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Smart cities – Guide to the role of the planning and development process

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Contents

Summary of pages
This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 48, an inside back cover and a back cover.

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Foreword

This Published Document (PD) 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 31 October 2014.

Acknowledgement is given to Michael Mulquin of IS Communications Ltd, as the technical author, and the following organizations that were involved in the development of this PD as members of the steering group:

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- Space Syntax

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- City of Gothenburg
- ECS Limited
- Government BIM Task Group
- Living PlanIT

The PD process enables a guide to be rapidly developed in order to fulfil an immediate need in industry. A PD 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 PD 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 181, *Smart city framework – Guide to establishing strategies for smart cities and communities*, which gives guidance on a good practice 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;

- PAS 182, *Smart city concept model – Guide to establishing a model for data interoperability*, which provides 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)]

Use of this document

As a guide, this PD 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.

For the purpose of this PD, "major development" is defined in accordance with the Town and Country Planning (Development Management Procedure) (England) Order 2010, rule 2 [1]:

"(c) the provision of dwellinghouses where—

(i) the number of dwellinghouses to be provided is 10 or more; or

(ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);

(d) the provision of a building or buildings where the floor space to be created by the development is 1 000 square metres or more; or

(e) development carried out on a site having an area of 1 hectare or more;"

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".

Spelling conforms to *The Shorter 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 PD cannot confer immunity from legal obligations.

1) In preparation.

0 Introduction

0.1 General

smart city

effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens

[SOURCE: PAS 180:2014, **3.1.62**]

In the UK, more than eight out of ten people now live in urban areas. 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, cities need to become smarter.

The purpose of this PD is to support this process by providing guidance for ensuring that developments and infrastructure projects are designed and built in a way that facilitates the city's progress towards becoming smarter.

Designing smartness into developments and infrastructure projects could provide cities with the clarity they need to think strategically about how smart urban planning and design can help the city as a whole to function better.

It could also provide an opportunity to test new business models and processes comparatively cheaply and easily and use this to demonstrate the viability of replicating them citywide.

This PD also aims to help the wider development community understand how they might better position their proposals to fit in with the local authority's wider strategic aims and, by adding value to the people and businesses that will be using their development, make it more desirable and profitable.

This PD provides guidance on:

- five key areas where the planning and development process can support smart city applications and where smart city approaches can improve the planning and development process; and
- opportunities that can be exploited at the different stages of the planning and development process.

A summary of the recommendations in this PD, listed in relation to the roles they apply to, is provided at Annex A.

0.2 Smart city approaches and place-making

Smart city approaches build on and transform a key element of modern urban planning and design – the concept of place-making.

It has long been recognized that urban planning and design cannot simply focus on the hard infrastructure of buildings, roads and so on, but needs to give just as much attention to soft infrastructure.

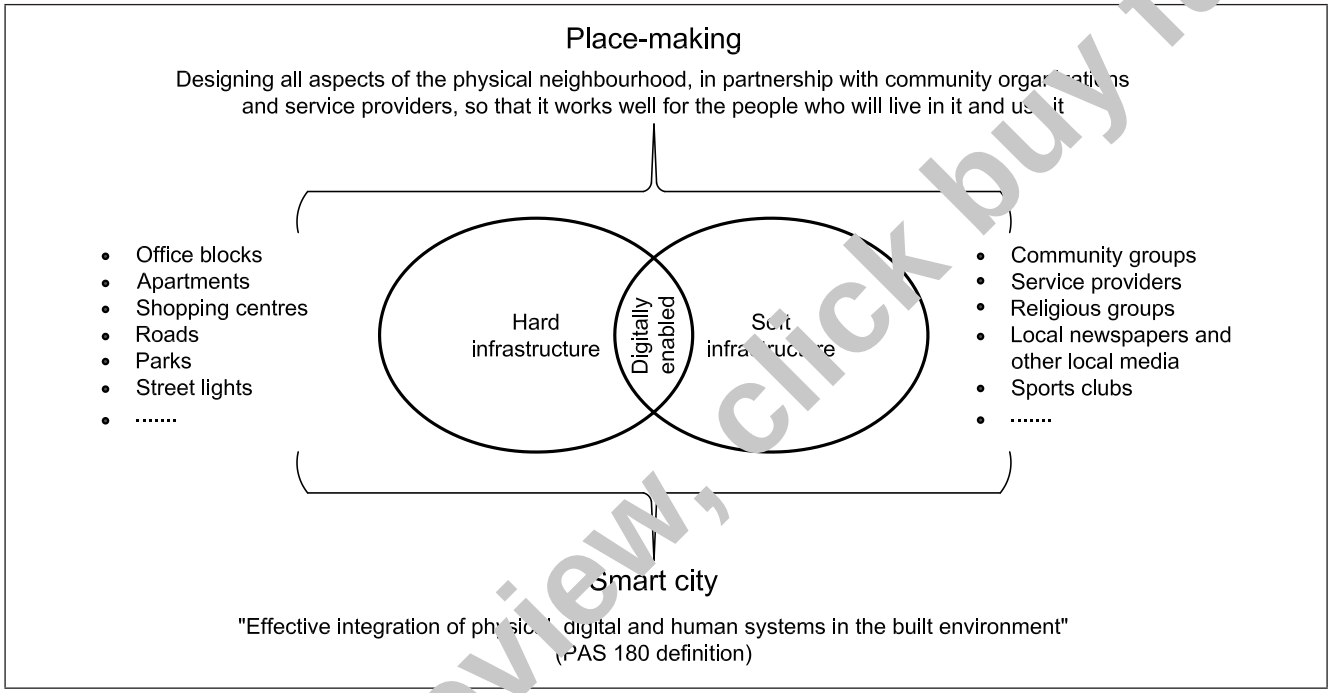
Soft infrastructure refers to the social systems that enable society to function. Buildings on their own, no matter how well-designed, cannot make an area attractive, vibrant and economically sustainable; the activities of service providers, businesses and community organizations are just as important. Therefore the overall plans for city development need to include measures that support both the hard and soft infrastructures.

