Code of Technological Practices for Barcelona City Council

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

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Ajuntament de
Barcelona

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1 Aim and scope

1.1. Aim

This document constitutes the Code of Technological Practices which sets out the agile digital transformation strategy for Barcelona City Council, in a practical format and under the city's digital services standards issued in September 2017.

This Code consists mainly of a list of clear and direct principles and requirements, enabling a rapid understanding of the various elements of the digital transformation being carried out in Barcelona. It aims to enable those in charge of governance and management of digital service projects to ensure that they are in line with Barcelona City Council's strategy in this area.

The Code is designed to be a practical reference document and does not contain theoretical justifications for the policies proposed or references to examples, except in a few cases.

The specific guidelines are based on the best practices of various other countries and contexts. The United Kingdom, the United States, Sweden and the Netherlands, among many other places, have implemented innovative state-level policies on open technologies and agile developments.

1.2. Scope and application

This Code of Technological Practices applies to the management and governance of technology and innovation projects carried out within the agile digital transformation Plan, not only for the Municipal Institute of Information Technology (IMI) but also for other entities and departments that are accountable to Barcelona City Council. It also covers the design and construction of all the City Council's digital services, understood as services for the management and delivery of information through digital platforms and devices.

It is aimed at all the leaders and managers of the municipal group's business units, programme administrators and staff involved in putting this strategy into action. Those in charge of each management office are ul-

timately responsible for ensuring that the strategy guidelines and this Code are implemented. These principles and guidelines will be put into operation through performance of the City Council's agile digital transformation projects, which are largely managed by the IMI. These projects will enable resources to be dedicated, infrastructures to be created and skills to be acquire for carrying out these transformations. So changes involved in the application of these practices within the City Council will be managed in an iterative way through specific projects. Some of the projects and their extensions (e.g. Decidim. Barcelona, Sentilo, BIMA) already comply in good measure with the guidelines outlined here, while others will gradually do so in a more progressive manner.

1.3. Structure

The document is divided up into a set of general principles, backed by the guidelines that correspond to the three main cornerstones of Barcelona City Council's agile digital transformation strategy.

· The development of agile digital services

· Technological sovereignty, based on the use of open standards and free and open source software

· The ethical and secure management of data and open data policies

This document complements but does not replace any of the organisation's policies or regulations, municipal or otherwise.

This Code of Technological Practices is accompanied by two supporting documents to promote the Agile Digital Transformation Plan: The Agile Methodologies Guide and the Technological Sovereignty Guide. In addition, the Plan is being implemented through the City Council's Procurement Guides, particularly the Technology Procurement Guide and the Innovative Procurement Guide. As for responsible and ethical data management, a key element of the Agile Digital Transformation Plan (particularly the Open Data strategy and the Data Commons, Data Driven projects and interoperability based on open data formats), the corresponding guidelines and their implementation will be developed in a new Government Measure on the Strategy for Responsible and Ethical Data Management at Barcelona City Council, which will specify the required technical details, processes and responsibilities.

2 Principals for designing and developing digital services

The following general principles and guidelines form the basis of Barcelona City Council's agile digital transformation Strategy and the digital services standards, in terms of their design, development and maintenance.

1. COMPLIANCE WITH THE DIGITAL SERVICES STANDARDS AND RESPONSIBLE DATA MANAGEMENT

Every new digital service must follow the City Council's Digital Services Standards and the Responsible Data Management Strategy.

2. AIMED AT CITIZENS

Barcelona City Council's digital services are focused on covering users' needs. All systems and services are ultimately at the service of the citizens and have to bring utility and added value to their experience.

3. CLARITY IN OBJECTIVES AND RESOURCES

Projects have to show clarity in the objectives they aim to achieve, in the impact of these objectives and in how they are integrated into the City Council's strategic plans. It is not sufficient for a project to be consistent internally and well developed; it must explain how the digital service will meet the specific needs of the City Council and the citizens.

Projects must specify the technical and organisational resources needed for their performance and how these will be provided for. It is not necessary for all the details to be defined in the projects' initial stages; however, large projects must not be approved either, without a sufficient analysis of these aspects.

4. OPTIONS ANALYSIS

Every new service must begin with a strategic analysis of the options, to determine whether it has to be built within the municipal organisation, by external providers or by a mixed team involving both. Similarly, it must establish the development method to be used (by default, Agile), as will whether free software will be created, used or reused. Part of this process requires looking at the implications in choosing technologies and methodologies as regards the management and training of the City Council's internal and external staff.

5. PRINCIPLE OF SIMPLICITY

The services to be developed will be designed by applying the principles of clarity and simplicity in their use and architecture. The aim will be to unify the various versions of applications used within the organisation and to avoid the proliferation of different versions. Transversal solutions to be used across the organisation will prevail over vertical (sectoral) solutions.

