Department for Transport

CATAPULT Connected Places

Assessing how to grow the market for interventions to improve transport safety for women and girls

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Foreword

This report summarises a study conducted by the Connected Places Catapult on how to grow the market for interventions that improve transport safety for women and girls in England. Connected Places Catapult is the UK's innovation accelerator for cities, transport, and place leadership. It was commissioned by the Department for Transport in response to the Violence Against Women and Girls Transport Champions review of cross-modal transport safety.

Through desk research, stakeholder interviews and workshops, and a market scan, the research sought to:

- Better understand the nature of violence against women and girls on the transport system
- Identify interventions related to transport safety for women and girls
- Discover market challenges and opportunities

The research findings led to four recommendations for how to grow the market of interventions in England:

1. Develop, test, and validate interventions with those impacted
2. Build capabilities for shared metrics and data
3. Coordinate shared learning
4. Continue to support intervention development through targeted funding

The ‘Transport safety for women and girls interventions scan’ gives an overview of the spread and types of interventions that are available relating to violence against women and girls on the transport system. The list is not exhaustive, nor is there evidence of the impact of these interventions.

Warning: You might find the content in this report triggering and upsetting, as it includes accounts of sexual harassment and violence.

Acknowledgements

We want to thank all those who contributed to the workshops and interviews. Their perspectives and experiences formulated the insights presented in this report and shaped our understanding of VAWG and related interventions on the transport system. Their views led us to the recommendations presented in this report.

We would also like to thank Open Inclusion and SMPL Research for carrying out research with disabled women and school-aged girls, respectively. Their work gave us rich and nuanced insights into the experiences that some disabled women and school-aged girls have while travelling and highlighted the need for further research in this space.

Executive summary

Introduction

Personal safety for women and girls on the transport system is a complex issue. Assessing incidence of violence against women and girls (VAWG) is challenging because of underreporting and underrepresentation in surveys and crime statistics. However, existing literature indicates that the occurrence and fear of VAWG can influence women's and girls' travel choices. This report synthesises evidence of VAWG and other problematic behaviours on the transport system and recommends how to grow the market for interventions that can improve the personal safety of women and girls when travelling.

In March 2022, the independent VAWG Transport Champions, Laura Shoaf and Anne Shaw, published a review of cross-modal transport safety, forming a set of recommendations on how to tackle VAWG within the transport sector. Among the 13 recommendations, the Champions highlighted the potential role of technology and innovation.

Following the Champions' report, the Department for Transport asked Connected Places Catapult to recommend how to grow the market for interventions, including technology and innovation, that support women and girls' personal safety (actual and perceived safety) on the transport system.

The headline finding is that better evidence collection and more collaborative action are needed to better understand VAWG and other problematic behaviours on the transport system and accelerate effective and impactful interventions in this area.

Connected Places Catapult (also referenced in the report as 'the Catapult'), conducted desk research of national and international evidence, a market scan, and convened stakeholders across the system to:

- Better understand the nature of VAWG and other problematic behaviours on land-based transport (henceforth, 'the transport system');
- Identify interventions related to transport safety for women and girls;
- Discover market challenges and opportunities;
- Compare the needs of women and girls against existing interventions; and

- Provide recommendations for how to grow the market in England.

Methodology

The Catapult used several research methods to get an overview of the issue and generate recommendations for how to grow the market of interventions. The work included engaging with 76 stakeholders, representing local authorities, police forces, transport operators, intervention developers, charities, academics, and women and girls. Through the interviews, workshops, and desk research, the Catapult identified 116 interventions, including those related to technology, campaigns, and infrastructure design, to understand the landscape of interventions related to the personal safety of women and girls on the transport system. The Catapult then shortlisted 12 interventions and interviewed the interventions' developers to better understand market challenges and opportunities, and generate recommendations.

Findings

Summarising the existing evidence on this topic is complex because VAWG and other problematic behaviours are defined in various ways and are not specific to transport.

Authorities collecting data on personal safety and VAWG, collect slightly different data points, making it difficult for actors in the system to comprehensively understand the scale and risk factors specific to women and girls. The variation in definitions and measurements means that police, local authorities, intervention developers, and transport operators have difficulties knowing how to design interventions and where or when to deploy them.

Travel experiences are intersectional, differing for women and girls based on socio-demographic characteristics; however, there is limited data on how these characteristics impact personal safety. Transport operators, local authorities, and other intervention implementers must consider various intersecting needs in designing and deploying interventions.

There is large underreporting of incidents of VAWG and other problematic behaviours on the transport system, contributing to the lack of data. Underreporting is potentially due to uncertainty about how or where to report and a lack of confidence in what reporting will achieve.

Stakeholders, disabled women, and school-aged girls who participated in this research suggested several interventions to improve transport safety for women and girls. This included having more visible transport staff, especially those who are trained to intervene in an incident of VAWG or other problematic behaviours, campaigns to encourage reporting of VAWG and other problematic behaviours on the transport system, and clearer avenues on how to report incidents.

There are many existing interventions related to transport safety for women and girls, but they are rarely integrated into existing systems. Interventions can be uncoordinated across different transport modes or geographical locations instead of encompassing a user's end-to-end journey. Furthermore, it is unclear how the data collected by interventions are shared with other relevant authorities, which creates a siloed market.

There is limited evidence on the effectiveness of interventions at reducing VAWG and other problematic behaviours or improving perceptions of personal safety on the transport system. These interventions are rarely tested with users and target beneficiaries.

Participants in the research showed genuine interest in improving personal safety for women and girls on the transport system and expressed interest in continuing to work on this topic. As the recommendations will show, this is an opportune moment for collective action.

