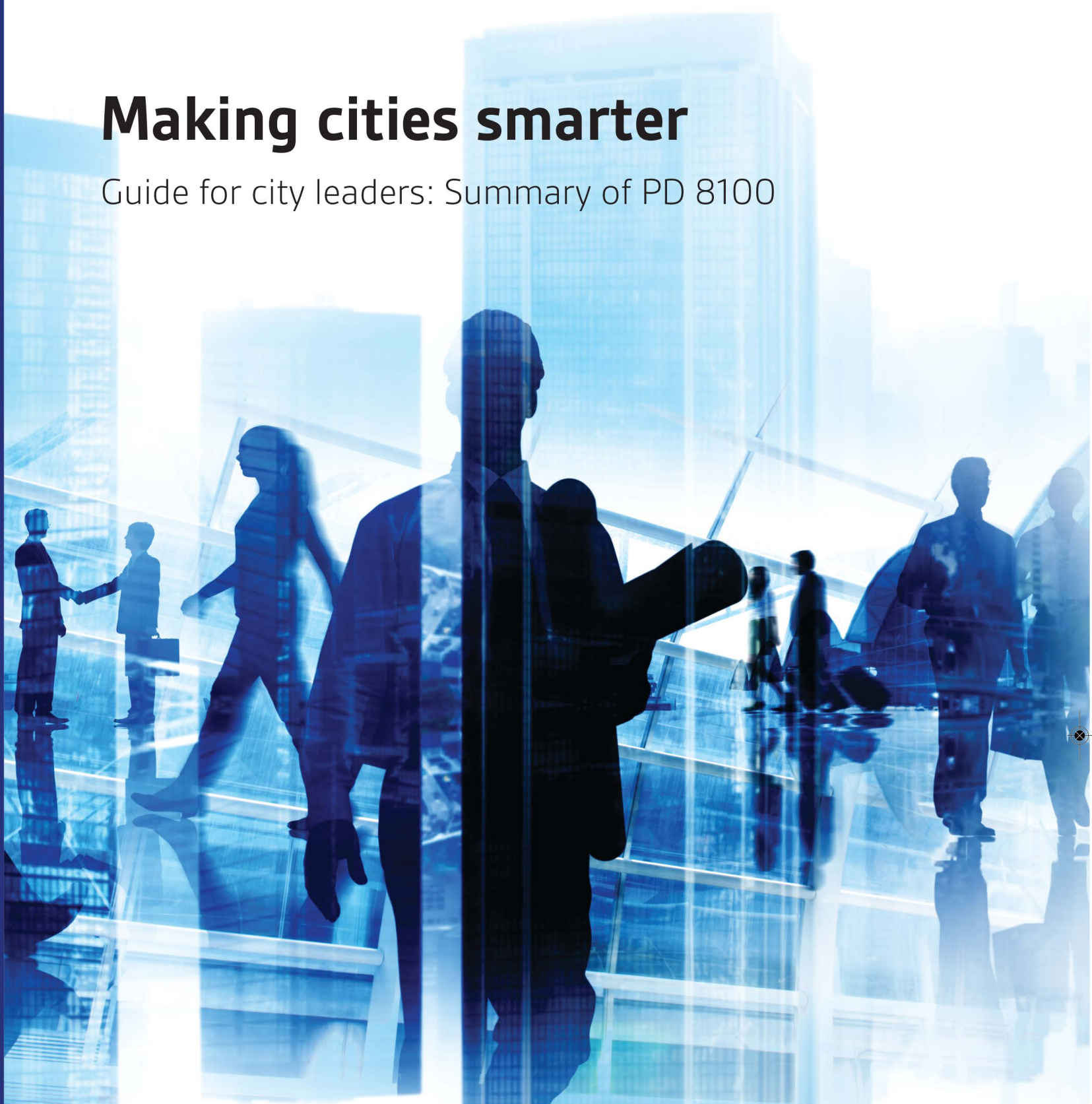


Making cities smarter

Guide for city leaders: Summary of PD 8100



Department
for Business
Innovation & Skills

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'There is no better way to improve the lives of billions of people around the world than to improve the way cities work.'

Michael Bloomberg – former mayor of New York City¹

Introduction

Cities today are facing enormous challenges, including the impacts of an ageing society, environmental stresses, an ageing infrastructure and a future of severe and increasing resource constraints.

