DSIT | Connected places research

Technical Annexe

1. Background and context

1.1. Research objectives

To support policy development, the Secure Connected Places Team within the Department for Science, Innovation and Technology ('DSIT') commissioned Thinks Insight & Strategy ('Thinks', 'we') to conduct qualitative research with professionals in the higher education, rail, aviation, sports and culture sectors who are responsible for the procurement, deployment, and management of connected places technologies.

The purpose of this research is to provide insight into approaches to connected places and cyber security, including:

- How do stakeholders in these sectors understand connected places?
- How, if at all, are connected places technology currently being deployed in these sectors?
- What are the drivers and barriers to uptake of connected places technology?
- What approaches are being taken to cyber security?
- What is the role of cyber security guidance, if any?
- Are there any future trends for connected places technology in these sectors?

1.2. Method

We used a predominantly qualitative approach described below:

Rapid literature review **July 2023**	Before undertaking the interviews, we conducted a rapid literature review. The purpose of this was to ensure the findings of the primary research built upon, rather than replicated, existing research and guidance. It also ensured that we understood the context in which the target sectors understood connected place and the extent and nature of cyber security guidance in this space. Thinks collated a list of 20 sources, which comprised:

	• previous internal research conducted by Thinks, • existing connected place and cyber security guidance (both general and aimed at the target sectors), found either through Thinks' desk research, or recommended by DSIT or stakeholders working in these sectors. The final source list was reviewed and signed off by DSIT. A short summary of findings from the literature review was presented to DSIT before Thinks commenced the qualitative interviews. This summary can be found in the overarching thematic report
Primary research (qualitative in-depth interview and follow up survey) **Thursday 3rd August - Friday 1st December 2023**	After having conducted a rapid literature review, Thinks conducted 50 in-depth, qualitative interviews with professionals working in the higher education, rail, aviation, sports and culture sectors. These interviews were 60 minutes long, and afterwards professionals also completed a 5-minute online survey. All interviewees were employed by either directly by their organisation or worked as a consultant. All had responsibility for at least one of the following: • Designing and procuring connected places, • Deploying and managing connected places, • Cyber security associated with connected places. Some example job titles in the sample included: Chief Information Security Officer, Director of Estates, Head of

	IT, Head of Operations, and Head of Business Intelligence. Participation in the research was carried out in accordance with the Market Research Society Code of Conduct, on a strictly anonymous and confidential basis, and this was explained to participants at the start of each interview. The interviews took place between All were 1-to-1 between the moderator and participant, and took place via Microsoft Teams.

1.3. Outputs

Following the completion of the final interview, Thinks delivered the following documents to DSIT:

- Overarching thematic report, including findings from all interviews, the literature review and post-interview surveys
- 3 sector reports: Higher Education, Transport (Rail and Aviation combined), and Sports and Culture
- Technical report
- Anonymised transcripts of 50 interviews

1.4. Challenges, mitigations and limitations

A key challenge was the recruitment of relevant professionals to take part in the research, particularly in the aviation and rail sectors. This was due to a number of factors:

- Initially, **we were recruiting for only technology focused roles which limited our scope**. The initial interviews showed us that professionals responsible for venue / estate management also had responsibility for connected places projects within their organisation. We therefore widened the scope of relevant job roles when building our internal sample.
- Initial interviews also suggested that **organisations may be using connected places technology unknowingly**, for example, they may have installed people counting cameras but are not thinking about it as a connected place. We therefore adjusted our recruitment materials to lead with specific devices, rather than 'connected places' in general.
- There are **fewer aviation and rail organisations** compared to sports, culture and higher education. We used a multi-pronged approach to

recruitment including list building, partnering with recruitment agencies, snowballing, and DSIT contacts.

We used a qualitative approach, which allowed us to be exploratory and understand the *why* behind professionals' approach to technology and cyber security. However, as with all research, there are limitations:

- The research is not representative of all organisations in the UK. This means we are unable to describe the prevalence of barriers or drivers to connected places.
- Whilst we have described differences between and within sectors, these are only qualitative. We are unable to provide a proportion of the professionals holding each view.

2. Literature review source list

No.	Article/report name	Author/ client organisation	Year published	Link
1	Meeting digital and technology standards in schools and colleges	Department for Education	2022 (updated 2023)	https://www.gov.uk/guidance/meeting-digital-and-technology-standards-in-schools-and-colleges/cyber-security-standards-for-schools-and-colleges
2	Aviation Cyber Security Strategy	Department for Transport	2018	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/917529/aviation-cyber-security-strategy-document.pdf
3	Secure Connected Places Playbook	DSIT	2023	https://www.gov.uk/guidance/secure-connected-places-playbook
4	Governance in a box (from Playbook)			
5	Procurement and supply chain management (from Playbook)			
6	Conducting a STRIDE-based threat analysis (from Playbook)			
7	Connected Places Cyber Security Principles	National Cyber Security Centre	2021	https://www.ncsc.gov.uk/files/NCSC-Connected-Places-security-principles-May-2021.pdf
8	Secure connected places (smart cities) guidance collection	DSIT	2021 (updated 2023)	https://www.gov.uk/government/publications/secure-connected-places-smart-cities-guidance-collection

