse of free and open source software.

• Introduce guidelines at corporate level for the use of open standards for technologies, data and other information in the city.

Based on the lines of action identified, we will achieve the following:

•An increase in technological sovereignty.

•Improvement of our image and positioning among society.

•Reduction in development costs (low).

•Reduction maintenance costs (effective).

•Reduction of technology evolution costs (notable when we introduce new functionalities developed by the community).

•Reduction in costs of migration to new solutions (important).

Flagships projects in this area, with a total budget of 21.5 million euros and a timetable ranging from the first quarter of 2017 until the end of the second quarter of 2019, are included in the Open Source Migration Plan (Annex 12.5).

• Migration of corporate e-mail to open technologies

• Adaptation of the Windows workstation (Windows 10) with a set of free software applications.

• Adoption of development tools for applications based on open technologies.

• Open workstation and desktop.

• Mobile ID / e-ID.

• New services developed in open source

7.3. Responsible and ethical data strategy

Data are of considerable importance in the municipal and city environment and there is a clear need to define and put into operation a new cross-cutting municipal government model for reinforcing sovereignty. Given its importance, the City Council will devote a government measure to express the data management policy and its implementation throughout all the units of the City Council. Here, we indicate the action lines and projects that will fall under the scope of this forthcoming measure, an essential element of the Digital Transformation Plan.

The lines of actions here are:

• **Designing and carrying out** initiatives to adapt to the new GDPR for processing personal data in Barcelona City Council.

• **Defining and implementing** new processes which allow privacy and security to be incorporated by default, in the design of new computer applications.

• **Establishing the level of proactive control** required by the new regulation.

• Defining the role of the municipal office of data analytics and the **Chief Data Officer.**

• Creating a **Chief Data Analytics Office**, bringing new capabilities for privacy related data improvement and analysis.

• Creating a **Data Challenges** programme to involve SMEs and companies in devising data-driven applications for solving the city's challenges.

We worked on the following initiatives during the first quarter of 2017:

• Establishing new rules for data governance.

• Defining the open architecture of data.
• Creating platforms for big data analysis for public policies and services.

• Creating a guide for ethical and responsible uses of data, guaranteeing privacy and sovereignty.

Based on the lines of action that have been identified, we will be able to:

• Improve effectiveness and efficiency.

• Democratise access to data.

• Create new and improved public services.

• Achieve greater democratic quality, respecting citizens' rights, data protection and access to informatoin.

• Generate Transparency and accountability.

• Regain citizens' trust.

The total budget for the flagship projects in this area is 2.3 million euros and their timetable runs from the first quarter of 2017 up to the middle of the first quarter of 2019.

• CityOS Services (pollution, mobility, tourism)

• Ecology dashboard.

• Barcelona Housing Observatory (OHB).

• DCODE: An EU wide project to develop a blockchain based architecture for data sovereignty.

7.4. New procurement model

Through achieving the main objective of the new procurement model, outlined in section 06.5, we can guarantee technological and data sovereignty, promote technological innovation and lever social and economic change.

The lines of action here are:

• **New Procurement Framework:** Conceptualising a new orientation in the procurement process.

• **ICT Procurement Guide:** A guide which gives an overview of the municipal strategy and facilitates the application of various measures.

• **Implementing the Innovative Procurement Guide:** A guide which orientates its readers towards considering innovation as a fundamental element which is inseparable from and boosts sustainable procurement.

• **Drafting standard procurement documents:** for standardisation and agility in procurement.

• **Creation of the Digital Marketplace:** A space for continuous dialogue and interaction between providers, citizens and the City Council.

• **Communication and dissemination:** Dissemination actions for the transformation process and municipal strategy over procurement. The following actions were carried out during the first quarter of 2017:

• Creating the guide for the procurement of technology and the guide for innovative procurement.

• The development of these standard procurement documentation.

• Work sessions with the ICT sector to fortify the measures linked to the procurement of technology

• Surveys to build a digital market platform (Marketplace).

The total budget for the flagship project in this area is 22 million euros. The timetable runs from the beginning of the second quarter of 2017 to the end of the first quarter of 2018.

• Digital Marketplace.

7.5. Culture and organisation of the change

For the transformation of the existing teams there is a plan to train internal staff, with workshops aimed at the organization, training and culture, agile management and learning new tools.