The concept of place-making has been a key part of urban planning and design for several decades. Place-making recognizes that the physical design of a neighbourhood needs to facilitate positive interaction between people and make it easy for them to navigate through it. In other words, the neighbourhood as a whole needs to be designed in order to work for the people who live in and use it.

This has led to a multi-faceted approach to the planning, design, implementation and management of urban environments that supports local players in collectively using their influence and abilities to create attractive, prosperous and safe communities.

Smart city approaches bring a step change to this by adding in the digital dimension. Figure 1 indicates how digitally enabling the hard and soft infrastructure in a neighbourhood, a key requirement for smart city applications, can enhance and support the place-making agenda.

Figure 1 **Urban planning and design in a smart cities context**



Place-making is now, therefore, even more important in urban planning and design as the potential offered by digital technologies and communications to take new soft infrastructure approaches to improve place becomes increasingly clear.

For instance, smart city approaches and services could support place-making by:

- utilizing digital modelling, so that the hard infrastructure in the new development or infrastructure project can be used to engage residents, users and citizens in designing a more attractive neighbourhood;
- utilizing the ability to automatically provide people with relevant information about transport options that affect travel patterns and habits (e.g. shared transport, public transport, bikes and walking), which could mitigate the need to invest in road infrastructure;

- enabling much greater amounts of data, including real-time data, to be collected, integrated and used to support neighbourhood management and service delivery, for the benefit of residents and visitors;
- utilizing communications/social media to:
  - aid in making a community more cohesive and safer for its citizens;
  - support local initiatives to change behaviours, for instance ones relating to waste and energy – thus avoiding or lessening the need to make changes to physical infrastructures.

0.3 Why this PD is needed

This PD is needed for the following reasons.

- It is easier and cheaper to put in place the foundations for a smart city within a development or infrastructure project at the planning and implementation stage.
- Developments and infrastructure projects often provide cost-effective opportunities to test and trial smart city products and services, and the business models and processes required to fund and operate them, before rolling them out citywide.
- The smart use of data and digital modelling can not only enable neighbourhoods to be better designed for the people who use them, but can also enable significant savings in the implementation, ongoing management and service delivery stages.

The **impact** of a failure to take these opportunities is:

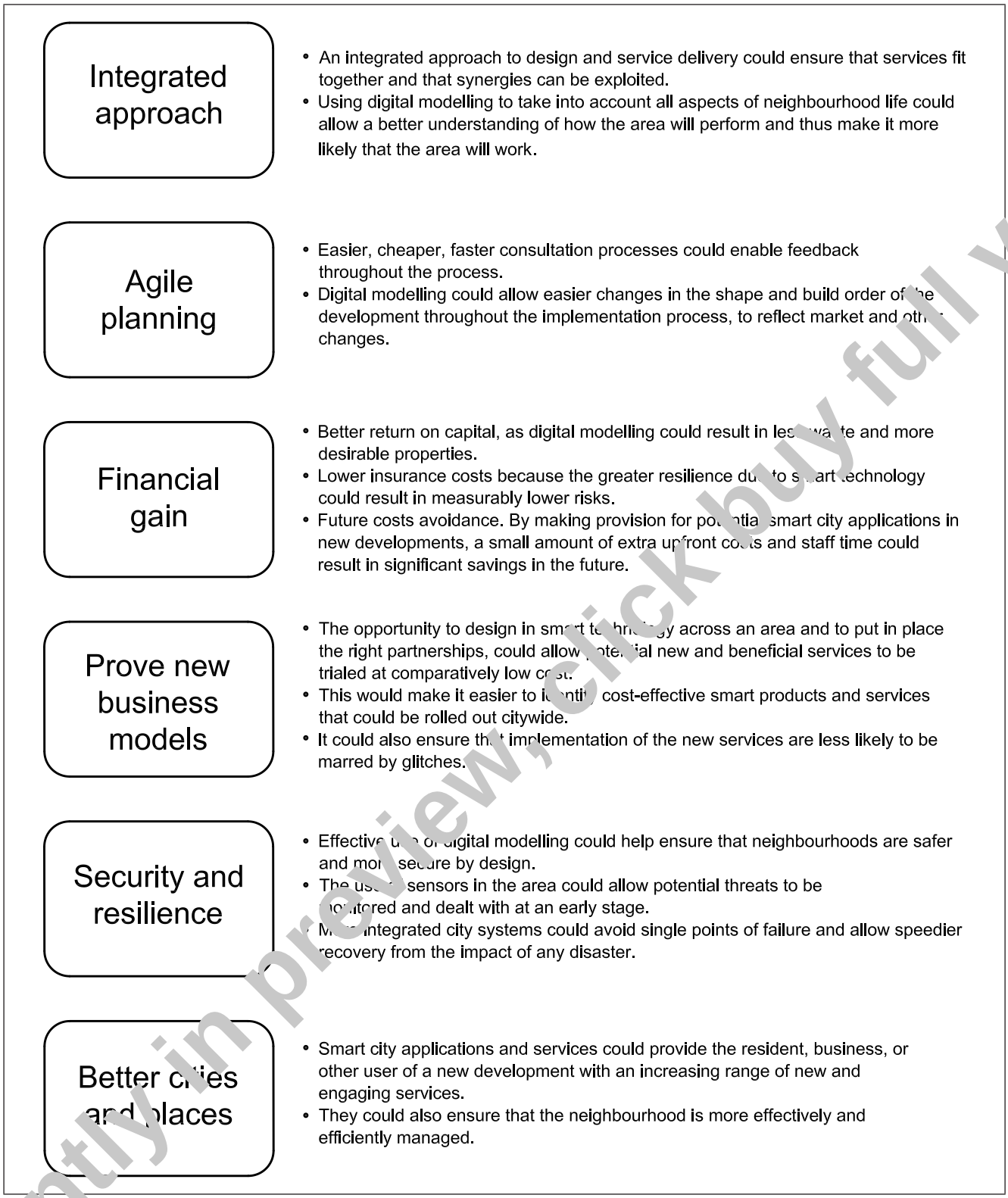
- the added complexity of having to re-write contracts, and re-define management and funding arrangements in order to support the provision of smart city products and services later on;
- the cost of having to rectify faults in the way a new neighbourhood or area is designed that could have been picked up in the early stages through the use of digital modelling;
- the cost of having to retrofit vital smart technology;
- the missed opportunity for using new urban developments and infrastructure projects to learn important lessons that can inform wider smart city strategies.

This PD aims to demonstrate how these issues can be **resolved** by providing guidance on five key areas identified in **0.5** and detailed in Clause **4**, all of which are aspects of adopting an integrated approach to the city. It also provides guidance for each stage of the planning and development process.

0.4 Benefits

Figure 2 outlines the potential process and output benefits that could come from ensuring that developments and infrastructure projects are using smart urban planning and design.

Figure 2 **Benefits of smart urban planning and design**



0.5 Key areas

This PD identifies five key areas where the planning and development process can support smart city aspirations.

1) **Build the partnerships to deliver holistic solutions**

   Cities need to put in place the right agreements and partnership arrangements to enable all the key city agencies to work together so that the soft infrastructure in the city is working and opportunities for place-making can be effectively exploited.

2) **Build the foundation for widespread exploitation of data**

   Cities need to put in place agreements between organizations regarding data handling and technical infrastructure to allow the information that can be generated in the city to be directed and utilized in order to support both the day-to-day management of the city and long-term plans.

3) **Use digital modelling to deliver a people-centred physical environment**

   Cities need to make sure that the physical environment of the city and its neighbourhoods is designed to support the citizen, business and visitor in achieving their goals and in supporting collaboration and innovation.

4) **Put in place an enabling digital and communications infrastructure**

   Cities need to put in place the digital and communications infrastructure to support new services and allow real-time data to be generated, delivered to where it is needed, and utilized to help the city work better.

5) **Develop and test new business models and processes**

   Cities need to be willing to implement the new and transformational business models that are made possible by increased access to data and closer integration between city systems, and to change existing processes in order to capitalize on these.

These five key areas provide the framework for Clause **4** of this PD.

1 Scope

This PD gives guidance on how the planning and implementation of development and infrastructure projects can equip cities to benefit from the potential of smart technologies and approaches.

It is relevant to major developments, major infrastructure projects, refurbishment programmes, streetworks and improvements to the public realm.

It considers how each stage of the planning and development process could support smart city opportunities and benefit from good practice in smart urban planning and design.

It identifies some key areas where developments and infrastructure projects could be planned and implemented in a way that supports the city as a whole in becoming smarter. It sets out what needs to be done at each stage, with an indication of where to go for further help.

This PD is for use by those involved in the planning and implementation of developments and infrastructure projects, including:

- city leadership;
- planning policy makers;
- planning case officers;
- regeneration officers; and
- developers and the consultants who work with them.