9	Surveying UK connected places	DSIT / Department for Culture, Media and Sport	2022	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1123191/Surveying_UK_Connected_Places_-_final_report__1_.pdf
10	Cyber Essentials scheme: overview	DSIT / Department for Culture, Media and Sport	2014 (updated 2023)	https://www.gov.uk/government/publications/cyber-essentials-scheme-overview
11	Cyber security guidance for business	DSIT / Department for Culture, Media and Sport	2016 (updated 2023)	https://www.gov.uk/government/collections/cyber-security-guidance-for-business
12	UK Safety Tech Sector: 2023 analysis	DSIT / Department for Culture, Media and Sport	2023	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1160085/uk_safety_tech_analysis_2023.pdf
13	The Connected Places Market in the UK 2022	DSIT / Department for Culture, Media and Sport	2021	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1109443/The_connected_places_market_in_the_UK_2022.pdf
14	National Cyber Strategy 2022	HM Government	2022	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1053023/national-cyber-strategy-amend.pdf

15	The Cyber Threat to Sports Organisations	National Cyber Security Centre	2020	https://www.ncsc.gov.uk/report/the-cyber-threat-to-sports-organisations
16	Cybersecurity Best Practices for Smart Cities	National Cyber Security Centre (with international collaborators)	2023	https://www.cisa.gov/sites/default/files/2023-04/cybersecurity-best-practices-for-smart-cities_508.pdf
17	Manual for Smart Streets	Technology Transport Forum	2023	https://ttf.uk.net/manual-for-smart-streets/
18	Cyber Security for Higher Education Institutions	National Cyber Security Centre	Varied	https://www.ncsc.gov.uk/section/education-skills/cyber-security-heis-feis
19	Rail Code of Practice for Security Informed Safety	Centre for the protection of National Infrastructure (now NPSA)	2022	https://www.npsa.gov.uk/system/files/documents/rail-code-practice-security-informed-safety.pdf
20	ITS Cyber Sign-posting guidance	Technology Transport Forum	2021	https://ttf.uk.net/projects/its-cyber-sign-posting-guidance/

3. Recruitment of participants

3.1. Recruitment specification

During the research design phase we developed and agreed a sample specification for this research. This was informed by findings of the desk research and agreed with in collaboration with DSIT. We covered a specification regarding:

- Agreement of sector specific quotas, including sub-group quotas
- Agreement of relevant job titles for each sector
- Regional quotas
- Quotas on level of engagement with connected places

Below is the final specification we developed:

<table>
<tr><th>Criteria</th><th colspan="4">Total (50 interviews)</th></tr>
<tr><td rowspan="2">Sector</td><td>Rail</td><td>Aviation</td><td>Higher education</td><td>Culture & Sport</td></tr>
<tr><td>Min. 10</td><td>Min. 8</td><td>Min. 15</td><td>Min. 10</td></tr>
<tr><td>Suppliers</td><td colspan="4">In addition to the above:
Max. 7 stakeholders who work for large suppliers who support the above sectors (e.g. consultants, engineering firms)</td></tr>
<tr><td>Organisation size</td><td colspan="4">Across the sample:
Min. 5 small to medium sized (less than 250 employees)
Min. 10 larger organisations (250 or more employees)</td></tr>
<tr><td>Region</td><td colspan="4">Across the sample:
Min. 10 from England including a good mix of regions
Min. 5 from Scotland including a good mix of regions
Min. 5 from Wales
Min. 3 from Northern Ireland</td></tr>
<tr><td>Deployment of connected places tech</td><td colspan="4">Across the sample:</td></tr>
</table>

	• Min. 5 to be familiar with but have not deployed connected places technology • Min. 5 to have first deployed connected places tech in the last year • Min. 5 to have first deployed connected places tech more than a year ago
Type of connected places technology	To monitor throughout recruitment and ensure we're recruiting a spread of stakeholders who use: • IoT devices in a place based context • Networks for data transmission (including Wi-Fi, Bluetooth, mobile networks and IoT networks) • Data aggregation for visualisation and insight • Whole stack solutions • Consulting / strategy / managed services
Required responsibilities	To monitor throughout recruitment and ensure all to be responsible for at least one of the following within their organisation: • Designing connected places systems • Procuring connected places technology • Implementing connected places technology • Managing connected places technology • Using data from connected places technology
Level of responsibility	All to either have shared or sole decision-making responsibility.

Initially we targeted stakeholders with the following job titles:

- Chief Information Security Officer
- Head of Innovation and Technology
- Head of Digital
- Connected places (or smart city/campus/airport/railway) project and strategy leads and officials
- Innovation project and strategy leads
- Head of IT / other IT personnel
- Cyber security architects and engineers
- Commercial and procurement leads / officials

During fieldwork, we found that while we were occupied by the IT & security side of organisations, there were potentially additional roles to include, which were

relevant to connected place technology. Even though it was likely that the above roles would give the final sign off for a connected place technology to be deployed within an organisation, there were other roles (e.g., people in charge of facilities, or who oversee visitor experience or energy efficiency) who would manage the procurement and strategy for these types of technologies.

Therefore, we started targeting stakeholders with job titles such as:

- Venue Director
- Head of Facilities
- Head of Visitor Experience
- Operations Director

We added an additional layer of screening for these new potential respondents to ensure that they are engaged with these types of technology.