It is for city leaders to help shape the response.

At the same time, we have only just begun to explore the benefits that modern technologies (e.g. sensors, pervasive communications, robotics, cloud computing) and new business models can bring to cities, and to take advantage of the opportunities available through information (e.g. real-time data, analytics, visualization, personalization and social engagement).

These benefits can only be fully realized by ensuring that technologies are fully aligned with our business drivers and by moving beyond the limits of conventional service functions towards a more active and open collaborative working culture.

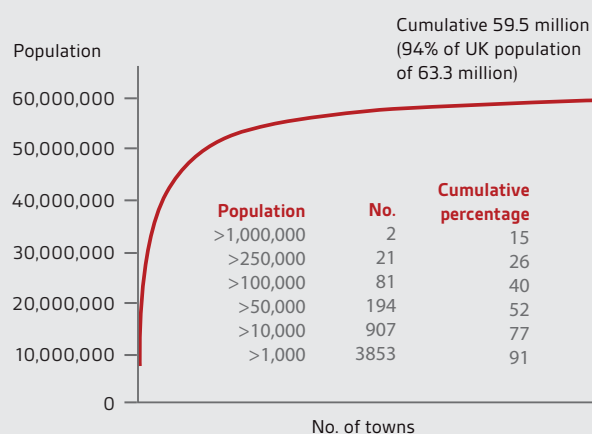
This document provides city leaders (public, private and community-focused) with an overview of the guidance contained in the BSI portfolio of documents (covered in greater detail by PD 8100, *Smart cities overview – Guide*). It reviews the benefits of becoming a smarter city and outlines a process to do so. It provides practical recommendations, and highlights how standards can help eliminate risks, lower costs, and reduce the effort required to manage cities effectively.

Cities are important

Cities make up just 9% of the UK's landmass but account for 54% of population, 59% of jobs, 61% of GVA (Gross Value Added) and 72% of high-skilled jobs.

The smart city agenda is not just for major and medium-sized cities; it is just as important for smaller cities and towns. Including these, addresses the places where 80% of people in the UK live (See Figure 1).

Figure 1 – UK cities and towns by population



[SOURCE: Office for National Statistics data, 2013]

Benefits of integration

75% of the 60–90 million street lights in Europe are over 25 years old. Replacing them with LED lamps could potentially halve the energy bill and maintenance costs giving an ROI (Return on Investment) in around 6–8 years. Replacement would also enable them to be used as strategic assets for a Wi-Fi mesh network; a hub for smart parking and other sensors; a post for air quality monitoring; a stand for CCTV, for example.

The King's Cross development is one of the largest urban redevelopment projects in Europe, and will ultimately provide facilities for 45,000 people to live, work and study. A key feature is the integrated planning and operation of water, electricity, gas, heat and data services under a single asset owner. This integration will enable both substantial cost savings and the deployment of new technologies in energy supply, use of renewables, and other features that together will achieve high levels of sustainability and a targeted reduction in CO₂ emissions by over 50% relative to 2005 levels.

¹ Goldsmith, S. and Crawford, S., *The responsive city: Engaging communities through data-smart governance*. Hoboken, New Jersey: John Wiley and Sons, 2014.

Managing a city

Cities are complex entities, with many organizations, infrastructures and activities involved in providing the services needed by their citizens and businesses. This makes it difficult for the city to act cohesively.

Individual city systems are growing in complexity, while at the same time, becoming increasingly dependent on each other in often poorly understood ways, which increases the risks of a domino effect if there is a failure in one system. However, new approaches have the potential to enable cities to be managed in a more coherent and effective way.

What is the smarter city?

BSI defines a smart city as one where there is 'effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens'.²

The smartness of a city is therefore not about technology as such, but rather about how well technology is used in an *integrated* way to help the city function more effectively. That involves better engagement with its customers, and better mechanisms of governance. Becoming smarter allows a city to build on existing foundations in order to set a more engaging vision and follow a new and more effective trajectory.

Why a city needs to become smarter

All cities are unique, however they rarely face unique challenges. The scale of the challenges they face, and the limited resources they have at their disposal, make it unlikely that their current paradigm is sustainable. Cities need to maintain a sense of individuality and pride. They need to be competitive. However, they also need to collaborate to improve how they tackle common issues, build better relationships with the supply market and so help the necessary market transformation.