Recommendations

From this research, Connected Places Catapult recommends actors in the system should develop and validate interventions with relevant user groups and support the creation of shared metrics to collect data, measure impact of interventions, and address research gaps. Shared and consistent metrics and facilitating opportunities for stakeholders to share learnings, can support a coordinated approach to understanding the problem and building an evidence base. Finally, more targeted funding could facilitate the development and improvement of interventions. The Catapult's recommendations can be summarised into the four listed below:

1. Develop, test, and validate interventions with those impacted. Developers must systematically and robustly evaluate their interventions with affected user groups (such as women and girls).

2. Build capabilities for shared metrics and data. Actors across the system must create and share rigorous metrics for data collection. These metrics will underpin a shared understanding of VAWG and other problematic behaviours on the transport system and clarify whether interventions are effective.

3. Coordinate shared learning. Opportunities for various actors in the system to meet and share best practices could improve collaboration and build capacity to prevent and respond to incidents of VAWG, problematic behaviours, and ultimately enhance personal safety.

4. Continue to support intervention development through targeted funding. Actors in the system should make specific and long-term funding opportunities available to ensure interventions are collaboratively developed, deployed, and sustained.

Terms and Definitions

Table 1 lists important terms, definitions and acronyms used throughout this report.

Table 1. Key terms and definitions used throughout the report

Actors in the system	Refers to the people and organisations with a vested interest in this issue, such as transport providers, local authorities, academics, charities, and police.

Capable guardian	Someone or something that can deter potential offenders from perpetrating a crime and offer support to a traveller. A capable guardian can be a security guard, transport staff, police patrols, bystanders or monitored CCTV.
Connected Places Catapult (the Catapult)	The UK's innovation accelerator for cities, transport, and place leadership. The project team included staff from Business Modelling, Urban Innovation and Human Connected Design teams at Connected Places Catapult with a mix of business analysis and social research expertise.
Disabled women	In this report, disabled women are recognised in accordance with the social model of disability. This model states that "people are disabled by barriers in society, not by their impairment or difference." (1)
End-user	Refers to any user of the transport system or intervention.
Problematic behaviours	Refers to other problematic behaviours which depending on the circumstances, may or may not meet the criminal threshold, but can reduce the feelings of personal safety of women and girls on the transport system. These behaviours could include, but are not limited to, perpetrators: • being rowdy and excessively loud • catcalling or wolf-whistling • excessively staring or looking • following someone • intimidating and threatening someone • invading someone's personal space • making sexual jokes and comments and sounds • sitting too close to someone on a bus or train • taking photos without permission

Intervention	Refers to actions that could reduce VAWG or improve perceptions of personal safety on the transport system, such as: • surveillance and policing • education • built environment interventions • management • vehicle design
Market	Refers to the existing products and services which could impact perceptions of personal safety, and VAWG and other problematic behaviours on the transport system, including interventions developed and deployed by private and government organisations.
Market Scan	Refers to a review of interventions related to transport safety for women and girls on the market.
Personal safety	"Whether and how people experience or feel at risk of harassment, intimidation and unwanted sexual or violent behaviour" (2).
Public transport	In line with the scope of the project, refers only to land-based transport available to the public, including bus, rail, light rail, tram, underground systems, taxis, and private hire vehicles.
School-aged girls	Refers to girls between the ages of 12-17.
Sexual harassment	"Unwanted conduct of a sexual nature that has the purpose or effect of violating an individual's dignity, or creating an intimidating, hostile, degrading, humiliating or offensive environment for the victim" (3).
Transport system	Refers to all private and public transport enabling a door-to-door journey, such as active travel, micro-mobility, rail, metro and tram, taxi services, shared and private car use, and bus.
Violence Against Women and Girls (VAWG)	As defined by the Home Office in the 2021 document 'Tackling Violence Against Women and Girls': The term refers to acts of violence or abuse

	that we know disproportionately affect women and girls. Crimes and behaviour covered by this term include rape and other sexual offences, domestic abuse, stalking, ‘honour’-based abuse (including female genital mutilation forced marriage, and ‘honour’ killings), as well as many others, including offences committed online (4).

1. Introduction

Connected Places Catapult (also known as 'the Catapult') aimed to assess how to grow the market for interventions that could improve the personal safety of women and girls on the transport system. Between May 2022 and January 2023, the Catapult conducted desk research and engaged with stakeholders to better understand the challenges in this space and to advise recommendations. This report presents the findings from those activities.

1.1 Context

In July 2021, the UK government appointed Laura Shoaf, Chief Executive of the West Midlands Combined Authority, and Anne Shaw, Managing Director for the Transport for West Midlands, to be the UK's first Violence Against Women and Girls (VAWG) Transport Champions. This was in response to a commitment in the government's Tackling Violence Against Women and Girls Strategy in 2021 (5). Through roundtable discussions with nearly 200 representatives from transport, placemaking, enforcement and charity organisations, the Transport Champions published a report on a review of cross-modal transport safety in 2022. The report outlined 13 recommendations for how to tackle VAWG on the transport network (6). Recommendation 7 of the report highlighted the potential role that technology and innovation could play in combating VAWG during travel. The recommendation states:

"Through our roundtables it was apparent that technology and digital communications can play a big part in making women and girls feel safer on our transport networks. Through embracing the latest innovations, technology can help prevent incidents, improve safeguarding, provide vital support across a range of specialist services, aid communication and improve the mechanisms for reporting incidents. In fact, there are endless opportunities for technology to help improve protection, mitigate the risks, and respond to incidents." – Recommendation 7: Embrace more use of technology to combat VAWG, from the Transport Champions (2022) report

Following the Transport Champions' report, the Department for Transport (DfT) commissioned Connected Places Catapult to conduct a project to assess how to grow the market for interventions supporting women and girls' personal safety (actual and perceived safety) on the transport system. As an innovation accelerator for cities, transport, and

place leadership, Connected Places Catapult is well-placed to identify how actors in the system can use technology and innovation to tackle VAWG on the transport system.

