



BSI Standards Publication

Smart city framework – Guide to establishing strategies for smart cities and communities

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Foreword

This PAS was sponsored by the UK Department for Business, Innovation & Skills (BIS). Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 28 February 2014.

Acknowledgement is given to Chris Parker of CS Transform Limited, as the technical author, and the following organizations that were involved in the development of this PAS as members of the steering group:

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This PAS is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

The PAS process enables a guide to be rapidly developed in order to fulfil an immediate need in industry. A PAS can be considered for further development as a British Standard, or constitute part of the UK input into the development of a European or International Standard.

Relationship with other publications

This PAS draws on the approach developed by OASIS, the international standards consortium, in its *Transformational Government Framework* (TGF; a global open standard for IT-enabled change programmes in the public sector) [1]. Acknowledgement is given to OASIS for permission to build on the approach recommended in the TGF for the purposes of this PAS to fit the needs of UK smart cities.

This PAS is issued as part of a suite of BSI publications related to smart cities:

- PAS 180, *Smart cities – Vocabulary*, which defines terms for smart cities, including smart cities concepts across different infrastructure and systems elements and used across all service delivery channels;
- PAS 182, *Smart city concept model – Guide to establishing a model for data interoperability*, which will provide a framework that can normalize and classify information from many sources so that data sets can be discovered and combined to gain a better picture of the needs and behaviours of a city's citizens (residents and businesses);¹⁾
- PD 8100, an overview document that will provide guidance on how to effectively communicate the value of smart cities to key decision-makers;¹⁾
- PD 8101, *Smart cities – Guide to development*, a smart city planning document, which will provide guidance to local authorities on what they need to require or incentivize new infrastructure developments to support the overall smart city plans for their area.¹⁾

In addition, examples and case studies of the good practices recommended in this PAS will be built up over time by the Future Cities Catalogue at <https://futurecities.catapult.org.uk/>.

Use of this document

As a guide, this PAS takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice and claims of compliance cannot be made to it.

Presentational conventions

The guidance in this standard is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is "should". Key recommendations are provided under the heading "Recommendations".

Spelling conforms to *The Concise Oxford English Dictionary*. If a word has more than one spelling, the first spelling in the dictionary is used.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a PAS cannot confer immunity from legal obligations.

¹⁾ In preparation.

0 Introduction

0.1 Context: the challenges cities face

Smarter cities are essential if the world is to respond effectively to the critical challenges it faces. As of 2008, and for the first time in human history, more than half of the world's population now live in cities. The UN predicts this will rise to 70% by 2050. Here in the UK, more than eight out of ten of us already live in cities. Yet cities increasingly need to be able to do more with less, to compete in a globally-interconnected economy, and to provide for the well-being of their citizens in a truly sustainable way. In short, to become smarter.

Here in the UK, the Government has identified the following challenges in particular that are driving change in UK cities [2]:

- *economic restructuring, combined with the economic downturn, has raised levels of unemployment, particularly among young people, and so economic growth and building a resilience to further change is a key priority for city authorities;*
- *the urban infrastructure has grown piecemeal and rising urban populations are putting pressure on housing and transport;*
- *concerns about climate change, and the fact that 80% of the UK population live in cities, inevitably means that cities have a key role in improving energy efficiency and reducing carbon emissions, while promoting energy resilience in terms of security of supply and price;*
- *the paradigm shift towards online entertainment and online retail/consumer services is beginning to change the nature of the High Street;*
- *an ageing population is placing an increasing burden on adult social care, to the point where it is absorbing an ever-increasing proportion of local authority budgets;*
- *at the same time, the pressures on public finances have seen local authority budgets reduced, on average, by an estimated 12-15% in real terms over the past three years, with many reporting 20-30% cuts;*
- *notwithstanding recent flexibility accorded to Local Authorities in relation to Council Tax and Business Rates, grants from Government Departments are still the main source of local authority funding, especially for cities, and local authorities consider this to limit their ability to provide integrated responses to the challenges they face.*

The scale of the challenges is forcing cities to rethink their strategies and to innovate in order to maintain service levels, in particular:

- *outsourcing services using outcomes based contracts;*
- *service integration, both back office and increasingly front line services;*
- *online service delivery;*
- *releasing data to enable new services to develop and citizens to make informed decisions e.g. providing real-time information on traffic to assist citizens in planning journeys; and*
- *reducing demand on services, for example, promoting independent living allows older people to live much longer in their own communities with less statutory support.*

However, the complexity and the pace of change, combined with the need for integrated and systemic solutions, are presenting a major challenge to local authorities who, traditionally, have developed responses in a "siloed" fashion.