Whenever possible, new services will minimise the number of modifications made to "standard" software packages (both proprietary and open source code), to make them easier to deploy and use, to maintain the advantages in terms of cost and speed that standard solutions may have as opposed to custom developments and to avoid problems in updating or replacing them. Any modification or extension will undergo strict technical controls of its budgetary implications beyond those of the project itself (over time and across the organisation).

6.
AGILE DEVELOPMENT METHODOLOGIES AND CONTINUOUS INNOVATION

All of the IMI's technological projects will by default use Agile development methodologies, centred on users, , putting the focus on continuous innovation in accordance with the principles of the Agile Manifesto. Projects will be developed using iterative and incremental processes, testing hypotheses and creating prototypes, and using analytical and experimental methods. Projects will use the City Council's Agile methodology, Scrum@IMI.

7.
REUSING AND PROVIDING SHARED COMPONENTS AND SERVICES

Projects will reuse existing shared digital components and services wherever possible and, where these do not exist or can be improved, contribute to their creation or development, before considering creating parallel alternatives. This permits costs to be reduced and brings consistency to the users' experience and to service maintenance.

8.
INTEGRATED AND COMPREHENSIVE SERVICES

New digital services must demonstrate how the components and technology needed to provide them will be vertically integrated. Systems must be designed taking into account all aspects from user experience to the implications for the system's architecture and its maintenance. This will require collaboration between teams in various departments and specialities.

9.
MAINTENANCE AND DOCUMENTATION

Services will follow the corporate classification of information (Service Catalogue) and operate following ITIL best practices. New digital services must maintain high quality documentation, including guides and manuals made available to the public so that they can be accessible to all stakeholders, both internal and external (such as providers), so that they may contribute to the documentation process. Documents will be kept in a centralised platform in standard formats, with version and authoring control.

10.
NEW SERVICE ARCHITECTURE

Whenever possible, the City Council's new digital services will avoid traditional client-server architectures, giving preference to web solutions that comply with W3C standards, as these offer more flexibility, interoperability and independence over the machinery and operating systems they run on. Every new project must contribute to the phasing out of obsolete services, to reduce the number of services and technologies in use. Where appropriate, development projects for the services will useapplication programming interfaces (APIs) which will be correctly documented.

11.
ACCESSIBILITY AND DUAL LANGUAGE

Digital services will be conceived from their initial stage in both Catalan and Spanish and will be accessible for all users, both internal users and citizens, in accordance with the linguistic and accessibility style guides in force at any time for the City Council's services.

12.
SECURITY

Services and projects will be designed taking security into account from their initial conceptualisation. Services must follow the corporate security Policy and standards based on standard ISO27002 and the national security Framework.

13.
PROCUREMENT

The acquisition and procurement of technological services will apply Barcelona City Council's procurement guides, namely, the Social Public Procurement Guide and the Environmental Public Procurement Guide from the Mayoral Decree on sustainable public procurement (S1/D/2017-1271 of 24 April), and the Guides on Technology Procurement and Innovative Procurement. New services will be procured as a matter of priority under procurement-framework agreements.

To support the principle of technological sovereignty of the city, services must avoid dependency on a sole provider; this is also a key factor in increasing the capacity for innovation in public services. Systems integration must be carried out by a supplier that is different from the manufacturers of these systems. Whenever possible, the procurement of digital services will increase the diversity of providers and limit the budget volume of contracts.

Compliance with the legal framework and competition regulations will help to promote procurement with SMEs in the city and its area of influence, though where necessary, the city will work with specialist companies from Spain and other countries within the EU.

14.
TECHNOLOGICAL SOVEREIGNTY AND FREE AND OPEN SOURCE SOFTWARE

Projects must promote technological sovereignty, based on the principles that guide Barcelona's Municipal Institute of Information Technology with regard to technology and innovation: interoperability, agility, reuse and ethics, as well as open knowledge and technology. The IMI will incorporate free software and open technologies and standards into its technological services and processes, integrated throughout the architecture of its systems.

15.
CIVIC SOVEREIGNTY OF DATA

Citizens and the common good must be at the heart of all technological plans and platforms within the Barcelona municipality that collect, create or manage data and other information. Citizens must be able to control their data, the digital divide must be minimised and discriminatory or unethical practices towards the data prevented.

16.
DATA ACCESS AND REUSE, INNOVATION

Municipal institutions must be open, transparent and responsible towards the public. Municipal information and documents must be accessible, usable and analysable, so as to promote entrepreneurship, social and digital innovation, employment and excellence in scientific research, as well as improving the lives of Barcelona's residents and contributing significantly to the city's stability and prosperity.

3 Guidelines for designing and implementing digital services

The following guidelines, divided into three areas, must be followed when designing and implementing digital services:

1. *Agile* Methodologies
2. Technologicalsovereignty
3. Responsibledatamanagement and open data

It is the responsibility of both the IMI and the business units that make up the City Council to follow these guidelines in projects implemented by and for Barcelona City Council.