3.2. Recruitment approach

Recruitment for the 50 participants was undertaken using a combination of in-house recruitment and recruitment via our network of specialist recruitment agencies. In-house recruitment involved sample building by a dedicated team at Thinks. We identified a total of 693 potentials, who were reviewed and signed off by DSIT before we reached out to them. We sent an invitation to every respondent and chaser emails were sent up to 2 times.

We reached out to the potential respondents with a personalised email based on their sector. We also attached an information letter with contact details from DSIT, to confirm the legitimacy of the research and to provide detailed information about the research and next steps. In these emails we were offering stakeholders multiple ways to get in touch with us and to opt in – via email or by filling out a Microsoft Form, which would also function as a screening form.

Throughout the recruitment period we reviewed and adapted our recruitment materials e.g. by shortening the body of the message, making it more engaging and concise. We kept our schedules flexible by offering stakeholders out of office hours and by shortening the length of the interview if needed.

We also used social media (LinkedIn & Twitter X) to reach out to potential respondents. Posts were reviewed and signed off by DSIT ahead of publishing them.

We did not provide cash incentives to the participants, incentives were offered via Love2Shop vouchers, Ayda vouchers and donations to a preferred charity.

We also asked DSIT to put us in touch with your warm contacts, furthermore we snowballed from our existing interviews, and asked participants to connect us with their peers.

Finally, we worked closely with our recruitment partners who specialise in finding this audience. Participants found via these partners were first screened, then shared with DSIT in form of a short, anonymised biography for sign off before scheduling them for an interview.

3.3. Recruitment materials

3.3.1. Invitation email

Internally, we reached out to stakeholders using the following template for our **invitation email** was as follows:

Subject: Share your views on technology in [rail/aviation/higher education/sports and culture] - £100 (later increased to £150 and £175)

Dear [X],

Thinks Insight & Strategy have been commissioned by the Department for Science, Innovation and Technology to conduct research with professionals in the rail sector responsible for digital innovation and [smart station/airport/campus/connected places] projects (referred to by DSIT as connected places) within their organisation.

We have identified you as a key stakeholder and would like to invite you to take part in a 60-minute interview and complete a short (5 minute) online survey. **As a thank you for your time, we will provide you with an honorarium of £100/£150/£175 via your choice of an Ayda voucher, Love2Shop voucher or charity donation.**

It is not essential that smart station technology is being used within your organisation to take part in the research.

We have attached more information about the research and its purpose in the PDF.

If you are interested in taking part, please complete the following form to register your interest: https://forms.office.com/e/gS5UqBygPL

If you think another colleague at your organisation is more suitable, please forward on this email.

If you have any questions, please do not hesitate to get in touch.

[Name and signature]

3.3.2. Invitation letter

Attached was the below **information letter** in a PDF to each invitation email, which had Thinks' and DSIT's logos added to the header of the document:

Thank you for your interest in taking part in the research. This note provides a summary of key information about the research. If you would like further information or if you have any questions please contact:

- **REDACTED**
- **REDACTED**

1. About the research and its purpose

1.1. The client organisation

The Secure Connected Places team sits within the Cyber Security and Digital Identity Directorate of the Department for Science, Innovation and Technology. They are responsible for supporting the secure and sustainable deployment of connected places technologies across the UK. Their work feeds into the objectives set out in the National Cyber Strategy.

1.2. The purpose of the research

The Secure Connected Places team are committed to delivering effective policy, based on the views and needs of relevant stakeholders. They have therefore commissioned Thinks Insight & Strategy to conduct research **to understand the approaches to connected places and cyber security in four sectors: rail, air, education, and culture & sport.**

The findings from this research will be used to create an evidence base to inform DSIT's future policy interventions aimed at promoting the security of connected places.

1.2.1. What is a connected place and connected place technology?

A 'connected place' is sometimes referred to as a 'smart city' or 'smart airport' etc. can be described as a community that integrates information and communication technologies and IoT devices to collect and analyse data to deliver new services to the built environment (e.g. an airport, rail station, campus, museum or stadium) and enhance the quality of living for citizens.

A connected place will use a system of sensors, networks, and applications to collect data to improve its operation, including its transportation, buildings, utilities, environment, infrastructure, and public services. Below we have included examples of how connected places technology may be deployed in the relevant sectors.

Sector	How connected place technology may be deployed
Rail	• Capacity monitoring e.g. by detecting how many passengers are on a platform and the extent of usage of facilities such as bike racks to improve passenger experience and inform organisational planning. • IoT devices such as AI cameras deployed for station maintenance. • Station environmental monitoring and automated lighting.
Airports	• Sensors to monitor a terminal's environment such as temperature and CO2 levels. • Use of facial recognition to minimise passenger time at security and immigration controls.

	• Monitoring footfall and movement patterns in airports to improve accessibility and terminal design.
Universities	• Monitoring footfall to understand patterns of usage of facilities. • IoT devices to monitor building occupancy and to manage a building's environmental and lighting systems. • Use of facial recognition and alert systems to promote student safety. • Cameras and sensors to guide visitors to available parking spaces.
Cultural and sports venues	• Sensors that count the number of visitors to a particular venue. • Cameras and sensors to provide up to date information on empty parking spaces and queue times for visitors. • Sensors that monitor footfall, movement patterns and dwell times to gather data on how visitors are using the facilities. • Facial recognition cameras used to promote citizen safety or individuals banned from the premise.