This is just as true for the medium- to small-sized cities and towns, where the majority of the UK population live, as it is for the few major cities in the UK such as London and Manchester. Indeed, aggregating demand amongst smaller cities stimulates the supply market and gives a greater voice for smaller cities.

Fortunately, the effective use of data and new technology solutions are providing new tools and opportunities that can help overcome these challenges. The role of city leaders is to build the capacity to integrate these into the daily operations of the city.

How BSI guidance documents and standards can help

In order to help cities tackle this challenging agenda and benefit from these new opportunities, BSI is bringing together leading exponents in the field of smart cities from all stakeholder groups to:

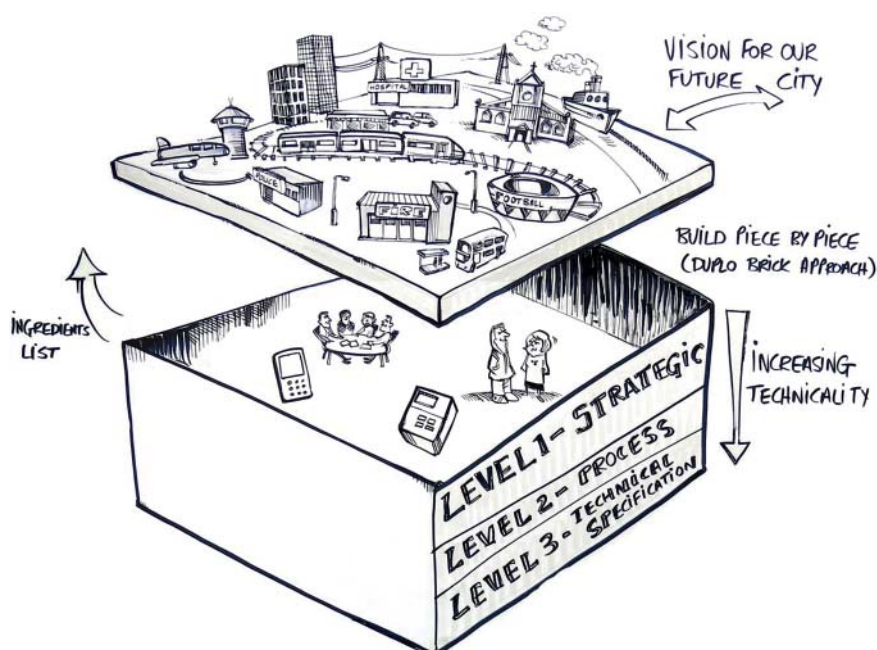
1. develop a coherent portfolio of guidance documents that help to deal with the cross-service systemic nature of cities; and
2. provide material that is relevant to different stakeholders: leadership guides (level 1); management frameworks and process models (level 2); and technical specifications (level 3) (see Figure 2).

This approach provides a framework that supports:

- consistency in the language used within and between organizations;
- a reliable process to steer users through activities and interactions;

² SOURCE: PAS 180:2014, **3.1.62**

Figure 2 – Levels of smart city standards



- truly interoperable systems, so that smart approaches can be developed incrementally, without the risk of proprietary lock-in;
- the ability to share data securely and reliably;
- more agile planning, greater systems resilience and useful performance measurement systems; and
- a set of guidance documents that fit together to make a progressively more coherent picture.

BSI is also working with international counterparts, so that UK cities will have access to global solutions and UK firms will have access to global markets.