3.1. *Agile* Projects

To meet the objective of implementing Agile Methodologies in projects carried out by the City Council's entities, the following principles and guidelines shall apply:

1.
MULTI-DISCIPLINARY COLLABORATION
Multidisciplinary teams will be set up that include the various roles and specialities needed to develop the applications, services and processes. Only one or two people will be directly in charge, although the team's success will be shared by each of its members equally.

2.
SELF-MANAGED TEAMS
Teams that are organised independently and flexibly can create new approaches and adapt to new challenges in their environment. As a consequence, roles and responsibilities within the teams will have a certain level of flexibility and fluidity according to the experience, skills and knowledge of the team's members, as well as the needs of the projects.

3.
COMMUNICATION

A communication plan has to be devised, taking into consideration the need for transparency and the responsibilities of the various parties involved. Key players of the municipal services and processes must be identified, as well as the main players involved on the technical side. These will receive the communications that must be carried out as frequently as appropriate for the objectives and needs of the projects. Face-to-face dialogue will take priority over other means of communication.

4.
TRANSPARENCY

The status of the project, priorities, risks, problems, tasks, landmarks, user-stories, contributions and possible "barriers" must be shared in an open and transparent manner with the key players, so that the challenges may be tackled quickly. This can be done using direct communication or tools adapted to Agile methodology.

5.
CONTINUOUS IMPROVEMENT

Collaborative work practices will be established to promote a culture of learning and continuous improvement, both in the services provided as well as the capabilities of the teams' members.

6.
RAPID FEEDBACK

Teams will do their utmost to make iterations as short as possible. Team practices will be implemented in such a way as to facilitate rapid feedback, and incorporate this feedback into the project backlog.

7.
ACCEPTANCE TO CHANGE

It is understood that plans and projects evolve and change throughout the provision of the service. Analysis and planning practices will be established to take this into account.

8.
ITERITIVE APROACH

Analysis, design, planning and development activities will adopt an iterative approach in short cycles to enable prompt feedback and changes to priorities according to needs.

9.
RAPID AND FREQUENT DEPLOYMENT

Emphasis must be placed on providing value for end-users as quickly as possible, reducing the time it takes to put applications into production and receiving feedback from users in the shortest time frame. Priority will be given to the minimum viable product that meets users' priority needs, while the other functionalities will be deployed in subsequent deliveries.

10.
CENTRED ON OFFERING VALUE TO THE USER

Users' needs must be put first, in priority to any other need, including those of the key players. Where there is a conflict of needs among the groups, we must ensure there are clear priorities. Diversity within teams will be promoted to foster inclusive designs.

11.
QUALITY

Quality does not just refer to technical quality but also to quality of service. Quality must be present at every step in the process and everybody in the team has a responsibility to guarantee that the service is of a high standard.

12.
MEASURINGPROGRESS

Delivering viable software is the main measure of progress. Other measures also need to be applied that reflect the value provided to users and the municipal services to ensure that they meet real needs and give real value to citizens.

3.2. Technological sovereignty

To meet the objective of technological sovereignty set out in the Agile Digital Transformation Strategy and the Digital Service Standards, in particular to prevent dependency on suppliers (vendor lock-in), the following guidelines, which expand on the principles governing the IMI in technology and innovation (interoperability, agility, ethics and opening knowledge and technologies, both software and data related), are as follows.

INTEROPERABILITY, OPEN FORMATS AND STANDARDS

1.
INTEROPERABILITY
All Barcelona City Council's digital services will support interoperability based on the use of open standards and formats.

2.
USING OPEN STANDARDS
The City Council's digital services will use open standards on a mandatory basis, and in particular those set out in the catalogue of standards from the Technical Interoperability Standard (as implemented under Royal Decree 4/2010) or the internationally accepted open standards that update, replace or complement these standards. Where there is no approved open standard for a required format, a format that is intended to be used will be proposed, in accordance with the provisions of the applicable regulations and the IMI's requirements for open standards (as defined in the Guide to Technological Sovereignty that accompanies this Code).

3.
IDENTIFYING FORMATS AND STANDARDS
The IMI will maintain public lists of technical formats and standards in use, classed as mandatory, priority or recommended.

4.
CHOOSING STANDARDS
The choice of standards will follow an open and transparent process based on users' needs, flexibility, promotion of free competition and free collaboration and any implications for future interoperability. This process must be formally approved. The areas that have their own legal framework will comply with the specific standards applicable in that area (e.g. Geodata).

GENERAL GUIDELINES ON FREE SOFTWARE

5.
ACQUISITION AND PRIORITY USE OF FREE SOFTWARE
Preference will be given to the public procurement and acquisition of tools and systems that use free software, for all the technical architecture of the applications and services that are delivered, avoiding dependency on systems that are not free. The use of non-free solutions will be only be allowed in exceptional circumstances, which will be reviewed on a case-by-case basis, in accordance with criteria established in the Technology Procurement Guide.