2. Who we're looking to hear from

We are looking to hear from professionals within organisations in the relevant sectors i.e. rail, education, culture & sport, who are responsible for designing, procuring and managing connected place technology throughout its lifecycle. We are also interested in hearing from large suppliers, such as consultancies or engineering firms, who support these organisations. We are interested in hearing from organisations at all stages of development, including those that have not yet deployed connected place technology within their organisation.

We anticipate the following types of roles will be involved in this work (this is not an exhaustive list):

- Chief Information Security Officer
- Head of Innovation/Technology
- Head of Digital
- Head of Digital Transformation
- Station/Estate/Campus digitalisation strategy lead

3. Requirements for the research

We require anyone who is interested in the research to complete a short screening questionnaire linked here: https://forms.office.com/e/wxGUxYDJRR

The research itself is comprised of two parts:

- A 60 minute interview over the phone or online
- A 5 minute follow up survey

We will provide you with an honorarium of £100 (later updated to £150/£175] either via a Love2Shop or Ayda voucher or charity donation as a thank you for your time.

4. How we'll protect your data and anonymity

Your participation in the research will be anonymous:

- Thinks Insight & Strategy will collect your name and contact details as part of the fieldwork process. These will be held on their servers for 12-months and then deleted. They will not be shared with DSIT.
- We will record and transcribe all interviews. All transcripts will be anonymised before they are shared with DSIT.
- DSIT may choose to publish the findings of the research. However, neither you nor your organisation will be identified in any of the reporting.

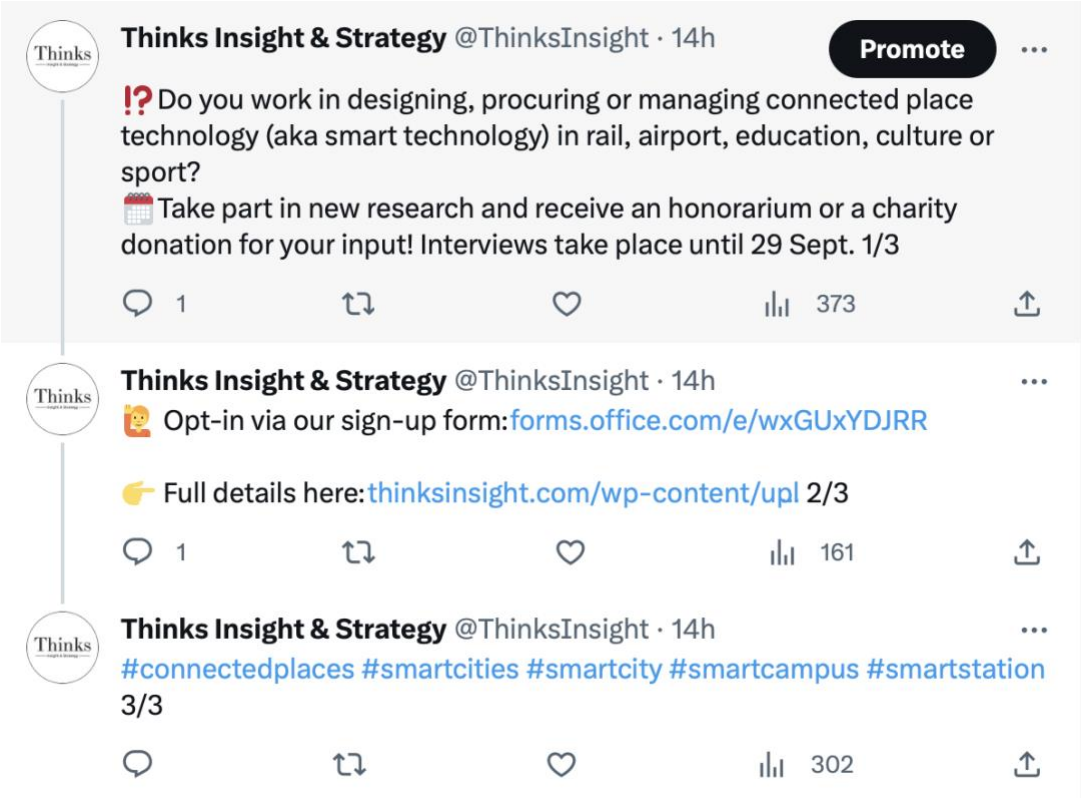
You can find a copy of our privacy policy here: https://thinksinsight.com/privacy/

3.3.3. Social media

We shared the following posts to social media:

LinkedIn post: https://www.linkedin.com/feed/update/urn:li:activity:7099788881385926658/

Twitter X post: https://twitter.com/ThinksInsight/status/1694027292492673362



3.3.4. Screening questionnaire

1. **What is the size of the organisation you work for? [SINGLE CODE]**
   a) 0 – 9 employees
   b) 10 – 49 employees
   c) 50 – 249 employees
   d) 250+ employees

2. **A 'connected place' integrates IT and IoT devices to collect and analyse data to deliver new services within an environment.**

We describe the following types of technology as 'connected place technology' i.e. they make up a 'connected place system':