Making a start

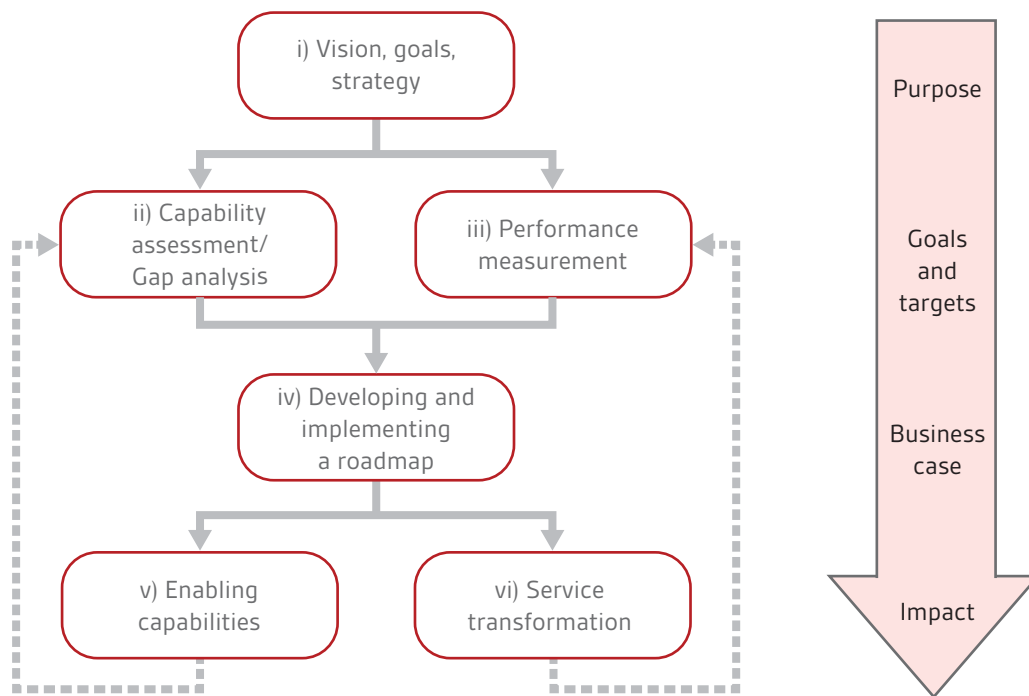
In order to take forward the smart city agenda, city leaders should progressively bring together the elements shown in Figure 3 in a more coherent and effective way, rather than as currently, where they are often fragmented across tiers, departments and sectors.

i) Vision, goals, strategy

A smart city requires that all the key stakeholders in the city agree to a joint vision, a set of goals, and an overall strategy with which to achieve them. Part of the process will be to set up a smart cities team, directly accountable to city leadership to drive forward the process. An example of this is the Smart London Board.

ii) Capability assessment/Gap analysis

A model has been developed, consistent with PAS 181, *Smart cities framework*, which enables a swift assessment of how well a city is positioned to benefit from the new approaches dealt with here. As illustrated in Figure 4, this allows a city to assess

Figure 3 – Route to a smarter city

both its current and desired states against seven criteria. It is being tested by a number of UK cities and has already proved its value.³

iii) Performance measurement

All smart city initiatives should have clear and outcome-focused goals, and a reliable method of measuring progress, involving a set of standard metrics that should be set up in place to enable city leaders to judge success.

iv) Developing and implementing a roadmap

Many cities already have a roadmap of some form, however few address specifically how the city can move towards becoming smarter. Such a roadmap needs to be developed collaboratively with local stakeholders and include identifying initiatives that are high impact and/or can be swiftly implemented.

v) The roadmap will include initiatives based on extending the **Enabling capabilities**. These might include:

- collecting and making publicly available increasing amounts of useful city data;
- identifying and accessing effective sources of financing;
- building links with the Future Cities Catapult⁴ in order to benefit from state-of-the-art expertise and knowledge;
- building collaboration with other cities facing similar challenges.