6.
FREEING SOFTWARE AND DOCUMENTATION
Both internal and external projects for the development of digital services will be developed from the outset with a view to their freeing, in line with the best practices of free software development, and based by default on open technologies that allow the final product to be released in accordance with the City Council's policy and the applicable regulations. Documentation, design and other elements (sounds, typographies, etc.) will also be made available to third parties under open content licences.

7.
FOSTERING REUSE

Software acquisition will provide incentives for reusing existing solutions. Development projects in which the City Council participates will attempt, on top of being released under free software licences, to offer technical and organisational facilities for their reuse by third parties. Where software owned by the City Council and its associated entities cannot be released under a free software licence (for technical or legal reasons), it will be made available to other administrations without the need for any valuable consideration or agreement, in accordance with applicable regulations.

8.
SHARING PROJECTS

Where appropriate, the possibility of collaborating with other public authorities and entities in the development of technological projects of interest will be studied, with a view to sharing costs and encouraging interoperability.

PROJECTS

9.
PREPARATION AND PRELIMINARY PROJECTS

The preparation stage of contracts must show that an exhaustiv search has been made into already existing and reusable possible solutions, both nationally and in international public repositories.

10.
TECHNICAL AND FUNCTIONAL SPECIFICATIONS

Proposed projects must not include any specification that prevents solutions with open technology from being proposed, nor must they mention specific products or suppliers unless they are compatible with existing technologies, in accordance with the Guide to Technological Sovereignty. Architecture and interoperability requirements, and right and ability to modify and reuse the software of digital systems and services, will be regarded as technical features and specifications.

11.
CALCULATION OF COSTS

Every decision on technology acquisitions will take into account the total cost of the system over the long-term useful life of the service (TCO, Total Cost of Ownership), including hidden costs (for example, exit costs to replace a technology in the future when formats or interfaces based on open standards are not used) as well as the net social benefits.

12.
PROCUREMENT OF PROJECTS AND SERVICES

Contracts for new projects or extensions of existing projects will use standard clauses based on these principles, even in preliminary projects where a pre-selection of technologies is made, as well as in framework agreements and contracting in lots. These clauses will require the use of solutions based on free technology, except in exceptional circumstances as provided for in the Technology Procurement Guide.

13.
BEST DEVELOPMENT PRACTICES

The development of digital infrastructures and services will follow best practices in development methodologies for free and open source software, employing by default the IMI's Agile methodology.

14.
CODE MAINTENANCE AND DOCUMENTATION

During the lifetime of the contract, providers of ICT development services will collaborate with the IMI to keep the code available at all times in appropriate version-control systems. Similarly, every system and service must be properly documented and include the necessary instructions for the installation, deployment and configuration of services in free and open environments.

OPENNESS, COMMUNITY AND CONTRIBUTIONS

15.
COLLABORATION WITH FREE COMMUNITIES AND OTHER ENTITIES

Proposed projects will study the possibility of collaborating with the technology and free software communities, especially with local communities. Collaboration with other interested entities and institutions will also be encouraged, to promote social innovation and local technological products and skills.

16.
SUSTAINABILITY AND GOVERNANCE

Projects that produce free systems and tools through a development service promoted and funded by the City Council must include a sustainability and governance model. This model will include an approximate definition of the community, support tools, communication and marketing activities, processes for external contributions, the management of intellectual property and the sustainability of the software beyond the project itself for the City Council.

17.
EXTERNAL CONTRIBUTIONS

External players will be encouraged to make contributions to projects led or freed by the City Council. Specific rules adapted to each case will be established for the management of rights over contributions, with the objective of guaranteeing compliance with third-party rights and applicable law.

18.
RETURN TO THE COMMUNITY (UPSTREAMING) AND COMPATIBILITY TOWARDS THE FUTURE (FORWARD COMPATIBILITY)

Where projects developed by City Council staff and/or providers improve or transform an existing free software product, such improvements and any corrections will be contributed, as far as possible, to the original project (upstreaming). Similarly, projects will ensure forward compatibility, as much as possible, so that software adapted for Barcelona City Council will reduce to the maximum the number of potential problems for updating and maintenance.

LEGAL ASPECTS

19.
INTELLECTUAL PROPRETY IN MUNICIPAL SOFTWARE

City Council projects will establish a legal framework for clearly determining and managing intellectual property rights over software developments. Depending on each case, agreements will establish an ownership model, including options for assigning rights to the City Council or the IMI, leaving them in the hands of the provider, or assigning them to the entities that manage the relevant code for the project, as long as those relating to free projects are are available under a free software licence.