- IoT devices (e.g. sensors, actuators) in a place based context
- Networks for data transmission (including Wi-Fi, Bluetooth, mobile networks and IoT networks)
- Data aggregation for visualisation and insight
- Whole stack solutions
- Consulting / strategy / managed services

Thinking about connected place technology, which of the following best describes its status within your organisation? [SINGLE CODE]

a) We do not use and are not thinking about using connected place technology within our organisation

b) We do not use, but are thinking about using connected place technology within our organisation in the future

c) We first deployed connected place technology in the last year

d) We first deployed connected place technology more than a year ago

3. **Which of the following best describe your responsibilities in relation to connected place technology within your organisation? Please select all that apply. We have also provided an 'other' text box if you'd like to share more detail. [MULTI CODE]**

a) Designing connected places systems

b) Procuring connected places technology

c) Implementing connected places technology

d) Managing connected places technology

e) Using data from connected places technology

f) My organisation's cyber security

g) Other – please specify [OPEN TEXT]

4. **Finally, how would you describe your level of responsibility? [SINGLE CODE]**

- I have sole decision making responsibility
- I have shared decision making responsibility
- I am not involved in decision making

5. **Thank you for all your responses. Please could you share your contact details and a member of the Thinks Insight & Strategy team will get back to you to arrange an interview.**

Your contact details will only be shared with Thinks Insight & Strategy and not passed on to the Department Science Innovation and Technology.

You can find a copy of Thinks Insight & Strategy's privacy agreement here.

4. Depth interview achieved sample breakdown

The achieved sample contained a spread of business sizes, nations and sectors, meeting the specification quotas. Since this research is qualitative, the findings in this report are intended to be illustrative of different businesses' experiences, and not necessarily representative. The coverage of different groups recruited ensured a breadth of business experience, and also allowed for indicative findings by subgroup (sector and size).

4.1. Achieved quotas

Size (employees)	Total	Nation (in which primarily based)	Total
Large (250+)	**34**	England	**40**
Medium (50-249)	**7**	Scotland	**1**
Small (10-49)	**9**	Wales	**2**
		Northern Ireland	**/**
		UK-wide	**7**

Sector	Employee	Consultant	Total*
Rail	5	4	**9**
Aviation	4	1	**5**
Culture & Sport	16	1	**17**
Higher education	18	2	**20**

*Please note this adds up to 51 since one consultant (interview no. 50) worked in both the rail and higher education sectors and is counted in both in this table.

4.2. Full interview sample breakdown

No.	Sector	Size	Nation	Job title
1	Culture & Sport	Small	England	Head of Digital Strategy
2	Higher education	Large	Scotland	Chief Information Officer
3	Aviation	Large	England	Head of Innovation and Intelligent Automation
4	Culture & Sport	Large	England	Chief Digital Information Officer
5	Rail	Large	England	Head of Continuous Improvement & Efficiency
6	Culture & Sport	Large	England	Head of Technology
7	Aviation	Large	England	Chief Technology Officer
8	Higher education	Large	England	Director of Digital Technologies
9	Culture & Sport	Large	England	Director of Estate
10	Rail	Large	UK	Head of Digital Experience / Digital Transformation Leader
11	Higher education	Large	England	Chief Information Security Officer
12	Aviation	Small	England	Consultancy - Managing Director
13	Rail	Medium	UK	Programme Lead (Commercial Partnerships) (Secondment)
14	Culture & Sport	Medium	England	Head of IT
15	Higher education	Large	England	Network Operations Manager
16	Higher Education	Small	England	Consultancy - Advisor on the Digital Built Environment
17	Rail	Large	England	Consultancy - IT Procurement Manager
18	Culture & Sport	Medium	England	Director of Finance and Administration, Operations & Data & Technology
19	Higher education	Large	England	Director of IT & Digital Infrastructure

20	Higher education	Large	England	Head of Innovation
21	Higher education	Large	England	Director of Technology
22	Rail	Medium	England	Consultancy - Managing Director
23	Higher education	Large	England	CIO
24	Higher education	Large	England	Director of IT
25	Culture & Sport	Medium	England	VP, Business Intelligence
26	Higher education	Large	England	Head of Digital Architecture
27	Higher education	Large	England	Chief Information & Transformation Officer
28	Culture & Sport	Small	Wales	Operations Director
29	Rail	Large	UK	Enterprise Services Manager
30	Culture & Sport	Small	England	Joint CEO
31	Culture & Sport	Medium	UK	CEO
32	Culture & Sport	Small	England	Director of Operations and Enterprise
33	Higher education	Large	England	Head of Digital Portfolio
34	Culture & Sport	Medium	England	Director of Audience
35	Culture & Sport	Small	Wales	Marketing and Development Director
36	Culture & Sport	Large	England	Digital Transformation CTO
37	Higher education	Large	England	Chief Information Security Officer
38	Culture & Sport	Large	England	Consultancy - Strategic Lead - Data
39	Higher education	Large	England	Research Centre Director

40	Aviation	Small	UK	Director/Engineer
41	Higher education	Large	England	Director - Connected & Autonomous Automotive
42	Culture & Sport	Large	England	Head of Property and Facilities
43	Higher education	Large	England	Lecturer in Cyber Security & Artificial Intelligence
44	Higher education	Large	England	Head of Digital Learning
45	Aviation	Large	UK	Group Head of Capital and Planning
46	Rail	Small	England	Consultancy - Managing Director
47	Rail	Large	UK	Head of Strategy & Operational Delivery
48	Culture & Sport	Large	England	Director
49	Higher education	Large	England	Director of Library & IT Services
50	Rail / education	Large	England	Consultancy - Energy Manager

5. Research materials

5.1. Discussion guide

About this discussion guide

The purpose of this document is to serve as a guide to inform the flow of the discussions, rather than a definitive list of questions to cover. As these are qualitative sessions, the moderator will use the guide flexibly and be guided by what comes out of the discussions.