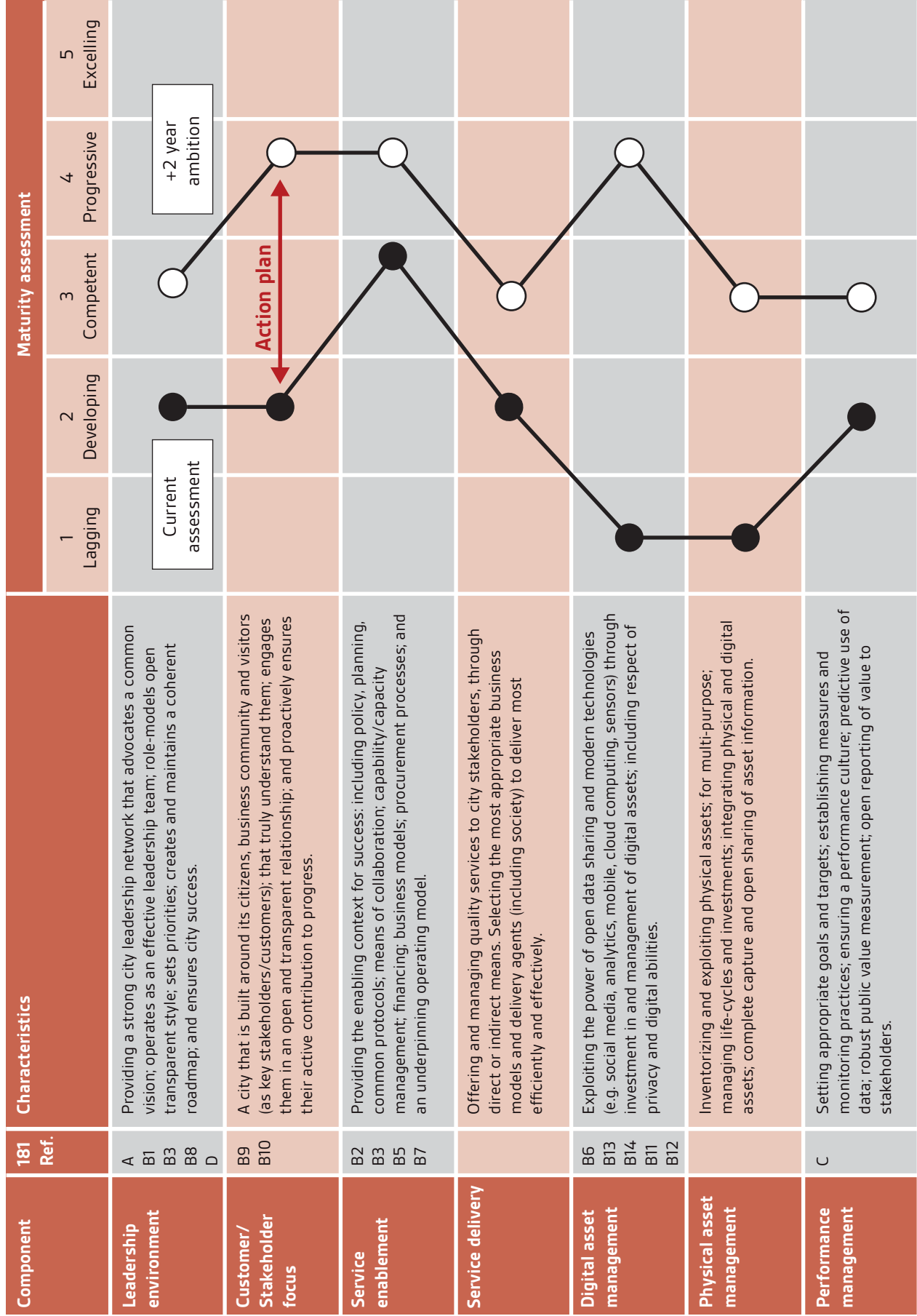
vi) Just as importantly, the roadmap will address areas where **Service transformation** is required such as urban mobility, economic growth, air quality, security and affordable energy supply and ensuring that the citizen is involved as an active participant.

PAS 181 offers practical guidance in developing a smart city roadmap.

³ Acknowledgement is given to Urban DNA for their role in the development of the Smart city capability assessment/gap analysis shown in Figure 4.