20.
LEGAL MANAGEMENT OF SOFTWARE-DEVELOPMENT PROECTS

Projects must establish processes and documents for managing the legal aspects relating to intellectual property and software licences (in particular, in relation to contributions, licences over components used in development and other dependencies of the software), and in doing so, use best practices and standard or widespread-use tools in the sector, to guarantee the traceability and integrity of the code.

21.
LICENCES FOR FREEING SOFTWARE

Software produced within the framework of the City Council's digital services projects, including software resulting from procurement agreements, will be made publicly available under a free and open source software licence that complies with applicable regulations. The City Council will establish the criteria and requirements to determine the type of licence to use for each project.

22.
TRADEMARKS

Where a trademark is registered to identify a software project freed by the City Council, a public-use policy will be established to allow members of the community of users and developers to use the mark within the framework of the community's activities.

3.3. Responsible and ethical data management

To meet the objective of responsible and ethical data management, within the framework of the Digital Service Standards, the following guidelines under this Code of Technological Practices shall apply:

SCOPE

1.
SCOPE
This Code of Practice covers the entire set of all municipal data. Municipal data can be divided, for conceptual purposes, into three large groups: a) **Management data**: these are the datasets that the various municipal management offices and entities use for carrying out their work. B) **Open data**: These are the datasets that the municipal corporation makes available to the public in raw format. C) **Official statistics**: These are the statistics obtained by the City Council on various datasets, and which are considered Official Statistics. Only the first set (management data) can include **personal data**.

2.
REPOSITORIES
The City Council has various repositories available for each type of dataset. Their definition and management will be linked to the set of technological requirements set out in this Code, as well as data-protection legislation. There is a transversal comprehensive data repository, within the City OS, which constitutes a single analytical repository of municipal data. The City OS will be able to include an analytical dashboard of any of the management datasets.

DATA MANAGEMENT

3.
MANAGEMENT BASED ON EVIDENCE
Municipal services will be managed on the basis of data-based evidence. The datasets currently available to the City Council (the Data Lake) will be managed in a more efficient and transversal way so that they can return much greater value to citizens, and allow more complex analyses developed by Data Science.

4.
PLANNING
In order to support the management needs and mission of Barcelona City Council, each business unit will develop and maintain its own Data Management Plan (PMD) to define the objectives of its own information technology resources. The objectives must be specific, measurable and verifiable so that their progress can be monitored.

5.
INVENTORY AND ACTIVITY RECORDS
Business units will keep an inventory of the principal information systems, their containers and dissemination tools, with a level of detail appropriate for their supervision and management. In addition, each business unit will keep a record of all the actions taken in both management and analytical databases The Office of the Municipal Data Director (DMD or CDO) will determine the meta-information of these systems.

6.
DATA MANAGEMENT
Business units will have to continuously enable the adoption of new technologies and evaluate the entire life-cycle of each information system. Entities will have to incorporate the following steps, where appropriate, in the planning, budget definition and management:

• Municipal data will be ethically managed during their entire life-cycle (creation, collection, storage, use-analysis, dissemination, archiving and destruction).

• Municipal information is managed by enabling its access, consultation and use by the public on the basis of legal provisions in force.

• Activities carried out on the data will be recorded within an extensive set of meta-information.

• Risks to privacy and security will be identified throughout the life-cycle of the data, performing risk analyses and developing security solutions.

• Data management will involve a clear allocation of roles and responsibilities to promote the efficient design and operation of all the management processes.

7.
ARCHITECTURE

Business units will develop an architectural description (AD) that depicts the architecture that is available, the target architecture and the plan to achieve the latter. The AD for each unit must be in line with the PMD. The AD must identify which roles may have access to systems and which profiles have access to particular information, and under which circumstances.

8.
OPENNESS AND INTEROPERABILITY OF DATA AND FORMATS

Business units will promote the opening up of municipal data (Open Data) and interoperability based on open formats, subject to existing technical and legal requirements, to increase the public's access to municipal information and make operations more efficient, reduce costs and improve services for citizens.

9.
RISK MANAGEMENT

Business units must apply and document appropriate safety measures for designated information and data, records management, transparency, impact assessment and supply chains, and do so during the entire data cycle so that the risks are assessed and managed.

10.
RESILIENCE PLAN

Each unit will develop a Resilience Plan. The Resilience Plan is crucial so that services can continue to operate and carry out tasks during disruptions.

11.
PRIVACY AND THE PROTECTION OF PERSONAL DATA

Municipal units will only be able to create, collect, use, store or disseminate personal data when they have the required authorisation. Business units must establish and maintain a data protection programme which ensures compliance with applicable regulations (in particular, Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016) and other privacy requirements, which assesses and manages privacy risks.

12.
PRIVACY BY DESIGN AND PETS

Measures must be taken to incorporate when necessary privacy by design strategies and/or privacy enhancing technologies (PETs), through which the privacy of data subjects is taken into account during all the processes for designing, developing and managing the City Council's information systems. When applicable, encryption algorithms, data anonymization or pseudonymisation must be employed.