1.2 Background

1.2.1 What evidence is there about the prevalence of VAWG in the UK?

At the time of the research, national government statistics indicated the prevalence of VAWG and illustrated why many women and girls might feel unsafe (7). Between February and March of 2022, the Office for National Statistics (ONS) conducted the Opinion and Lifestyle survey with a nationally representative sample of 6,213 adults aged 16 years and over. The survey results showed that in the 12 months preceding the survey, 27% of the surveyed women (compared to 16% of men) had been victims of harassment. Specifically for those women aged between 16 and 34 years, this rose to 50% (8). Similarly, between January and February of 2020, the Government Equalities Office (GEO) conducted a nationally representative sample with 12,131 adults aged 16 years and over. They found that 84% of the surveyed women (compared to 60% of men) had experienced some form of sexual harassment or assault in their lifetime (9).

1.2.2 Incidents of VAWG specifically on the transport system

The evidence shows that sexual harassment is particularly prominent in public spaces, including on public transport. In the GEO survey mentioned above, 41% of respondents (across all genders) experienced sexual harassment in the 12 months leading up to the survey. 42% of this subset reported that the incident occurred on the street or when walking around, and 28% on public transport (9). These statistics do not clarify the prevalence of women affected by sexual harassment on transport. However, the survey showed that 73% of the surveyed women, compared to 40% of men, were worried about being sexually harassed in outdoor spaces. Similar findings were found for being concerned about sexual harassment on public transport (72% of women, compared with 40% of men) (9). These findings indicate that the actual and perceived risk of sexual harassment are challenges women and girls face while travelling.

Transport authorities, central government and intervention developers have made many efforts to tackle VAWG and improve perceptions of personal safety, including funding opportunities from the Home Office, such as the ‘Safety of Women at Night Fund’ (2021) and ‘Safer Streets Fund’ (2022). As a result, there exist many interventions related to the issue. These interventions include personal safety alarms and applications, infrastructure improvements, campaigns, and more. However, and as this report will later show, there is limited evidence around whether and how interventions reduce VAWG or improve perceptions of personal safety on the transport system.

1.3 Project aim

Through the Transport Safety for Women and Girls project, Connected Places Catapult aimed to provide recommendations for how to grow the market for interventions which support the personal safety of women and girls on the transport system. To achieve this aim, the Catapult set the following objectives:

1. Gain a high-level understanding of the needs of women and girls and the challenges they face on the transport system;

2. Identify and investigate existing interventions;

3. Provide evidence on market challenges and opportunities which set the context for potential market growth;

4. Compare the needs of women and girls against existing interventions; and

5. Provide recommendations for how to grow the market.

1.4 Project scope

Transport safety for women and girls is a complex topic. The following factors focused the project scope in different ways:

- **The burden of responsibility.** The Catapult explored interventions which incentivise behaviour change for perpetrators, bystanders, transport operators and staff, and policing instead of just incentivising women and girls to change their behaviour.

- **An end-to-end-journey.** The scope includes the whole door-to-door journey (including planning and undertaking the trip and reflecting on it post-journey).

- **Geography.** The Catapult generated recommendations relevant to England only, in line with the relevant DfT policy remit. This delimitation is because transport is a devolved matter and DfT's responsibility primarily covers the English transport network. However, the Catapult reviewed literature focusing on a broader geographical context (including international evidence) to explore more widely the problem space and what interventions exist.

- **VAWG and other problematic behaviours.** Initially, the Catapult explored incidents of VAWG, as defined by the Home Office. Through the research, the Catapult identified other problematic behaviours relevant to the transport context and which may impact the personal safety of women and girls, yet may not meet the criminal threshold. Therefore, this report uses the more encompassing phrasing of 'VAWG and other problematic behaviours' to describe acts that can impact the personal safety of women and girls while they travel.

- **Interventions.** The Catapult considered different types of interventions related to VAWG and the personal safety of women and girls, including tech-based interventions. This includes those focused on surveillance and policing, education, infrastructure upgrades, vehicle design, data management and incident reporting.

- **Mode.** The Catapult considered different land-based modes of transport, such as active travel, micro-mobility, rail, metro and tram, taxi services, shared and private car use, and buses. This also meant looking at the interchanges between different modes. The Catapult did not include aviation and maritime travel in the research.

2. Methodology and Limitations

Connected Places Catapult used a mixed-methods approach to achieve the research objectives:

- Desk research to understand the existing evidence of VAWG on the transport system;
- Workshops and interviews to capture the views of stakeholders;
- Interviews with disabled women and school-aged girls to explore their experiences and perceptions of personal safety;
- Market scan to identify interventions relevant to VAWG and the personal safety of women and girls on the transport system; and
- Interviews with intervention developers to explore the market challenges and opportunities.

Limitations are explained after the methodology.

2.1 Desk research to understand existing evidence of VAWG on the transport system – Findings from the desk research

With the desk research, the Catapult aimed to understand what is already known about the personal safety of women and girls on the transport system and to identify relevant themes for inclusion in the stakeholder and user research. Using searches on Scopus, Google, and Google Scholar, the Catapult identified academic and grey literature published outside of academic journals (such as government reports, policy papers, and dissertations) related to VAWG in general and VAWG on public transport specifically. The Catapult limited their search to English-language literature published between 2008-2022. The body of literature was later supplemented with papers recommended by stakeholders engaged through interviews and workshops (see next section). In total, the Catapult reviewed more than 50 papers.

Overall, the desk research explored the prevalence of VAWG and other problematic behaviours on public transport and the impact these acts have on individuals and society.

