

PRINCIPLES OF GOOD DEPLOYMENT

DIGITAL STREET FURNITURE

What are the Principles for?

The principles are intended to form a basis for dialogue between councils, providers, designers and anyone involved in a DSF deployment. They do not make up a legal document, but a guide for shaping deployments, and in the future could form the basis for a “kitemark” of good DSF deployments.

The five Principles for Good Deployment are as follows:

1. Transparency, ownership and opting out
2. Data collected in public are public by default
3. Local context and a fair and balanced value exchange
4. Regular review
5. Inclusivity

Some are more developed and/or have more detail than others, based on the current state of discourse. We have also excluded issues currently covered by legal requirements, such as health and safety and risk assessments.

What do we mean by Digital Street Furniture (DSF)?

Digital street furniture is any furniture that is located in a public space and is fitted with digital screens, sensors or any other digital actuating or sensing components. It interacts either actively or passively (or both) with people or its direct environment.

Street furniture could refer to specific physical objects located in public space, that are a part of what we could consider the overall streetscape. In this project, our focus is on the entire digital streetscape not limiting ourselves to only single objects in the public realm.

While some of these principles could also apply to temporary objects, like parked vehicles or dockless bikes, we have excluded them from our definition in this version. We may seek to include them in the future.

Urban infrastructure is increasingly becoming digital as well as physical, opening up new opportunities for the public and private sector. With the right products and services, the digital public realm could have a positive impact on cities, providing useful services, supporting civic engagement and participation, improving public service delivery, and providing spaces for experimentation.

Technology development and application move fast, challenging regulators and the public sector, who are often unable to keep up due to resource and institutional limitations. This rapid development of technology can cause real problems for cities and has, at times, led cities to become apprehensive about new tech deployments in the public realm.

The best solutions are not about technology for technology's sake, but focused on how we can address challenges with a better, more informed understanding of people who use space. Developers need to work together with cities, its decision makers and the public to get the most from new applications of technology and innovation.

We believe in learning by doing, so when we wanted to explore the possibilities and barriers to digital infrastructure in the streets, we decided to build and deploy a prototype to help us learn first hand and start the conversation with industry, government and citizens. In 2016 Future Cities Catapult began developing ideas for ways in which city authorities could broaden their use of physical space into the digital realm, understand the opportunities and shortcomings of digital technologies, test new ways of engaging with citizens and create distributed, accessible spaces for experimentation.

The result was a Technology Totem - a physical city experimentation platform designed to:

- Evaluate the impact of urban interventions;
- Allow business to easily deploy and test their technology in the city;
- Engage with inhabitants, capture local sentiment and sense the environment;

These Tech Totems have been deployed in Birmingham and Newcastle, working with local partners (including the Southside BID, Newcastle City Council and Newcastle Urban Data Observatory) to tailor the content and technology contained in the Totem to meet their challenges. We used these projects to explore use cases, including the potential for Digital Street Furniture (DSF) to facilitate the deployment communications networks, distributed sensor systems and promote local businesses.

Through our work in Birmingham and Newcastle, and wider research we conducted with the market, city authorities and other stakeholders, we found that councils were often missing opportunities to gain real value from digital street furniture, and that there was a need for greater engagement from the market in order to understand how their technologies could provide a tangible benefit to cities.

In early 2019 Future Cities Catapult held a roundtable discussion 'digital street furniture' bringing together representatives from the forefront of the industry, government, planners and designers to share knowledge and develop ideas for how the future of digital street furniture might look. One of the outcomes was the potential for guidelines to allow cities and industry to deploy these technologies in a positive way. Based on the results of the discussion as well as further research, we have developed these guidelines into a set of Principles for Good Deployment.

PRINCIPLES OF GOOD DEPLOYMENT

PRINCIPLE 1

CONTEXT

Digital street furniture has the potential to provide new ways to help cities gather new and useful datasets more easily. Examples would include hosting air quality sensors, counting nearby footfall, or measuring levels of noise pollution.

However, outside of traditional technologies such as CCTV, there is currently little public awareness of data collection in public spaces. A lack of transparency and communication around newer, less visible (and often more pervasive) data collection in the public realm, such as footfall counting through WiFi signal detection, has inevitably led to a level of suspicion and mistrust in these technologies.

While the data may not be personal, the level of its anonymisation and aggregation is not always clear. In addition, as monitoring may evolve to become less passive and more predictive, the purpose of the data collection may become less obvious. While most people know CCTV footage may be used to identify the perpetrator of a crime, it is currently unclear what data gathered from footfall sensors, for example, might be used for or to predict.