13.
IMPACT ASSESSMENTS

Business units will carry out privacy impact assessments aimed preventively at ensuring that, where data processing my involve especially serious risks, the necessary measures are taken to reduce, as far as possible, the risk of damaging or prejudicing people or of negatively affecting their rights and freedoms, blocking or restricting their exercise or content.

14.
DATA SECURITY

The physical security of the data will be determined by the standards defined by the IMI. In any event, any third party in charge of data processing must offer sufficient guarantees regarding the implementation and maintenance of required security measures, and the other guidelines defined in this Code and the future Data Strategy of Barcelona City Council.

ROLES AND GOVERNANCE

15.
ROLES AND RESPONSIBILITIES

The municipal organisation will adapt the roles and responsibilities of managers and business units for the purposes of observing the requirements of this Code. A Municipal

Data Manager will be appointed to head the Municipal Data Analytics Office, and each unit will have an officer responsible for data who will carry out this role for each of the bodies in charge of data. Pursuant to Regulation (EU) 2106/679, the City Council will appoint a corporate Data Protection Officer with the functions assigned by this regulation.

16.
CORPORATE MANAGEMENT – GOVERNANCE

The management offices and bodies will comply with the regulations and instructions regarding the management of data, information and municipal documents that are passed by the executive bodies, which will be developed on the basis of the Responsible Data Management Strategy led by the Commissioner for Technology and Digital Innovation.

17.
DATA DIRECTIVE

The Municipal Data Strategy that will be developed under this Code and the corresponding Government Measure on the Barcelona City Council Data Strategy, will establish the technical details for the development of municipal data management.

Annexe 1 Glossary

This glossary includes a list of the key concepts that are used in this Code of Technological Practices. The concepts have been defined illustratively but not exhaustively so that anyone with access to the content, regardless of their level of technical knowledge, can use the Code and understand it and thereby share the meaning of these concepts

PRELIMINARY PROJECTS OR CONSULTATIONS WITH THE MARKET

A set of actions aimed at maintaining a dialogue between contracting authorities and the market, prior to the start of the tender. The objective of these actions is to facilitate a greater understanding among providers' of the authority's needs, to study and assess the largest number of existing solutions in the market, and appropriately define the features of the tender.

These processes are recommendable where the services to be contracted are particularly complex (and therefore, the solution too) or require innovative solutions.

VENDOR LOCK-IN

In the field of ICTs, a situation where the provider of a given product or technological service is in a position of power over the buyer, given that once the product or service has been provided, the client lacks the capacity to change the product or provider due to the costs in time and money that the change entails, or for want of viable alternatives.

This situation may arise for several reasons, for example:
• Use of proprietary software only accessible to the provider and which only the provider can therefore guarantee to develop or maintain.

• A lack of technical skills on the part of the client or organisation, thereby preventing the service from being taken on with internal resources once it has been developed.

OPEN STANDARDS

An open standard is a standard that meets the following conditions:

a) It is public and available for use for free or at a cost that does not make it difficult to access.

b) Its use and application are not subject to payment for intellectual or industrial property rights.

(Art. 11 RD 4/2010)
As for standards that fall outside the catalogue legally established as "open", the IMI adopts the following definition:

• Open and Free Use. Any intellectual and industrial property rights whatsoever which are essential for implementing the standard, including "essential" patents, must be made

available to everyone irrevocably and for free (without royalties). Reversible agreements on royalties or variable-price formats are not acceptable as they can create problems in free and open-source software and innovation, and in principle, they will not be used unless they are justified in accordance with the Act. There must be clear authorisation for allowing the use of any intellectual or industrial property rights in free or open-source software projects. By the same token, the rights set out in the text of the standard must allow their reproduction and redistribution without any restrictions or need for signing an agreement.

• No discrimination. The standard does must not establish technical or legal clauses that limit its use by groups or for a specific purpose.

• Complete information. The available information is complete enough for multiple implementations of the standard, in the framework of commercial competition, so that they are interoperable. The components, interfaces, extensions and protocols must meet the same conditions outlined in the standard, to prevent applications or solutions that implement restricted versions of the standard from dominating the market in practice.

• Open collaboration. The standard is developed in a transparent process of consensus, open to the effective involvement of all interested parties. Management of the standard will preferably be the responsibility of a non-profit organisation. In no case will standards be accepted that are dominated by an organisation or group. standards that are actively maintained on an ongoing basis are preferred.

INTEROPERABILITY
The ability of information systems, and therefore the procedures they support, to share data and enable the exchange of information and knowledge between them (RD 4/2010).

• Organisational interoperability: the capacity of entities and the processes through which they carry out their activities to collaborate in order to achieve mutually agreed objectives relating to the services they provide.