0.2 Background to the smart cities standards strategy

The UK Government is committed to helping cities respond to these challenges, by supporting the development of smarter cities. Both because of the social, economic and environmental benefits for cities and citizens here in the UK and because the smart city market globally represents a major export opportunity for UK businesses.

In 2012, the Department for Business, Innovation & Skills (BIS) therefore commissioned BSI to develop a smart cities standards strategy: to identify where standards are needed to accelerate the rollout of smart cities and support UK providers of smart city solutions.

The strategy development involved research into current thinking on smart cities, a gap analysis to identify where standards are needed; stakeholder consultation events; and a proposed work programme for the delivery stage.

0.3 Purpose of this document

The smart city framework (SCF) is a guide intended for use by leaders, at all levels and from all sectors, of smart city programmes. It provides practical, "how-to" advice, reflecting current good practice as identified by a broad range of public, private and voluntary sector practitioners engaged in facilitating UK smart cities.

The document breaks down into the following clauses:

Clause 1: Scope

- The purpose of the SCF
- The content and nature of the SCF, that is, what it does and does not seek to cover
- The intended audience for the framework

Clause 2: Terms and definitions

Clause 3: Overview of the smart city framework

- High level description of the key components of the SCF
- Summary of recommendations from across all components of the SCF

Clause 4: Component A: Guiding principles

Clause 5: Component B: Key city-wide governance and delivery processes

Clause 6: Component C: Benefit realization framework

Clause 7: Component D: Critical success factors

Supplementary information on guiding principles and critical success factors is detailed in Annexes A and B.

1 Scope

This PAS gives guidance on a framework for decision-makers in smart cities and communities (from the public, private and voluntary sectors) to develop, agree and deliver smart city strategies that can transform their cities' ability to meet future challenges and deliver future aspirations.

The smart city framework (SCF) distils current good practices into a set of consistent and repeatable patterns that city leaders can use to help them develop and deliver their own smart city strategies.

The PAS does not intend to describe a one-size-fits-all model for the future of UK cities. Rather, the focus is on the enabling processes by which innovative use of technology and data coupled with organizational change can help deliver the diverse visions for future UK cities in more efficient, effective and sustainable ways.

This means, in particular, a focus on enabling cities to:

- a) make current and future citizen needs the driving force behind all city spaces and systems;
- b) integrate physical and digital planning;
- c) identify, anticipate and respond to emerging challenges in a systematic, agile and sustainable way;
- d) create a step-change in the capacity for joined-up delivery and innovation across organizational boundaries within the city.

Although many of the principles and methodologies established by the SCF are relevant within specific vertical sectors of cities (smart grids, smart mobility, smart health, etc.) the focus is very much on the issues and challenges involved in joining all of these up into a whole-city approach. Central to the SCF is therefore a strong emphasis on leadership and governance, culture, business model innovation, and the active role played by all stakeholders in the creation, delivery and use of city spaces and services.

This PAS is aimed at UK city leaders. It can also be helpful to leaders of communities other than at city-scale – including both smaller urban areas and larger, regional-scale initiatives – and for city leaders outside the UK. However, the prime intended audience, with which the guidance has been developed and tested is UK city leaders, including:

- policy developers in city authorities – both those responsible for the authority's service design, commissioning and delivery role, and also those responsible for its community leadership role, in particular:
 - elected leaders;
 - senior executives of local authorities (including chief executives, chief information officers and directors of key departments);
 - senior executives of other public bodies with a city-wide remit;
- other stakeholders interested in leading and shaping the city environment, including:
 - senior executives in the private sector who wish to partner with and assist cities in transformation of city systems to create shared value;
 - leaders from the voluntary sector organizations active within the city;
 - leaders in the higher and further education sectors;
 - community innovators and representatives.