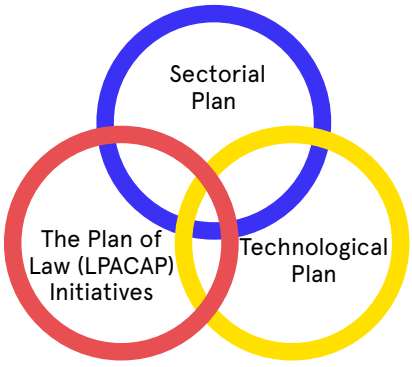
In parallel, in the first half of 2017, a process to cover 64 new positions for computer technicians (superior and middle level) has also begun, through 2 job boards. This process should last until the end of 2017 and the incorporation of people will take place during the first half of 2018.

We are also planning an organic restructuring that provides for the creation of 16 new departments, in accordance with differentiation criteria for sectoral areas by technical specialization, which will reinforce management, delegate responsibilities for middle management and the coordination of the different working groups.

To finish, the emblematic projects that have been pointed out in each one of the lines of action and that are detailed in the section 08, are part of the Mandate Plan that consists of 3 plans: Sectoral, Legal and Technological, as is set out in the following diagram (Figure 4).

We also show how progression has been made, and consumption of the 2017 budget.

The Mandate Plan is made up of:



	Initiatives pending startup	Initiatives in progress	Initiatives finalized	% Execution initiatives
Initiatives Sectorial Plan	53	105	10	64%
Initiatives The Plan of Law (LPACP)	3	5	0	62,4%
Initiatives Technological Plan	31	70	6	65,4%

The degree of execution of the 2017 budget for each plan up to June 2017 is as follows:

The Mandate Plan takes into account the needs of the Council and the programme for open digitisation and development of agile services.

8

Flagship projects within the course of action

The changes to be introduced as a result of the development of this open digitisation and development of agile services programme, are being carried out gradually through a series of projects outlined in the previous section, which is why we call them flagship projects.

These will be pioneer projects for the application of the new practices, whether they are agile development technologies or using open source software solutions, applying open standards or implementing the recommendations derived from the new data strategy.

This section presents all the flagship projects within this digitisation programme, with a brief description of each:

1. Municipal Management Dashboard. In addition to the development of a dashboard for the government team, a free application for citizens will also be developed that shows a summary of strategic indicators and provides data on the city council services with management indicators for their projects, progress made on accomplishing government commitments, citizens' ratings, etc. This service is an important step towards having more transparency in municipal management and public scrutiny.

2. Citizen Help and Information Portal. The procedures portal for citizens and companies in Barcelona will be renewed to simplify access and use and reduce the documentation required by the rules of administrative procedure. Citizens will notice a clear improvement in the usability of the portal's digital services and a simplification in the procedures.

3. Mobile Municipal Services. Reducing the number of web apps. This is about simplifying how the portal functions to improve usability. Obsolete applications will be removed, applications will be consolidated, new open source tools will be introduced and open data-use increased. A set of new web apps using adaptive design will be developed and made available to citizens.

4. Decidim Barcelona. Development of Stage 3 of the citizen participation platform which includes multi-consultation functions. This will improve the participatory services that the City Council has made available to citizens.

5. Information system for social rights. Part of the new information system from the Manager's Office for Social Rights will be developed using new methodologies. This will speed up the development of new digital services and the efficiency of related public services.

6. ASIA. A new calendar of events and facilities in the city. This is currently one of the digital services most used by citizens. Its performance and usability will be improved.

7. Barcelona Sports Institute's Information System. Some of the applications that make up the new information system of the Barcelona Sports Institute will be developed with the new agile methodologies. Citizens should notice an improvement in the services provided by this institute.

8. E-Government. A series of digital applications and services to adapt administrative procedures to the new legal framework. Some of these applications will be constructed with the new agile development methodology. The most tangible benefit of this will be the simplification of municipal procedures for citizens, who will appreciate a reduction in bureaucracy and an improvement in response times.

9. Corporate-email migration. The Microsoft Exchange email servers will be replaced with an open source alternative. Email clients will also be migrated by Microsoft Outlook will be kept in place (for 20% of users). The service's improvement will have an impact on the entire municipal organisation.