• Semantic interoperability: the ability to interpret automatically information exchanged in a reusable way by applications that were not involved in its creation.

• Technical interoperability: connectivity between information technology systems and services, including aspects such as interfaces, interconnection, integration of data and services, presentation of information, accessibility and security and other aspects of a similar nature.

• Interoperability over time: the ability for elements corresponding to various technological waves to interact; mainly for information that is conserved in an electronic format.

Technical, semantic and organisational interoperability is highly regulated under legislation under Royal Decree 4/2010, of 8th January, regulating the National Interoperability Framework in the field of e-Government.

AGILE MANIFESTO
http://agilemanifesto.org/iso/en/manifesto.html
The manifesto on agile software development (2001).

We are uncovering better ways of developing software by doing it and helping others do it.

Through this work we have come to value:

• **Individuals and interactions** over processes and tools

• **Working software** over comprehensive documentation

• **Collaboration with clients** over contract negotiation.

• **Responding to change** over focusing on planning

In other words, even though the elements on the right are of value, we value those on the left even more.

AGILE METHODOLOGIES

A set of methodologies used in the field of software development and maintenance, based on iterative and short-term processes (typically lasting from one to four weeks). These processes result in the initial delivery of a partial but operational product, and the subsequent versions released have increasing functionalities.

It is through these continuous iterations that the methodologies seek to provide value as from the beginning of the project, as well as enable continuous development of the product. The aim is to introduce improvements and constant development of products until an excellent end result is achieved, meeting all user requirements.

This iterative strategy allows us to minimise risk, since each iteration is like a mini project and includes all the necessary stages: planning, requirements analysis, design, coding, user testing and documenting. Thus, any problems in execution, adaptation to requirements and the risks of the project surface sooner and corrective actions are less expensive and more immediate than in a traditional development project (in which they tend to emerge in the final phase of the project after months of evolution).

Likewise, agile methodologies place the focus on user satisfaction, since they require the user to participate actively in the project both during design and development (through the validation of partial deliveries). This ensures that the final product meets users' needs and is in line with their expectations.

OPEN DATA[1]

In the public-sector field , open data is understood as sets of data that are made available to the public and can be reused and re-published. The aim is to take full advantage of available public resources, making the information generated or held by public bodies available, enabling them to be accessed and reused for the benefit of any person or entity who may be interested in doing so.

This public information, with a high potential value, can be relative to any topic and of any type — images, documents, statistical data, results of studies or analyses, information on public services, etc., — and companies, researchers, other public institutions or citizens in general, may use the information resources for any purpose.

The aim is to maximise the economic and social possibilities offered by the data that are collected: promoting transparency in management, improving services to citizens, generating business activities and a positive social impact, as well as seeking efficiency in governance.

AGILE PRINCIPLES

http://agilemanifesto.org/iso/en/principles.html
The twelve principles derived from the Agile Manifesto are:

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.

2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.

4. Business people and developers must work together daily throughout the project.

5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.

6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

7. Working software is the primary measure of progress.

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[1] *Law 37/2007 on the reuse of public sector information*

8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

9. Continuous attention to technical excellence and good design enhances agility.

10. Simplicity--the art of maximizing the amountof work not done--is essential.

11. The best architectures, requirements, and designs emerge from self-organizing teams.

12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly .

FREE SOFTWARE

Free software is software that can be used, studied and modified without restrictions, and which can be copied and redistributed without restrictions, in a modified or unmodified version or with minimal restrictions to ensure that future recipients will also have these rights. It can generally be said that a program is free if it allows the four freedoms defined by the Free Software Foundation:

· The freedom to run the program as you wish, for whatever purpose (freedom 0).

· The freedom to study how the programme works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.

· The freedom to redistribute copies (freedom 2).

· The freedom to distribute copies of your modified versions to others (freedom 3). As with freedom 1, access to the source code is a precondition for this.
Free software must not be confused with freeware.

This Code uses the term free software as a synonym for open source software.

OPEN-SOURCE SOFTWARE

Open-source software refers to all software that can be used, modified and shared (with or without modifications) by any person, and published or distributed under an open licence, according to the "Open Source Definition" published by the Open Source Initiative (or OSI) and stated below.

The OSI is a non-profit organisation with extensive international recognition and reference that works to establish standards, training and promotes the benefits and importance of using open source. According to the OSI, a software may only be considered open source where it is published under a licence that meets ten conditions:

1. Free redistribution: the software must be given or sold freely.

2. Source code: must be included, published or freely obtainable.

3. Must allow modifications and derived works: the redistribution of modifications must be permitted.

4. Integrity of the author's source code: the licence may require that modifications be distributed only as "patch files", leaving the source code unchanged.

5. No discrimination against persons or groups: nobody can be excluded.

6. No discrimination against fields of endeavour: commercial users cannot be excluded.

7. Licence distribution: the same rights must apply to everyone who receives the program and the licence must remain intact when the software is distributed or modified.