It also looked at factors influencing the personal safety of women and girls while travelling on public transport.

2.2 Workshops and interviews with stakeholders

To get a comprehensive understanding of the challenges, barriers, and interventions related to VAWG and personal safety on the transport system, the Catapult engaged with a total of 47 stakeholders. *To ensure that the stakeholders invited for workshops and interviews represented various voices, the Catapult first created a stakeholder map of organisations pertinent to personal safety on the transport system. The Catapult's desk research findings, existing networks, and consultation with the DfT and Home Office, informed which stakeholders were included.*

A list of stakeholders is listed in Appendix 1. Stakeholders had experience working in, and knowledge about, the transport system or VAWG and included representatives from:

- Local authorities;
- Transport providers;
- Transport operators;
- Women's charities;
- Academia; and
- Policing bodies.

The Catapult conducted two workshops—one with the charity sector and the other with transport providers, operators, and local authorities. The workshop was designed to help participants discuss:

- Factors that make women and girls vulnerable to VAWG and other problematic behaviours on the transport system, with a focus on demographic and socio-economic factors, journey purpose, journey characteristics and the environment;
- Interventions that work and those that do not work, and what needs to change to make transport safer for women and girls. This gave the Catapult an initial understanding of the market of interventions.

Alongside the workshops, the Catapult conducted in-depth interviews with representatives from academia, police and crime commissioners, and other transport and innovation-related organisations. Interviewees were selected either because they worked in a different industry to the workshop participants or because they had specific experience working on VAWG and personal safety on transport. The interviews sought to understand how the participants' organisation is involved with reducing VAWG and other problematic behaviours on the transport system, what has and has not worked well, and what perceived changes need to be made to make transport safer.

In this report, the Catapult presents opinions, knowledge, and experiences that several workshop participants and interviewees shared with the researchers. Unless otherwise stated, the Catapult only included common themes from participants.

2.3 Exploring the experiences and perceptions of personal safety of disabled women and school-aged girls

In conducting desk research, workshops, and interviews with stakeholders, the Catapult found that disabled people and young people may be at higher risk of sexual harassment and victimisation, and there is limited research specific to the public transport context (9,10). Consequently, the Catapult commissioned two research agencies, Open Inclusion and SMPL Research, to engage with disabled women and school-aged girls. The engagement activities helped the researchers understand:

- Personal safety while travelling for disabled women and school-aged girls;
- What tools and strategies (if any) they use to make their transport experiences safer.

Open Inclusion, an inclusive research and solutions consultancy, conducted in-depth interviews with six women who identify as disabled and who use multiple forms of public and private transport in their daily lives. The interviewees were selected based on their distinct, functional access needs and disabilities so that the research would generate a broad range of insights based on diverse lived experiences of transport safety. Demographic characteristics of the six interviewees can be found in Appendix 2.

SMPL Research, a research agency experienced in undertaking research with vulnerable populations, conducted interviews with school-aged girls (aged 12 to 17 years). To recruit participants, they developed and distributed a nationwide screener survey to youth groups, schools and colleges, and sports clubs. They received 35 survey responses, of which eleven took part in a 30-minute virtual interview. The girls discussed details of their journeys, including factors that impact their personal safety, bystander involvement, reporting, and what could be changed to make them feel safer. Demographic characteristics of the interviewees can be found in Appendix 2.

Following the interviews, SMPL Research invited six of the eleven interviewees to participate in an in-depth ethnographic study, which involved capturing day-to-day experiences via a mobile ethnography app called Field Notes. The six participants were invited based on their level of engagement during the interview and to maintain the diversity of the sample. They were asked to:

- Capture photos and videos of their journeys;
- Provide a voice note describing a time when they felt unsafe;
- Complete a short survey about factors impacting personal safety; and
- Share their ideas for interventions to improve personal safety for young women.

2.4 Identifying interventions – the market scan

The Catapult needed to understand the nature of the market before recommending market action. To identify VAWG-related interventions and ensure a comprehensive overview of the various types, the Catapult used desk research (including reviewing crowdfunding and business information websites such as Kickstarter and Crunchbase) and insights gathered from the stakeholder workshops. Furthermore, the Catapult used business and product analysis expertise and knowledge of the innovation landscape to identify and assess interventions.

Through this research, the Catapult created a list of 116 interventions related to VAWG on the transport system. The list of interventions is provided as supplementary material.

To categorise the interventions, the Catapult utilised the EMPOWER framework. This comprehensive framework, developed with funding from UK Aid and managed by DT Global, aims to support decision-makers in addressing sexual harassment on public transport (11). The framework categorises interventions into five main and 48 sub-categories. Whilst the framework was initially created within the context of Sub-Saharan Africa, the Catapult decided to use it because the framework is comprehensive, it clarified the types of interventions related to transport safety for women and girls, and could be relevant to the English context.

For each intervention, the Catapult reviewed the interventions' websites and LinkedIn pages to assess the following:

- Transport mode that the intervention is (or could be) used on;
- Value proposition (what is valuable about the intervention);
- Stakeholders (who are directly or indirectly involved in the development and impact of the intervention);
- Location and year developed (where and when the intervention was developed and implemented);
- High-level business model (business to business, business to customer, or business to government); and
- Ease of implementation (feasibility of scaling or replicating an intervention to a different context such as another geographical location, transport mode, or target population).

Additionally, the Catapult reviewed six research papers with evidence of interventions' effectiveness at reducing or preventing VAWG or crime (12–17).

2.5 Exploring market challenges and opportunities – Interviews with intervention developers

The Catapult interviewed intervention developers to understand the market challenges and opportunities.