10. New workstation with free software. The project will replace the maximum number of proprietary applications currently used in the different work stations of the City Council for applications based on free and open source software, but without replacing the platform or Microsoft Windows operating system.

11. Adopting tools for the development of open technology based applications. The intention is to implement a framework that allows the development of open source applications and management tools for development in open source technologies.

12. Open desktop. Workstations that currently have proprietary applications and operating systems will gradually be migrated towards workstations with 100% open source products.

13. Mobile-ID Identifier/ e-ID. The mobile identifier currently has 18,000 users and is used more than 2,000 times each week. The service will be updated and new authentication mechanisms incorporated. The main beneficiaries of this service are citizens, who will have a tool to facilitate the use of the various digital services offered by the City Council.

14. Services developed in open source. Various applications used by the City Council will be developed internally and/or externally in free and open source code. These applications or services will be offered to the community so that any public administration can use them, so that any developer or ICT company can develop and add new features. Note that the City Council is already using open source applications such as the Open Data portal, the Internet of Things platform, Sentilo, the image bank (BIMA) and the Decidim.Barcelona participatory platform.

15. City OS Services. This is an advanced data-analytics platform with a consolidated view of city information, based on free and open source products. It will be offered to the community to detect problems, shorten response times and improve public services. The various management offices and service directorates will be able to use this data platform for carrying out more accurate analyses of information and thereby issue better public policies.

16. Ecology dashboard. A dashboard will be developed which integrates the areas of environment, urban planning, infrastructures, mobility and urban services to improve decision-making processes.

17. The Barcelona Housing Observatory (OHB). A repository of big data specialised in housing will be created that will allow data to be analysed and for public policies to be developed to combat the current housing issues.

18. DCODE. This is a European pilot project being developed in Barcelona and Amsterdam to manage data sovereignty in a shared economy. The technical solutions being developed in this project will work to improve services for citizens, making them more secure while further safeguarding data ownership and control.

19. Digital Marketplace. The creation of a digital marketplace to facilitate the access small businesses have to public procurement processes.

20. IRIS. Development of the new version of the multi-channel service for Incidents, Claims and Suggestions that manages the requests for services, notices, incidents and claims of citizens since 2003. This new version will be developed entirely in open source software and will be transferred to the community.

The schedule for execution of flagship projects related to the application of agile methodologies and the use of software and open standards is as follows.

Project	Pressupost	2017				2018				2019	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Municipal Management Dashboard	**€ 235K**										
Citizen Information and Help Portal	**€ 2,196K**										
Municipal Mobile Services	**€ 100K**										
Decidim.Barcelona	**€ 600K**										
Social rights information system	**€ 1,521K**										
ASIA	**€ 360K**										
Barcelona Institute of Sports' information system	**€ 270K**										
E-Government	**€ 1,755K**										
Corporate email migration to "open"	**€ 500K**										
New Windows workstation (10). Free stacking software	**€ 400K**										
Adopting tools for the development of applications based on open technologies	**€ 100K**										
Open desktop	**€ 484.5K**										
Mobile-ID Identifier/ e-ID	**€ 22K**										
Services developed in open source	**€ 20M**										
CityOS Services	**€ 1,132K**										
Ecology dashboard	**€ 375K**										
Barcelona Housing Observatory	**€ 421.7K**										
DCODE	**€ 400K**										
Marketplace conceptualisation	**€ 22K**										

FIGURE 5

9 Success metrics and results

The purpose behind success metrics is to provide tools for understanding whether the actions taken by the City Council have helped it to reach its goals and what changes need to be made to ensure these goals are achieved. A well-designed measurement responds to specific performance-related questions and allows decisions to be made to improve data-based services.

The digitisation programme's progress will be monitored through icon¬ic projects. Their degree of per¬formance (performance %) and the budget implemented will be measured. The progress of the programme's various action lines and the initiatives they entail will be measured by means of progress metrics and indicators specific to each initiative: proportion of contracts performed under fast methodologies, budget allocated to fast pro¬jects, budget aimed at freeware and open-code project, development and launch times for new services, quantity of defects detected in the developments, number of iterations, etc.