In this discussion guide, instructions to the moderator are *italicised* and key questions are **bolded**.

Moderators please review the stakeholder's screening information prior to conducting the interview. In particular, please note the sector and if their organisation is already using connected places technology (or not). The discussion will need to be tailored accordingly, for example using the language of 'smart stations' throughout.

Section and aim	Key questions and probes	Time	Total
Section 1: Introduction and warm-up **Aim:** To understand the context for views shared later in the interview. In particular, understanding more about the stakeholders' organisation and their role within it.	*Moderator to introduce themselves, Thinks Insight & Strategy and the topic of the research:* Thinks Insight & Strategy has been commissioned by the Secure Connected Places team within the Department for Science, Innovation and Technology to conduct research with [air/rail/university/culture/sport] professionals to understand their approach to smart [airports/stations/campuses/venues] projects (sometimes referred to as connected places) and cyber security. We are conducting this research with a range of organisations across four sectors. The findings from the interviews will be used by DSIT to support them with policymaking. *Explain terms of the session:* • The research findings will be anonymised. Neither yourself nor your organisation will be able to be identified in our report.	c.7	c.7

	• The interview will be recorded and transcribed. An anonymised version of the transcript will be shared with DSIT.
	• We'll be talking for 60 minutes – finishing up at [XX]. There will be a short 5-minute survey to complete after the interview.
	
	Moderator to offer stakeholder the opportunity to ask questions about the research process. Moderator to start recording the interview.
	
	Please can you introduce yourself and tell me about your employer and your role. *If necessary, moderator to remind participants that they are not security experts and may therefore need to explain things in 'layman's terms'.*
	
	• What does your company / organisation do?
	• What is your role?
	  ○ Where does your role sit within the wider structure of your organisation?
	  ○ What are your day to day responsibilities?
	  ○ And what are your responsibilities related to connected places within your organisation?
	  ○ *Moderator to understand broad role before briefly probing on responsibilities related to connected places and security.*		

Section 2: Awareness and understanding of connected places **Aim:** To understand how stakeholders think about and understand connected places technology and what drives that understanding.	Thanks so much for the introduction. I'd now like to talk more about connected places in general. *Throughout this section moderator to listen out for and record terminology used to describe connected places technology within their sector.* **What come to mind when I say 'connected places'?** • *Moderator to probe on reasons for word choices.* **How familiar are you with connected places and connected places technology?** • How would you define 'connected places'?	c.10	17

	○ How would you describe the overall aim(s) of connected places? ○ What types of technology would you say are included? • What areas, if any, are you less familiar with or would like to know more about? **Thinking broadly – not just within your sector – which organisations, if any, would you say are leading when it comes to connected places?** • Why do you say that? • And now thinking within your sector specifically: which organisations would you say are leading? Why? **What information sources, if any, do you use to hear about connected places?** • How did you first become aware of connected places?		
Section 3: Deployment of connected places technology **Aim:** To understand how technology is being used within their organisation and the drivers and barriers for deployment.	I'd now like to talk about connected places and your organisation specifically. *Ask if the participant has already deployed technology:* **What aims are you trying to achieve by using connected places technology within your organisation?** • *Moderator to probe on: benefits to service users (e.g. students/passengers) and benefits to the organisation e.g. service efficiencies, economic benefits.* • Have you seen tangible benefits or improvement since deploying connected places technologies? • And what would you say are the drawbacks, if any? Why? **Please can you give me an overview of how connected places technology is being used within your organisation.** • What types of connected places technology is being used within your organisation? *Moderator to probe on:*	c.20	40

	○ *IoT devices (e.g. sensors, actuators) in a place based context* ○ *Networks for data transmission (including Wi-Fi, Bluetooth, mobile networks and IoT networks)* ○ *Data aggregation for visualisation and insight* ○ *Whole stack solutions* ○ *Consulting / strategy / managed services* ● What role does connected places technology play within your organisation? ○ Please can you give me an example of how the technology is being used. ● **What is your process for acquiring or procuring the technology?** **I'd now like to focus on the journey to deploying connected places technology. What first prompted the use of connected places technology in your organisation?** ● *Moderator to understand if it was organic (e.g. updating a specific piece of tech) or part of an overarching strategy.* ● When did you first use connected place technologies? ○ What was the first way the technology was used within your organisation? ● **How have things developed in your organisation since that point?** *Moderator to encourage participant to share the journey.* ○ What is driving the continued use of connected places technology within your organisation? *Moderator to playback any benefits mentioned previously.* ● Is there (now) an overarching connected places strategy within your organisation? ○ *If yes:* When was that established?		