⁴ <https://futurecities.catapult.org.uk/>

Figure 4 – Smart city Capability assessment/Gap analysis



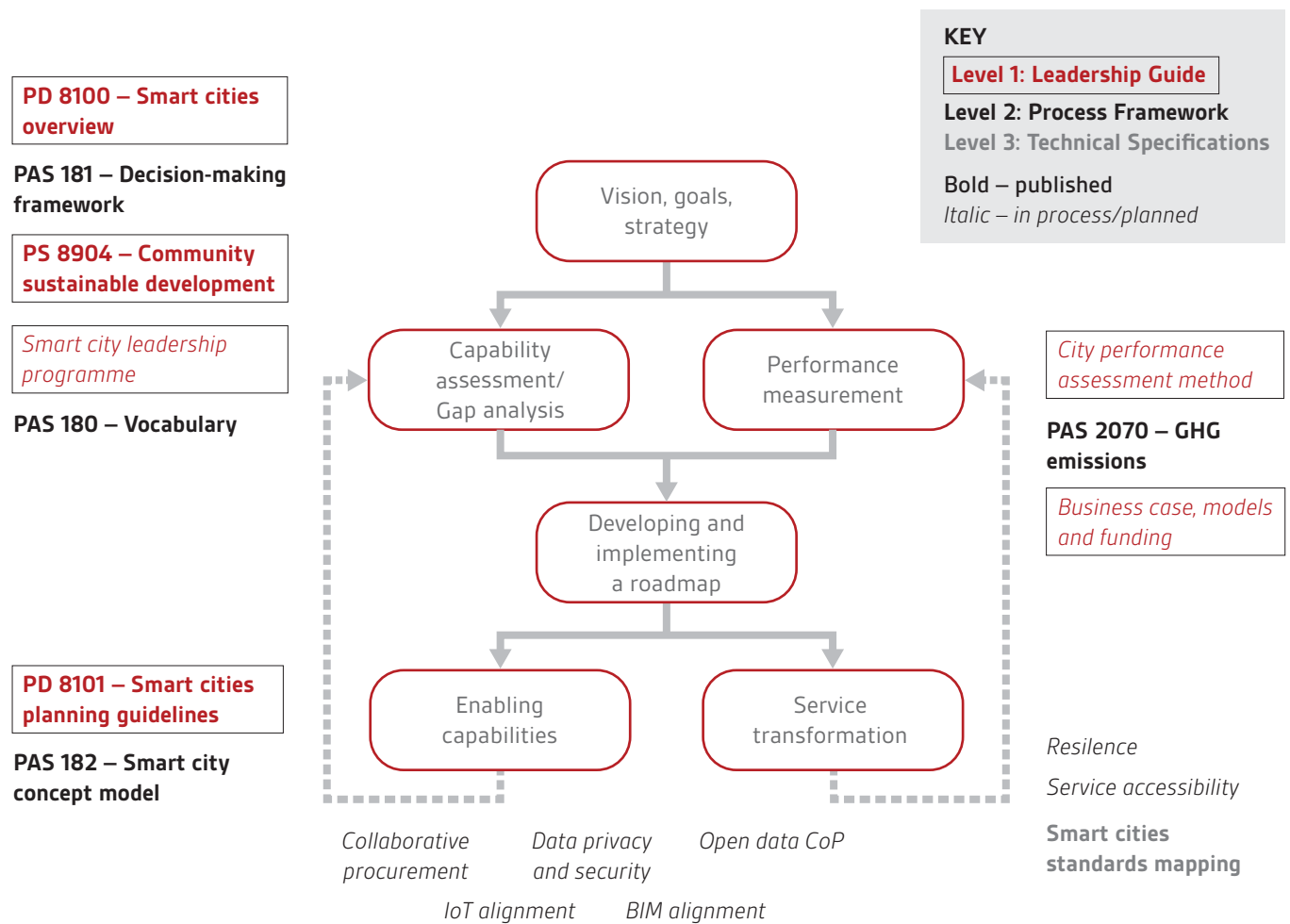
BSI smart cities portfolio

The BSI portfolio (Figure 5) presently includes a large number of service-specific level 3 technical specifications. Many are relevant to smart cities, though few as yet overtly address the integrated services agenda.

Of more relevance to city leaders are the level 1 and 2 documents that have been published or are in development, and are specific to the smart city agenda.

Work on further guidance documents and standards is continuing, in partnership with the Future Cities Catapult.

Figure 5 – BSI smart cities portfolio



NOTE Smart cities PAS and PD publications, including PD 8100, are available for free download at: <http://www.bsigroup.com/en-GB/smart-cities/>. Other BSI standards are available at <http://shop.bsigroup.com/>

Conclusion

City leaders know that collaboration is key to both tackling the challenges and taking advantage of the exciting opportunities facing cities. City councils, agencies, and businesses all need to benefit from the many ways that new technologies can support more effective joint working, and new and more collaborative relationships with the citizen. City leaders can also use the experience of other cities to gain evidence as to the effectiveness of new and transformational methods of city service delivery and management.

This task is about reshaping an entire market and ecosystem, driven by the requirements of making our cities work well for their residents and businesses. It will take resolve and persistence.

Quality guidance documents and standards form a vital foundation to this effort. It is for city leaders to make the best use of them.

We must become smarter together.