Although active consent and 'opt-out' mechanisms may be the ideal endgame for data collection in the public realm, the process of introducing these mechanisms here is currently prohibitively difficult. There needs to be a step to increase transparency of data collection in public spaces, and to facilitate a greater awareness of what data are being collected, by whom, and for what exact purpose. This can then inform a further conversation about consent and privacy in public spaces.

PRINCIPLE 1

Devices that collect data in the public realm should clearly communicate:

a) what data are being collected

b) why data are being collected (the purpose)

c) how the data are being processed

d) who owns and controls the data

e) what (if any) personal data are being collected, and how they are anonymised

6 It should be clearly communicated at the point of collection how GDPR regulations protect and regulate the data being collected.

It is reasonable to expect this information is provided in a way that is appropriate and inclusive for any type of audience, whether it being visuelle, audible, etc.

[DSF industry]

People are not necessarily against the private sector being present in the public space they use, as long as it's not hidden, there needs to be transparency.

[data expert]

People hear "data" and they think their personal information is being stored. It's important to educate people about that data: how the data is being used, what data is being collected, how it's being stored.

[urban planner]

The general opinion now seems to be that people are okay with giving information away, but public opinions are definitely changing. More and more people would like to know what happens with their information.

[public sector]

I think it is a fundamental requirement for citizens to trust the streetscape around them.

[DSF industry]

There is a massive disconnect between city and citizens. Citizens feel that infrastructure is happening to them.

[DSF industry]

FURTHER EXPLANATION

If data are being collected in the public realm, it is important that as users of that space - the public - are made aware of this. The type of data collected refers not only to personal data - which are already protected under GDPR regulations - but also includes environmental or journey tracking data.

Transparency on where objects are placed and what those objects do and why allows for a more democratic public realm, as citizens are better informed. This puts them in a better position to voice their opinions on data collection, influence others and appeal decisions made by local authorities if they feel it's necessary.

EXAMPLES

1. TfL - Wi-Fi data collection in London Underground

Data are being collected from passengers on the London Underground that connect to the free Wi-Fi internet access that TfL offers across their stations. By registering the MAC addresses of the devices that connect to different access points, TfL has a better insight into the flow of people through stations by the interchanging between services.

TfL informs passengers of the data that are collected with physical signs on the stations, as well as what they can do in order to opt-out. On the website (of which the hyperlink is shown on the signs) a detailed explanation is given of what data are collected, for what reason, how it is being processed, and how the information is being kept secure.

2. Sidewalk Labs - DTPR

Sidewalk Labs developed an open-source visual language for the Waterfront Toronto development to communicate what data are being collected, the level of anonymisation, and the purpose of the collection, in public spaces. Their “Digital Transparency in the Public Realm” toolkit is made up of simple icons to communicate information about data collection and privacy.

While both schemes address the issue of transparency, only TfL’s currently addresses the concept of consent - albeit by reducing the level of service the user receives; in this case, turning off the free WiFi. In the public realm is the physical equivalent of simply telling people not to enter areas where data are being collected, unless they did not mind. In the future, how can we create opt-out mechanisms for data collection in the public realm, and what data should this apply to?

PRINCIPLE 2

CONTEXT

The public realm is the space that is accessible and considered open for everyone to use. Data on the use of the public realm are data that are generated by the people located within that same space.

We therefore believe that this data should also benefit everyone who uses the public realm, and access to them should not be limited just to the owner of the device(s) that collect those data. However, it is obvious that some data, such as sensitive or personal data, are not suitable to be released publicly. That's why we think it is important to have a system in place that is able to make independent assessments on providing access to publicly collected data.

PRINCIPLE 2

Publicly collected data should be made available, where appropriate, by an independently accountable data trust. These trusts should evaluate individual requests for data, and provide justifications for when data cannot be released.

For big cities, mobility is of paramount importance. Data could be used to improve both transportation systems and general health and safety by monitoring routes.

[sector employee]

Cities collecting data should communicate that the data are collected with the goal of improving their lives. It should be a revenue generator that is going back into improving the city.

[DSF industry]

If data collected in the public realm are mostly created by citizens, they should be able to see how the collection of them can contribute to the common good, and therefore benefit society.

Where data or derived information could be used for public benefit it should be made available to the relevant authorities. In some cases, data may be made available to public authorities only: for example where privacy or safety issues make the data unsuitable to be publicly available. This assessment should be carried out by a data trust.

FURTHER EXPLANATION

As defined by the Open Data Institute, there are different interpretations of the term data trust:

- a data trust as a repeatable framework of terms and mechanisms;
- a data trust as a mutual organisation;
- a data trust as a legal structure;
- a data trust as a store of data;
- a data trust as public oversight of data access;

EXAMPLES

1. London Data Store

The London Data Store is a free, open data-sharing portal created by the GLA allowing access to over 700 datasets about the capital; including data on traffic, crime, air quality and planning.