	What, if anything, are / were the barriers to implementing connected places technology within your organisation?
	• *Moderator to allow spontaneous response before probing on:*
	  ○ *Technical expertise of staff*
	  ○ *Funding / resource*
	  ○ *Lack of a need*
	  ○ *Lack of backing from senior management*
	  ○ *Risk aversion*
	  ○ *Lack of access to relevant data*
	  ○ *Lack of clear benefits*
	• How did/do you overcome these barriers, if at all?
	• What, if anything, do you think will be different from now? *Probe on whether they think usage will increase in future and why*
	• What will help you get there?
	• And what do you see as the biggest challenges?
	How do you think connected places technology will be used within your sector in 5 years' time?
	• Are there any use cases you think will be particularly prevalent?
	• *If yes:* What will drive that?
	Ask if the participant has not yet deployed technology:
	Does your organisation have any plans to use connected places technology in the future?
	• Why / why not?
	[If they do plan to use connected places technology] **Please tell me about your plans to use connected places technology within your organisation.**		

	• What connected places technology do you plan to use within your organisation? *Moderator to probe on:*
	  ○ *IoT devices (e.g. sensors, actuators) in a place based context*
	  ○ *Networks for data transmission (including Wi-Fi, Bluetooth, mobile networks and IoT networks)*
	  ○ *Data aggregation for visualisation and insight*
	  ○ *Whole stack solutions*
	  ○ *Consulting / strategy / managed services*
	• What role will it play?
	  ○ Please can you give me an example?
	• What will be your process for acquiring or procuring the technology?
	
	What has prompted you to consider using connected places technology within your organisation?
	• *Moderator to understand if it was organic (e.g. updating a specific piece of tech), to compete with industry competitors or part of an overarching strategy.*
	• What benefits do you expect connected places technology to bring to your organisation? Why?
	
	What, if anything, are the barriers to implementing connected places technology within your organisation? *Moderator to allow spontaneous response before probing on:*
	• *Technical expertise of staff*
	• *Funding / resource*
	• *Lack of a need*
	• *Lack of backing from senior management*
	• *Lack of clear benefits*
	• How do you overcome these barriers, if at all?		

	How do you think connected places technology will be used within your organisation in 5 years' time? ● What will help you get there? And what do you see as the biggest challenges? **How do you think connected places technology will be used within your sector in 5 years' time?** ● Are there any use cases you think will be particularly prevalent? ● *If yes:* What will drive that?		

Section 4: Securing connected places
 	
Aim: To understand cyber security approaches and unmet needs in terms of guidance.
	For the final part of our conversation, I'd like to focus on the security of connected place technology.
	
	What do you perceive to be the main security risks associated with connected places technology projects?
	● Why do you say this?
	● And what are the key risks in relation to your organisation specifically?
	  ○ What makes these a priority?
	● What processes does your organisation have in place for assessing the risks of connected places technologies?
	
	● *If note covered spontaneously, moderator to probe participant on cyber security (as opposed to physical security).*
	
	What is your approach to cyber security and managing the risks associated with connected places within your organisation?
	● Are there any people with responsibility for security and managing risk within your organisation?
	  ○ What is their role(s) and responsibilities?
	● Do you have any governance structures that govern your connected places projects and their cyber security?
		20	60

	• **How do you decide and agree roles and responsibilities for cyber security between your organisation and your suppliers?**
	
	If not mentioned already: **What source(s), if any, do you use for information, guidance and training relating to the cyber security risks you have talked about?** *Moderator to listen out for and probe on mention of government guidance e.g. NCSC, Connected Places Playbook.*
	
	• Are there specialist organisations or sector specific sources that you look to?
	• Why do you go to these sources?
	  ○ What makes a source more / less useful compared to others?
	• How did you find out about them?
	
	If Central Government guidance not mentioned: **Are you aware of any Government guidance relevant to managing the security of connected places?**
	
	• *If yes:* What do you think about that guidance?
	
	How confident, if at all, are you in understanding and managing the cyber security risks we've been talking about?
	
	• How confident are you in other people who use connected places technology within your organisation to do the same?
	  ○ To what extent, if at all, would you say there's a cyber security conscious culture within your organisation?
	
	• What, if anything, would make you feel more confident?		

Section 5: Wrap up and survey	Thank you so much for your time today. The final part of the research is to complete a short 5-minute survey. We can do that over the phone		

Aim: To thank and close the interview and complete the survey.	together now or I can email you a link for you to complete in your own time. • What would you prefer to do? • *Moderator to take the participant through the survey if they would like to do it now or send via email if not.* [Survey link] We'll be providing you with an honorarium for your time and efforts which you can receive either via charity donation or Love2Shop gift voucher. We'll be sending this after we receive your survey response. Which option would you prefer? *(NB. This question is also asked in the survey, but can also offer to follow up via email)* *If charity donation, moderator record the charity the participant would like to donate to.*		

5.2. Post interview survey

Questions

1. **[SHOW ALL, SINGLE CODE PER OPTION, FIX ORDER OF OPTIONS] To what extent, if at all, is using connected technology to improve your services a priority for the following? Please use a scale of 0 – 10 where 0 is not at all a priority and 10 is a high priority.**

Scale:

0 – 10

Options:

a. Your organisation as a whole
b. Your leadership team
c. Other colleagues
d. You personally