From the 116 interventions identified, the Catapult reviewed evidence from desk research (where available) on each intervention's effectiveness at tackling VAWG and other problematic behaviours, and assessed the potential for scalability. Some sources specified evidence on how interventions impacted specific types of VAWG (i.e. sexual harassment). Still, other sources referred to evidence of tackling broader crimes, which the authors of the papers perceived might also impact VAWG and other problematic behaviours. The Catapult used this review to shortlist interventions considered to have 'high' potential for impact and scalability. Next, the Catapult selected twelve of the shortlisted interventions for further analysis. The selection process ensured that a spread of intervention types was considered (e.g., surveillance, educational, interventions for the built environment, etc).

The Catapult conducted in-depth interviews with the developers of each of the twelve shortlisted interventions. The interviews sought to understand how the intervention aims to: reduce VAWG and other problematic behaviours, its geographical reach, which stakeholders are involved, funding and revenue mechanisms, and factors that enable and hinder the growth and impact of the intervention. The Catapult analysed and synthesised interview findings to generate positive and negative market trends. These insights informed the Catapult's understanding of the market challenges and were the basis of developing recommendations for market growth.

2.6 Limitations

The research undertaken was small in scale and scope, which has implications for what can be drawn from the findings. The findings only represent the views of the stakeholders we engaged with and give an overview of the market of interventions and factors that may impact women and girls' vulnerability to VAWG and other problematic behaviours and their perceptions of personal safety while travelling. The research only captured insight from women and girls and not from men and boys. Therefore, the findings cannot be used to compare the experiences of women and girls to those of men and boys. In addition, while the Catapult signposts interventions that are potentially effective at reducing incidents of VAWG and other problematic behaviours, the Catapult did not directly test or assess the effectiveness as part of the research.

2.6.1 Limitations of desk research

The Catapult did not intend to conduct a comprehensive, systematic review of the desk research. The Catapult used a limited number of search terms and combinations and only reviewed full-text literature that was open-access or available on Scopus, Google, or Google Scholar. The initial project scope focused on public transport; therefore, the Catapult did not initially explore journeys beyond public transport. DfT added the usage of private car to the project scope at a later stage so the Catapult supplemented research findings to address this transport mode, after the completion of the initial desk research. Much of the literature that the Catapult uncovered is focused on London, and, therefore,

the resulting findings are biased towards London and are not fully representative across rural and other urban areas in the UK.

2.6.2 Limitations of engagement with stakeholders

The project attempted to get a variety of perspectives, and the Catapult captured insights from 47 stakeholders. Most participants held strategic roles in their organisations and did not share the day-to-day operational experiences of staff working on the transport system.

The Catapult prioritised understanding the needs and experiences of women and girls to consider the problem space from their perspective. This prioritisation reduced the Catapult's capacity to explore the perspectives of perpetrators, bystanders, and transport staff.

2.6.3 Limitations of engagement with disabled women and school-aged girls

Open Inclusion and SMPL Research generated in-depth insights from six disabled women and eleven school-aged girls. Given the qualitative nature of the research and small sample sizes, the findings cannot be generalised beyond the interviewees or compared to other groups of people (such as men and boys).

2.6.4 Limitations of identifying interventions

The intervention list (available as supplementary material) provides an overview of the types of existing interventions but does not include all interventions on the global market. Therefore, it does not provide an exhaustive list and could exclude important interventions. There is limited evidence on the efficacy of transport interventions in reducing incidents of VAWG and other problematic behaviours, or improving perceptions of personal safety. The six research papers that the Catapult reviewed did not solely focus on transport-specific interventions and cited the following limitations:

- Inconsistency of outcome metrics, including that VAWG is a broad term encompassing a range of behaviours and therefore using it as an outcome metric is not specific;
- Being utilised in various contexts and not necessarily in the UK;
- Conflicting or inconclusive results for interventions;
- Interventions were not always specific to VAWG and looked at broader crimes (12,14,16).

2.6.5 Limitations of exploring market challenges and opportunities

Business analysts at the Catapult utilised their expertise to assess the scalability of interventions. This was done to build upon the existing evidence and to prioritise

interventions for further analysis. Hence, the market challenges and opportunities are influenced by a small sample of intervention developers and by their unique perspectives relevant to their organisation’s experiences.

3. Findings

This section presents the insights generated from each research activity, as described in the Methodology section. Connected Places Catapult later used these findings to create recommendations.

3.1 Understanding existing evidence of VAWG on the transport system – Findings from the desk research

The Catapult carried out desk research to understand what evidence exists relating to VAWG, other problematic behaviours, and perceptions of personal safety on the transport system. Specifically, the desk research explored the extent to which the existing evidence can provide insights into:

- The nature of incidents of VAWG and other problematic behaviours, and perceptions of personal safety on journeys involving public transport in the UK and internationally.
- The impact that VAWG and other problematic behaviours on public transport has on travel behaviour.

3.1.1 Defining VAWG

There are several different and sometimes overlapping concepts and definitions to describe the unwanted behaviours and criminal acts that are predominantly directed towards women and girls. As Lewis (2018) points out, the fluid terminology used in the research field has both benefits and drawbacks (18). On the one hand, it empowers women and girls to themselves define what is problematic behaviour, reducing the risk that subjective experiences are overlooked or discredited just because they do not fit into pre-defined categories of VAWG. On the other hand, the lack of shared terminology makes it more difficult to compare findings from different research projects and to quantify the prevalence of different behaviours.

The Home Office defines VAWG as, “acts of violence or abuse that we know disproportionately affect women and girls. Crimes and behaviour covered by this term include rape and other sexual offences, domestic abuse, stalking, ‘honour’-based abuse (including female genital mutilation forced marriage, and ‘honour’ killings), as well as many others, including offences committed online” (4). The research indicates that, whilst a

range of evidence is available related to these incidents of VAWG on the transport system, much of the literature is not exclusively (or not specifically) focused on those behaviours. The Catapult found that there are other problematic behaviours that are more relevant to the transport context.