2. ODI/GLA/RBG Data Trust Pilot

The Open Data Institute (ODI) ran a pilot together with the Greater London Authority (GLA) and the Royal Borough of Greenwich (RBG) to explore whether a data trust model could support sharing of city data. Two use cases were explored within the areas of mobility (technology to increase parking data) and energy (energy efficiency of a social housing block through monitoring and controlling a retrofitted communal heating system).

After running the pilot the ODI concluded that in these use cases, a data trust would not necessarily improve the outcomes, but that there is value in exploring the feasibility of a data trust in the longer run.

PRINCIPLE 3

CONTEXT

When furniture is built in the public realm, a city is offering up a valuable part of its physical public space. The public realm provides value to citizens in many different ways: by acting as a meeting place, open-air spaces to move around in, green space, areas for recreation, etc.

Digital street furniture has the potential to add new types of value to this space for citizens: as a place to connect to WiFi, to prepare the infrastructure for 5G coverage, to allow greater understanding of a city's air quality, etc.

However, the value extracted by DSF providers from the public realm (including the value of data collected) does not always reflect of the value that is provided back to the community, or, in fact, the space it takes up. In cases where the technology does benefit the community in some way, this is currently not being felt by the communities directly impacted by its installation.

PRINCIPLE 3

Digital street furniture should only be placed in the public realm when it explicitly demonstrates public benefit.

There must be a fair value exchange between the place, its users and inhabitants and the street furniture. This can be seen either directly through services provided or indirectly through revenue share.

*Costs must be justified by seeing direct value to the community. Needs to demonstrate: needs to be obvious.
[DSF industry on value for citizens]*

*We need a hook to engage people for community value. [...] Content is a value point.
[sector employee]*

*[Digital street furniture could] “take contactless donations to fund local projects “
[workshop participant]*

*[digital street furniture could] ...take contactless donations to fund local projects.
[workshop participant]*

*[digitalstreet furniture could] ...be placed at the right intervals to encourage physical activity.
[workshop participant]*

*You can't just go in and do it. It's got to be steered by community, otherwise it doesn't make sense.
[city council about DSF industry]*

FURTHER EXPLANATION

Public authorities permitting DSF deployments should assess and approve a suitable balance of the value of the services delivered, the value of the space occupied, the revenue generated and its beneficiaries and any detrimental effect it may have on the existing streetscape.

This value exchange should consider public benefit at both a local and national level.

Cities could develop DSF strategies identifying areas and sites where different types of street furniture and services are required or would be acceptable. Cities should also consider if advertising, data collection or other revenue generation strategies are acceptable as a means to pay for services. If these models are permitted, its potential revenue should be calculated to allow a fair value exchange through services or revenue share with the city or community.

- 15** DSF should be suitable and appropriate to the local environmental, social and economic context, in terms of both services it delivers and the physical form it takes. DSF should not exacerbate existing street clutter: where possible, it should consolidate existing functions in order to reduce unnecessary detrimental impact or imposition on the streetscape.

The potential unintended consequences of DSF should be carefully considered and reviewed before deployment.

Considerations to be raised during the value calculation might include:

- What are the economic, social and environmental values?
- What is the value of providing WiFi in a given local area?
- What services might be most valuable in a given local area?
- What is the value of providing 5G in a given local area and on a national scale?
- How much revenue is generated and how much of that should go to the public authority or local community?
- How might the design of a piece of DSF be adapted to suit different street contexts?
- What other assets could occupy the same space and what is the utility value of a given area of space?

EXAMPLE**1. LinkNYC Revenue Share**

Intersection's LinkNYC digital advertising screens in New York operate under a revenue share model (<https://www.link.nyc/faq.html#helping-the-city>), where in addition to providing free public WiFi and phone charging, parthalf of the revenue generated from advertising is shared with the city of New York. Some of the advertising space was also offered, free, to nonprofits and local small businesses.

However, it was reported in May 2019 (<https://www.gothamgazette.com/city/8502-city-s-much-heralded-link-kiosks-not-generating-projected-revenue>) that the kiosks were not generating the minimum level of revenue that had been guaranteed to the city, and had encountered problems such as the tablet and phone being used for illegal purposes

PRINCIPLE 4

CONTEXT

The public realm is a valuable space, and any item placed within it should justify the value of the space it takes up. The TfL Better Streets guidance cites de-cluttering streetscapes as requiring “a more strategic justification for every individual piece of equipment in the street.”