2. **[SHOW ALL, SINGLE CODE, FIX ORDER OF OPTIONS] When did your organisation first deploy connected places technology?**

a. Less than 1 year ago
b. 1-2 years ago
c. 3-4 years ago
d. 5+ years ago
e. We haven't deployed any connected places technologies yet

3. **[SHOW ALL, SINGLE CODE PER OPTION, FIX ORDER OF OPTIONS] To what extent if at all would you say that ensuring the cyber security of connected places technology is a priority for the following? Please use a scale of 0 – 10 where 0 is not at all a priority and 10 is a high priority.**

Scale:

0 – 10

Options:

a. Your organisation as a whole
b. Your leadership team
c. Other colleagues
d. The project delivery team
e. You personally

4. **[SHOW ALL SELECTING A-D AT Q2, MULTICODE, RANDOMISE OPTIONS BUT FIX I] What resources, if any, have you used to determine effective security controls and measures to govern your connected places technology? Select all that apply.**

a. Organisational/individual expertise and experience
b. Supplier expertise and experience
c. Central government guidance
d. British or international technical standards
e. Industry guidance
f. Advice from other organisations in your sector
g. Paid-for cyber security consultancy
h. Other
i. None of the above [exclusive]

5. **[SHOW ALL SELECTING A-D AT Q2, SINGLE CODE] Which of the following statements best summarises your organisation's approach to cyber security risks in relation to its connected place ambitions before connected places technologies were deployed?**

Scale:

i. Cyber security was thought about in detail prior to deployment
ii. Cyber security was thought about a bit prior to deployment
iii. Cyber security was not thought about prior to deployment
iv. Don't know

6. **[SHOW ALL SELECTING A-D AT Q2, SINGLE CODE] Which of the following statements best summarises your organisation's approach to cyber security risks in relation to its connected place ambition since deploying those technologies?**

Scale:

i. We regularly review and update our cyber security policies and processes in relation to connected places

ii. We review and update our cyber security policies and processes in relation to connected places, but only on an ad-hoc basis

iii. We don't regularly review or update our cyber security policies and processes in relation to connected places

iv. Don't know

7. **[SHOW ALL, SINGLE CODE] How confident, if at all, do you feel in your understanding of the cyber security risks associated with your connected place ambitions?**

Scale:

Very confident
Somewhat confident
Somewhat unconfident
Very unconfident
Don't know

8. **Does your organisation have a cyber incident response plan?**

Options

a. Yes and it is regularly reviewed
b. Yes but it is not regularly reviewed
c. No
d. Don't know

9. **Thinking about guidance for implementing and managing connected places securely within your organisation. How would you rate the importance of the following factors?**

Scale:

v. Very important
vi. Somewhat important
vii. Neither important nor unimportant
viii. Somewhat unimportant

ix. Very unimportant
x. Don't know

Options

The guidance is…

a. Tailored to the sector in which my organisation is based
b. Written in non-technical language
c. Tailored to the size of my organisation (e.g. number of employees)
d. Tailored to specific connected place technology and devices

10. Which of the following types of guidance and support would be most helpful for you and your organisation to ensure your connected place is secure. Please select up to 3. [MULTICODE SELECT 3]

Options:

a. Sector specific guidance for project managers or organisation leadership
b. Best practice case studies
c. Risk and threat landscape briefings
d. Device specific cyber security standards
e. Sector specific cyber security standards
f. Cyber skills training and capacity building programmes
g. Advice relating to recommended governance structures
h. Guidance on handling data which are not subject to GDPR
i. Facilitation of networking / best practice forums
j. Other (please describe)
k. None of the above [SINGLE CODE]

6. Analysis

6.1. Defining the research question

The first step in our analytical approach was understanding the research objectives. We focused on:

- How do stakeholders in these sectors understand connected places?
- How, if at all, are connected places technology currently being deployed in these sectors?
- What are the drivers and barriers to uptake of connected places technology?
- What approaches are being taken to cyber security?
- What is the role of cyber security guidance, if any?
- Are there any future trends for connected places technology in these sectors?

6.2. Qualitative analysis

We conducted 50 in-depth interviews across four sectors. These all took the form of structured discussions, which moderators tailored 'live' to follow up on areas of interest.

Our approach to analysis of in-depth interviews followed several stages:

- **Preparing the data:** During the interviews, moderators took written notes of key themes and points which stood out to them. In addition, all sessions were recorded and then transcribed to ensure any missed information was picked up at later stages.
  Coding the data: We compiled an analysis grid, which was structured according to the topics in the interview (e.g. understanding of connected places) along the top and then corresponding sector information (e.g. sector, size of organisation) down the left hand side. This grid was populated with key findings and verbatim quotes. This approach allowed us to review the qualitative data in one place and understand differences between and within the sectors.
- **Identifying themes, patterns and relationships**: Throughout the course of the fieldwork period, the project team held several internal discussions about emerging findings. These sessions helped to identify key trends and points of differentiation within and between sectors.

6.3. Drawing the data together

It was important to answer the research questions we:

- **Had an extended brainstorm session**: the full moderation team attended a 2-hour brainstorm. The purpose of this session was to discuss the analytical themes.
- **Internally scrutinised the findings**: The reporting outputs were reviewed by a Director before they were shared with KCC. This review

made sure that the analysis was relevant and useful for DSIT (rather than 'noisy' i.e. reporting back on everything, regardless of relevance).