Data on VAWG and other problematic behaviours differ between organisations conducting large-scale surveys. In recent surveys, the Office for National Statistics (ONS) collected data on sexual assault and sexual offences, whereas the Government Equalities Office (GEO) collected data on sexual harassment (8,9). Therefore, the desk research explored both VAWG and other problematic behaviours, as defined in the 'Terms and Definitions' in Table 1 above.

3.1.2 Understanding perpetration and nature of VAWG on public transport and spaces

3.1.2.1 Gender is not the only determinant of risk

In interpreting the data, it was essential to recognise that the group 'women and girls' is very diverse, and intersecting factors such as age, ethnicity, ability and income can impact women and girls' risk or exposure to sexual harassment. For instance, the GEO's 2020 survey found that women were significantly more likely to experience sexual harassment than men. They also found that respondents of all genders were significantly more likely to experience (or perceive that they were at greater risk of) sexual harassment if they were (9):

- Aged below 35 years, compared with older age groups;
- From an ethnic minority background (excluding White minorities), compared with White people;
- Lesbian, Gay, or Bisexual individuals, compared with heterosexual people; and
- A person with a highly limiting disability, compared with non-disabled people.

Note: The demographic characteristics listed above were defined and used in the GEO survey and the Catapult have repeated them here to remain consistent with the survey data.

The desk research suggests that socio-demographic characteristics impact travel experiences. However, the Catapult found very few large-scale studies that examined the intersections of sexuality, race, class, and disability and their relationship to VAWG and other problematic behaviours.

3.1.3 Underreporting of incidents of VAWG is high

Incidents of VAWG and other problematic behaviours are underreported across official channels, with those occurring on the transport system being no exception. The All-Party Parliamentary Group (APPG) for UN Women commissioned a UK-wide YouGov survey in

2021, which explored the under-reporting of incidents of sexual harassment in public spaces with women and girls. They found that, of the 1,089 respondents who had experienced such incidents, 5% stated that they reported all their experiences of sexual harassment to an official organisation, decreasing to 2% for the subset of women aged 18-34 (19). In 2019, YouGov also surveyed 1,010 adults living in London to explore experiences of unwanted sexual behaviour on the public transport system. Of the 416 people who stated that they had experienced an incident, 26% (17% of males, 29% of females) had told a friend, family, or partner, and 17% (21% males, 15% females) confronted the person who had done it to them (20). A much smaller proportion of the sampled individuals (2% overall, 4% males, 1% females) had reported the incident to the British Transport Police or to transport staff (2% overall, 2% males, 1% females) (20). The study indicated that a victim's gender and age may lead to slight variation in who they report the incident to and that not all cases are reported and tracked via official channels.

Commonly cited reasons for women and girls not reporting VAWG or other problematic behaviours on public transport and in public spaces include (10,19,21):

- Viewing the incident as not severe enough to report;
- Thinking reporting would not help or was not worth the hassle;
- Not knowing who, how, and where to report to;
- Feeling like law officials, staff and others would not believe or take them seriously;
- Not wanting anyone to know;
- Fearing retaliation;
- Feeling reporting would be dangerous or upsetting; and
- Not wanting to delay a journey.

3.1.4 Understanding experiences of VAWG on public transport and spaces

The unique nature of public transport may impact the behaviour of criminals. Newton (2014) theorises that:

"The dynamic nature of the public transport system creates unique environments, through which specific modes of transport traverse, transporting potential targets and victims, on a system that passes through areas with different levels of crime risk, and therefore, continuously receives different inputs and outputs over time. This creates a unique, potentially specialised, and certainly concentrated arena with which crime and disorder may occur."(22)

In a submission to the House of Commons Women and Equalities Select Committee inquiry into sexual harassment of women and girls in public spaces (2018), Transport for London commented that "motivated offenders will target public transport as a place to

commit offences because of the opportunity it provides" (23). They continued to explain that:

"Crowded trains and buses allow offenders to touch or rub other passengers and evade detection, as they can claim it was accidental or a result of the movement of the vehicle. For a sex offender, public transport is a 'target rich' environment. Project Guardian showed that the majority of sex offenders caught on public transport were motivated offenders, who hold a clear preconception of the victim they are seeking to target and that they seek out victims on public transport."

Transport for London also suggested that the relative anonymity afforded to passengers, and the perceived lack of capable guardianship, are factors that make the transport system more appealing to perpetrators (23).

The GEO's 2020 survey captured behaviours of sexual harassment and the locations at which they took place in the preceding 12 months. The types of behaviours that respondents reported to have occurred more often on public transport compared to other public spaces included unwelcome staring and looks, personal invasion of space, unwanted non-sexual touching, sexual jokes and comments, offensive materials (i.e. displays of pornographic and sexually offensive materials), provocative sounds, being followed or threatened, and sexual assault (i.e. unwanted sexual touching, etc.) (9). Other forms of VAWG and other problematic behaviour – such as flashing, actual or attempted rape, and sexually pressured exchange – were also reported to have occurred on public transport; however, respondents had more often experienced these behaviours in other public places.

In the same survey, of all respondents who had experienced sexual harassment on public transport within the last 12 months (1,505 people), most reported that the incident happened on a bus (62%), followed by a train or tram (49%), underground (36%), and taxi (9%) (9). Of the 416 adults in the YouGov's survey who had experienced unwanted sexual behaviour on London public transport, most reported that the incident happened on the tube (64%), followed by the bus (38%), train (31%) and taxi (2%) (20). These findings suggest that people should carefully interpret data on how incidents of VAWG and other problematic behaviours are distributed between different transport modes (such as bus or train). That is because the distribution of these behaviours may be less dependent on how different modes are designed or operated, and more to do with what modes are readily available in the geographical location.