For many items of street furniture, this justification might not need to be re-evaluated on a regular basis. However, the rapidly evolving nature of digital technologies may put some DSF at risk of quickly becoming obsolete, which could result in further contributing to street clutter.

The life cycle of any DSF objects should therefore be thoroughly considered before they are deployed, and the objects should be reviewed (and re-justified) to endure they are still providing a fair value exchange.

PRINCIPLE 4

The full life cycle of any object placed in the public realm should be considered and the objects should be subject to review or reassessment on an agreed regular basis.

I remember the council being very excited about putting them [digital totems] up, but never being very clear what purpose they would have or value they would bring.

[urban planner]

FURTHER EXPLANATION

There should not be any assumptions that a digital street furniture deployment is permanent. As society changes over time, public spaces should also be adapting to the changing needs and wishes of the people using that space.

Providers, councils and communities should work together to understand the current and future use of an area before deploying DSF in order to ensure deployments are aligned with - and where possible, complement - future plans for their surroundings and the wider area.

EXAMPLES

1. Design Council - Design Review Principles

The Design Council has published a set of principles for carrying out Design Reviews: an “impartial evaluation process in which a panel of experts on the built environment assess the design of a proposal”. While these reviews are mainly intended for reviews of larger scale plans prior to implementation, similar reviews could be carried out at a more frequent scale to ensure that deployments are meeting the needs of the area, the people who use them, and the provider - all of which are needs which may have changed since they were first installed.

PRINCIPLE 5

CONTEXT

The benefits and services that DSF provides - whether it be free phone charging, wayfinding or access to emergency equipment - should be accessible to everyone.

While this principle should apply to all street furniture, the potential breadth and omnipresence of services that DSF could provide - upon which some people may depend heavily, such as wayfinding - means that there should be particular consideration of how these services are made available to anyone who might need to use them, regardless of whether they agree to providing data or not.

PRINCIPLE 5

The design of street furniture should reflect the diversity of the people who use it, not excluding any groups or individuals and not imposing any barriers to its use.

Good design [of DSF] should reflect the diversity of its users and not impose barriers of any kind

[workshop participant]

The information around data collection that Principle 1 covers should equally be accessible to all potential users.

22 If DSF forms a part of the public streetscape, the design should be inclusive and consider the local and wider community. The design of DSF objects should allow everyone to access the services in a way which does not hinder some users.

Additionally, related to Principle 3, the design should not unintendedly exclude certain users from accessing its services or benefits.

EXAMPLE

1. Design Council - Principles of inclusive design

In 2006 the Design Council (then CABI) published a report with principles of inclusive design. In it, a series of main principles and definitions of inclusive design are formulated in order to create places that everyone can use, regardless of age, gender, physical ability or income and other social factors. This inclusive approach to design offers new insights into the way people interact with the built environment and especially the public realm.

Thank you

How were the Principles developed?

Roundtable: digital street infrastructure (2,5 hrs)

Attendees representing:

- InLinkUK
- Clear Channel
- Arup
- Urban Innovation Company
- Strawberry Energy
- Hello Lamp Post
- Southwark Council
- Newcastle City Council
- GLA
- TfL
- Future Cities Catapult



We held our initial roundtable discussion at the Urban Innovation Centre, London, on 21 February 2019. There were 18 attendees in total, representing 11 different companies, cities and organisations. The goal of the roundtable discussion was for the participants to share their knowledge and perspectives surrounding the planning, manufacturing or design of digital street furniture to potentially inform a shared vision of how the future of the digital streetscape might, and should, look.

The afternoon started with Jon Hodges, Streetscape Design Manager from TfL, presenting on their streetscape design and digital strategy. This was followed by Paul Armstrong, Business Management Partner at Newcastle City Council, on the planning and placement of digital furniture in the streetscape from the cities' perspective.



Following the presentations the participants identified as opportunities for the future of digital street furniture. They then shared examples of what they would consider to be “good” and “bad” applications of technology in the streetscape.

The participants were put into teams and the initial principles of good deployment were explored, grouped by themes ranging from data collection and ownership to funding and value exchange. In addition the main challenges that each participant faced in those categories were shared and discussed with the whole group.

Finally, brief pledges were formulated individually to figure out actionable and pragmatic ways of working together.

Third Thursday

On the same evening - 21 February 2019 -we hosted a themed networking event on digital street furniture. It featured talks and a panel discussion by Usman Haque from Umbrellium, Matthew Trigg from InLinkUK and Geoffrey Stevens from Future Cities Catapult, and was attended by over 130 people with invested interest in the future of the digital streetscape.