The knowledge level of the transformation process that is acquired from the vario¬us municipal areas will be measured. At the same time, the degree of satisfaction for each area will be assessed with the new digital services developed, through a periodic survey. The adaptation of the services to the nee-ds of the "business", the degree of their updating, their usability, accessibility, degree of innovation and response time will be measured in that same survey.

Another important metric that will be used for monitoring the programme's success will be the availability of digital public services. The following diagram (Figure 6), shows the results regarding the availability and provision of services for the first half of 2017.

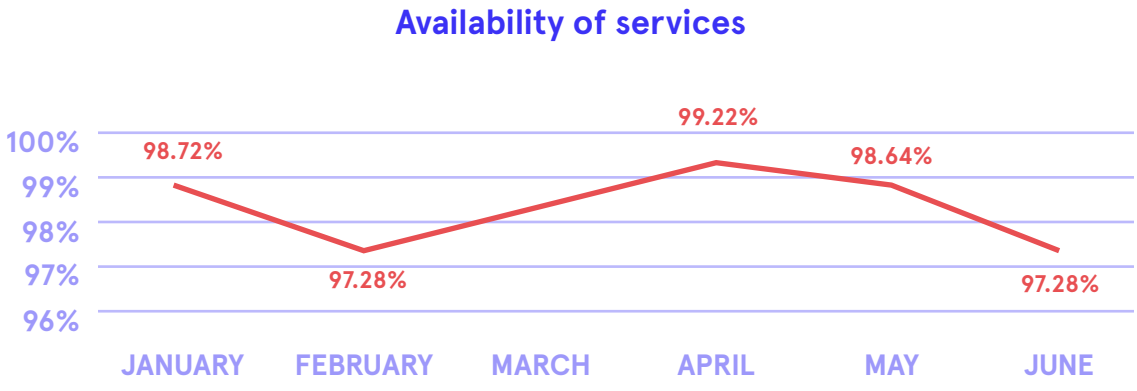


FIGURE 6: Service availability indicators

Finally, human resources is one of the main indicators that will be used for measuring the progress of this programme. The process that is being carried out in this area, as well as the planning, is depicted in the following image (Figure 7).

Under the Municipal Institute of Technology's Human Resources Plan for this curren term of office, the process for **filling** the following **IT vacancies** was started during the first six months of 2017:

	HR PLAN VACANCIES	OTHER VACANCIES	TOTAL VACANCIES
Senior IT Consultant	28	4	32
Intermediate Level IT Consultant	32	0	32
TOTAL VACANCIES	60	4	64

The Human Resources Department has begun a selection process for setting up two employment offices under the above-mentioned categories. The **planning** for the various initiatives to be followed is:

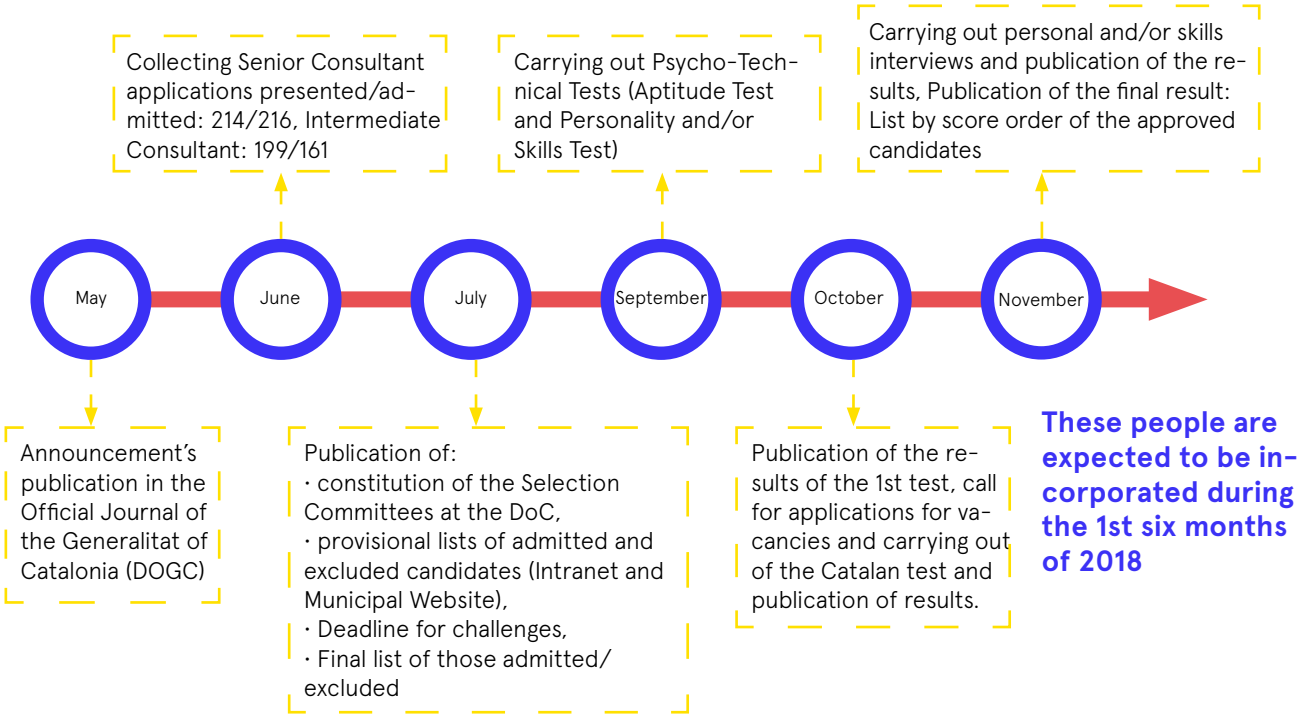
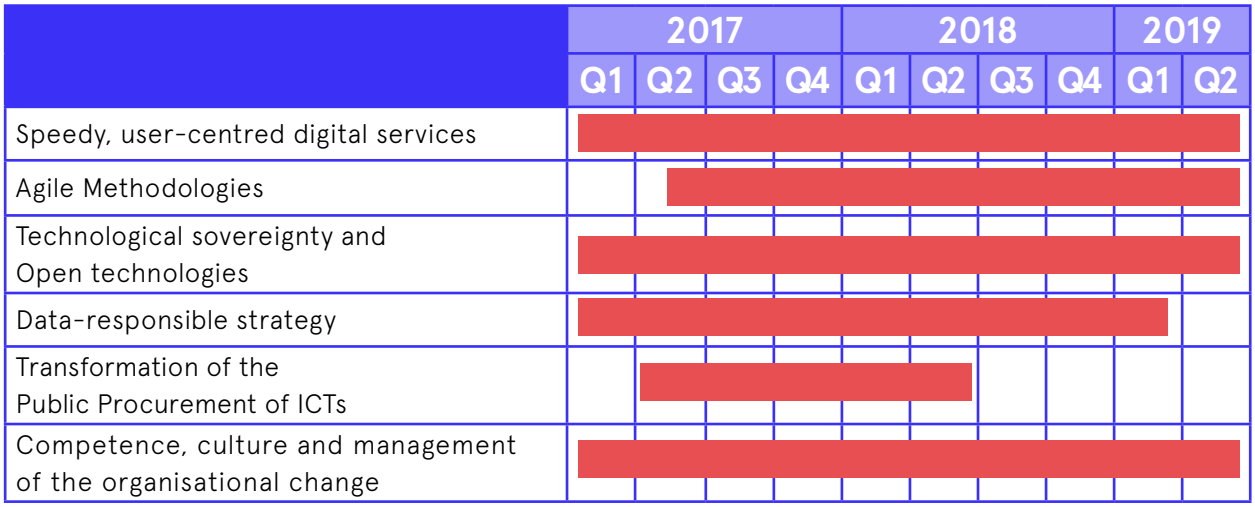


FIGURE 7: Human Resources Plan indicators

10

Implementation schedule



11 Budget

The Digital Transformation Plan of the Barcelona City Council currently has a budget of €72,000,000.

€ 31,750,000 of this plan is allocated to flagship projects that will be developed within the Program for Open Digitization: Free Software and Agile Development of Services. These projects will be developed with agile methodologies, will incorporate free and open source software or incorporate new practices in the use of data.

In addition, during the course of the mandate, an additional amount of € 1,500,000 will be allocated to the Program for Open Digitization: Free Software and Agile Development of Services for the governance of the transformation process, including the introduction of agile methodologies and the adoption of solutions based on free and open source software.

12 Annexes