3.1.5 Impact

Perceptions of safety can influence travel behaviour. A study conducted by Innovate UK, which surveyed over 365 women and girls in the UK, also highlighted the measures taken to manage the risk of sexual harassment during everyday journeys. This included avoiding certain areas associated with negative experiences or feeling unsafe (26). These actions have synergies with the term 'safety work,' as defined by Vera-Gray and Kelly (2020) as "invisible work mandated for women and girls in public (27)." Safety work can include always being on guard and aware of surroundings, looking for guardians, or wearing headphones to create a separation from others. Several reports also indicate that travelling in the dark reduces the perception of safety (8,10,15). The ONS (2022) survey

found that over a third of women (37%) stopped walking in quiet places, such as parks or open spaces, after dark, compared to under a quarter (24%) of men (8).

Furthermore, experiencing sexual harassment can greatly impact the victim's quality of life, with consequences including having to take time off work or exit the workforce. An analysis conducted by the European Institute for Gender Equality estimated that, in 2019, violence against women costs the UK approximately €43,436,000,000 (£37,336,000,000) across society, which was close to four times higher than the cost for gender-based violence directed at men (the calculation included lost economic output, cost of public services, and physical and emotional impact on victims) (28). While this is not specific to incidents that occur on the transport system, it suggests that incidents of VAWG and problematic behaviours on the transport system can influence victims' mental health and negatively impact the economy.

3.1.6 Understanding the perpetration of VAWG on public transport and spaces

The Catapult found limited evidence on the perpetration of VAWG and other problematic behaviours specific to the transport system. As such, this section represents general research on perpetration, rather than specific to the transport system.

The findings from the desk research show that men are the main perpetrators of VAWG incidents and other problematic behaviours. In 2018-2019, the Crown Prosecution Service reported that – of the defendants prosecuted for sexual offences (other than rape) – approximately 97% were men and 3% were women (24).

Furthermore, Promundo, a global organisation that works on masculinities and gender equality, carried out a representative survey of 1,225 young men in the UK in 2017 to explore the association between gender norms and the perpetration of sexual harassment. The researchers found that respondents who subscribed to more rigid views towards what "'real men'" are supposed to be, were more likely to report having sexually harassed women and girls than others (25). Promundo reflected what respondents thought a real man should believe or how they should behave and included characteristics such as "being self-sufficient, acting tough, looking physically attractive, sticking to rigid gender roles, being heterosexual, having sexual prowess, and using aggression to resolve conflicts." Again, this evidence indicates how gender norms can be associated with the perpetration of VAWG.

3.1.7 Conclusion of desk research

Data on the nature of incidents of VAWG and other problematic behaviours on the transport system, including causes of perpetration, prevalence, location, and time, are scarce. The desk research findings suggest that incidents of VAWG and problematic behaviours on the transport system are under-reported and likely to impact women and girls differently based on their socio-demographic characteristics. The research also indicates that women and girls often perceive the transport system as unsafe, which may reduce their use of public transport. The fear and occurrence of VAWG and other problematic behaviours on the transport system negatively impact women and girls and is costly to society.

3.2 Reflections from stakeholders – Insights from workshops and interviews

3.2.1 Purpose of research

Connected Places Catapult engaged with stakeholders to get their perspectives on what makes women and girls vulnerable to VAWG and other problematic behaviours on the transport system (exploring socio-economic and demographic factors, journey characteristics, and environmental factors) and to identify what interventions work, what is not working, and what needs to change to make transport safer for women and girls. This section provides findings from workshops and interviews with stakeholders (the complete list can be found in Appendix 1). Unless otherwise stated, the findings reflect common themes and experiences of the stakeholders.

3.2.2 Findings

At large, stakeholders noted that:

- While technology and other interventions could help reduce VAWG or make women and girls feel safer while travelling, VAWG and feeling unsafe on the transport system will continue until there is a fundamental change in attitudes and behaviours towards women and girls, particularly from men and boys.

- Similar to the desk research findings, stakeholders also felt there is a lack of data relating to incidents of VAWG and problematic behaviours on the transport system. They wanted to understand more about how characteristics such as race, sexual orientation, or age can influence personal safety. They also felt there needs to be a better understanding of which interventions have been, or are likely to be, impactful and in what contexts. The current knowledge gaps make it difficult to know what specific issues to solve and, consequently, which interventions to deploy.

- Stakeholders suggested that underreporting of VAWG may be due to victims not knowing how or where to report, feeling discouraged to report, or due to social stigma. Stakeholders recognised that they did not have the evidence they needed to understand the full scale of incidents of VAWG and other problematic behaviours on the transport system and suggested developing clearer and simpler reporting mechanisms.

- Existing infrastructure — including poor design of streets, lighting, bus stops, or inadequate surveillance — can facilitate incidents of VAWG and other problematic behaviour and impact perceptions of personal safety. Furthermore, the time of day that women and girls travel, the busyness of transport services, and travel disruptions were factors that stakeholders considered to impact perceptions of personal safety and which could inform how interventions are developed and deployed.

- Stakeholders recognised that organisations in the transport system may operate in silos, and many interventions are, therefore, specific to one transport mode or geographical location. They felt that this lack of synchronisation across the system

confuses travellers who use multiple transport modes in a single journey or travel between different transport authorities. Furthermore, the data collected by local authorities and transport operators rarely gets shared across the system, contributing to the siloed working practices. As such, it prevents a shared understanding of the issue and what actors in the system can do to enable more seamless and safer journeys. Stakeholders suggested a central platform to share data, and best practices could help tackle this issue.