8. Licences must not be specific to a product: the program may not obtain a licence solely as part of a wider distribution.

9. Licences must not restrict any other software: the licence may not compel other software that is distributed with open software to be open source as well.

10. Licences must be technology neutral: users must not be required to accept licences through a mouse click or other manner specific to the medium containing the software.

We therefore need to differentiate between products such as open source or free software, which give users the freedom to use and improve them, by providing access to their source codes and allowing their modification and free distribution, and products that simply provide access to the source code but which do not allow their modification or distribution.

Not all products that offer source code are necessarily open source or free, given that, despite their being transparent, they may not allow any modification or distribution.

Note that, for all legal and contractual intents and purposes, open source is the same as free software. Both movements may be distinguished for their policies, philosophy and ethics. This Guide uses the term open source software or code synonymously with free software.

INDUSTRIAL PROPERTY[2]
An exclusive set of rights that link a person or entity to an invention or other intangible creation (patents, trademarks or industrial designs), and which may be used by third parties.

Industrial property grants exclusive rights that allow the person holding them to decide who can use them and how they can be used.

These rights are granted under a procedure carried out by the competent office (in Spain's case, the Spanish Patent and Trademark Office) and protected throughout the entire territory that falls under the office's jurisdiction.

INTELLECTUAL PROPRETY[3]
Intellectual property rights are a set of personal and proprietary rights enjoyed by authors and other owners of works (in the case of the ICTs, developments and services) that result from their creation.

DATA SOVEREIGNTY
The capacity of a natural or legal person to self-manage and take decisions over data about him/her that are held by a third party and to make that third party responsible for the use of those data.

TECHNOLOGICAL SOVEREIGNTY
Technological sovereignty entails a high degree of decision-making and self-management by an organisation or entity (in this case, the City Council) over the technology it uses in a given field, as well as the ability to maintain and develop it in accordance with its principles and needs.

This approach contrasts with the classic dynamics of the supply of ICT services, which has been largely based on the use of licensed proprietary software. These dynamics have always favoured dependencies on technology providers.

FREEWARE
A type of software that is distributed for free but with a licence that prohibits other users from modifying or, in some cases, freely using the code. The user does not have access to the source code.

PROPRIETARY SOFTWARE
"Proprietary software" is software that is distributed under a licence that is not free or open and which does not allow other users to freely modify or adapt and redistribute it. Its source code is generally not available to third parties.

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2 *Patents and models. Law 24/2015, of 24th July, on Patents. Distinctive signs. Law 17/2001, of 7th December, on Trademarks. Industrial designs. Law 20/2003, of 7th July, on the Legal protection of industrial design. Topographies of semiconductors. Law 11/1988, of 3th May, on the Legal protection of topographies of semiconductor products.*
3 *Under the provisions set out in Royal Legislative Decree 1/1996, of 12 April, approving the consolidated text of the Intellectual Property Law.*

Annexe 2 References

The guides cited this Code have a detailed bibliography for each area (Barcelona City Council Guides on Agile Methodologies and Technological Sovereignty).

References:

European Union

• Communication COM (2013) 455 final: "*Against lock-in: building open ICT systems by making better use of standards in public procurement*". Available online at
http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=2327

• SWD (2013) 224 final: "*Guide for the procurement of standards-based ICT — Elements of Good Practice*". Available online at
http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=2326

• "*The Sharing and Reuse Framework for IT Solutions*", (2016). Available online at
https://joinup.ec.europa.eu/sites/default/files/sharing_and_reuse_of_it_solutions_framework_final.pdf

• "*Governance Models for Sharing and Re-use for Common IT Solutions,*" 2013. Available online at
https://joinup.ec.europa.eu/sites/default/files/b6/cc/cd/Governance%20Models%20for%20Sharing%20and%20Re-use.pdf

Spain

• Technical interoperability standard, in the PAE (e-Government Portal)
http://administracionelectronica.gob.es/pae_Home/pae_Estrategias/pae_Interoperabilidad_Inicio/pae_Normas_tecnicas_de_interoperabilidad.html

Barcelona City Council

• Document Management Policy
http://ajuntament.barcelona.cat/arxiumunicipal/sites/default/files/InstruccioPoliticaGD_cat.pdf

• Geoportalbcn,
http://www.bcn.cat/geoportal/es/estandards.html

Other documents

• Agile Manifesto: *http://agilemanifesto.org/iso/en/manifesto.html*
• Agile Principles: *http://agilemanifesto.org/iso/en/principles.html*
• Open Standards Requirement for Software, *https://opensource.org/osr*
• Definition of Free Software: *https://www.gnu.org/philosophy/free-sw.ca.html*
• Definition of Open Source: *https://opensource.org/osd*
• Paris Declaration of the Open Government Partnership, available online at
  https://paris-declaration.ogpsummit.org/