3.2.3 Exploring factors that impact women and girls' vulnerability to VAWG on the transport system

The Catapult asked stakeholders to discuss factors they thought could make women and girls more vulnerable to VAWG on the transport system. Most discussions focused on public transport and walking to and from destinations.

3.2.3.1 Socio-economic and demographic factors

As will be explained in this section, stakeholders reported that young women, ethnic minorities, disabled women and girls, and women and girls with lower income could be more vulnerable to VAWG and other problematic behaviours on the transport system.

Stakeholders suggested that young women and girls may tend to feel more unsafe while travelling and could also be more vulnerable to experiencing incidents of VAWG and other problematic behaviours, for instance, because they are less familiar and experienced with the transport system, when compared to older aged travellers who may have benefited from learning and exposure over time. Stakeholders also expressed that women from an ethnic minority background, trans women, and disabled women could be at higher risk of harassment than White, non-trans, and non-disabled women when travelling. These views mirror findings from the desk research (9,10).

Stakeholders pointed out that women with low incomes tend to have fewer transport options. This group often need to rely on public transport (as opposed to private car use) and cannot always afford a taxi service if they feel unsafe. Stakeholders also noted that women with low incomes (including women working night shifts) could have reduced perceptions of personal safety and feel more vulnerable to experiencing incidents of VAWG and other problematic behaviours because the cheapest modes of transport often include long waiting times, particularly at night. Their journeys could also involve walking long distances from the bus stop or train platform to their destination.

3.2.3.2 Journey purpose and characteristics

Stakeholders reflected that various factors can influence women and girls' perceptions of personal safety while travelling, such as time of day, the busyness of transport options, undertaking unfamiliar or indirect journeys, and travelling alone versus with others.

According to stakeholders, perceptions of safety decrease at certain times of day, particularly at night. They mentioned that this could be due to sharing spaces with rowdy or drunken passengers, that fewer transport options are available (meaning long waits at

bus stops and platforms), or that there tends to be a reduced presence of other female passengers at night. Daisy Chapman Chamberlain, Knowledge Transfer Manager in Rail at Innovate UK Knowledge Transfer Network at the time that the research engagement took place (now Innovation Manager at East West Railway Company), stated:

"…also the timetables often aren't interconnected… so obviously that's a huge safety factor. Especially if you're travelling late at night and in the morning, or anytime really, you don't want to be stuck, potentially in a dangerous, isolated, dark location waiting for a bus for 10–15 minutes."

Additionally, stakeholders suggested that undertaking unfamiliar journeys and travel disruptions could reduce perceptions of personal safety. Such trips can leave women and girls waiting for long periods at transport stations or stops and reduce their ability to remove themselves from unsafe situations.

Stakeholders largely agreed that the number of other passengers and staff present during a journey could impact perceptions of personal safety and vulnerability to VAWG and other problematic behaviours. Some stakeholders reflected that the type of offence tends to differ depending on how busy the service is. Dr. Sian Lewis, a lecturer in criminology at the University of Plymouth, also stated:

"It would be a certain type of offence happening at a certain time. There is obviously more groping in rush hour, but things like flashing or masturbation on tube carriages happen off-peak, in the middle of the day, often out of the centre."

Stakeholders also mentioned that women are likely to 'trip-chain,' which combines multiple journey purposes—such as picking up groceries, dropping off children at nursery, and going to work—into one multi-stop journey. Stakeholders reflected that service timetables poorly accommodate the complex needs associated with trip-chaining. In particular, poor alignment between different operators and transport modes can make trip-chaining difficult and time-consuming. Stakeholders also noted that multi-stop tickets are rarely affordable and flexible, which may leave women who need to trip-chain at an economic disadvantage.

3.2.3.3 Environmental factors

Stakeholders suggested that environmental factors can influence actual and perceived personal safety. For example, stakeholders noted that, at night, limited lighting on streets and at transport stations and stops could make women and girls more vulnerable to VAWG and other problematic behaviours and feel less safe. Stakeholders also mentioned that run-down transport hubs, including those with poorly kept foliage and graffiti, could reduce perceptions of personal safety because it indicates a lack of surveillance of the area. Related to this, stakeholders reported that lack of surveillance, such as staff presence or closed-circuit television (CCTV) visibility, could reduce perceptions of personal safety for some travellers.

3.2.4 Exploring challenges and areas for improvement

3.2.4.1 Challenges for stakeholders

Stakeholders reflected on several challenges that make it difficult to reduce incidents of VAWG and other problematic behaviours or improve perceptions of personal safety on the transport system.

There was a shared sentiment that insufficient data exists to understand the prevalence of VAWG and other problematic behaviours, mainly due to a lack of widely available gender-disaggregated data and the underreporting of these behaviours. Stakeholders recognised the abundance of apps related to personal safety, but many felt that the various options could be confusing to transport users. They also lacked confidence that apps collecting data on incidents would effectively share that data with relevant authorities, meaning that the data cannot come to good use in those authorities' decision-making process.

Stakeholders also mentioned a lack of coordination across the system, specifically when sharing data and coordinating services among transport modes and authorities. Stakeholders remarked that sharing data could allow for a better evidence base and decision-making, enabling more effective and targeted interventions to reduce VAWG and other problematic behaviours. Similarly, stakeholders reported that there is limited guidance and evidence on which interventions effectively reduce VAWG and other problematic behaviours and improve personal safety and, therefore, authorities have difficulty deciding which interventions to deploy.

While stakeholders highlighted the importance of reporting incidents of VAWG, it was highlighted by the British Transport Police (BTP) and local authorities that they have limited resources to analyse data and respond to reports. Nia Mellor, Detective Chief Inspector, Violence and Intimidation Against Women and Girls (VIAWG) and sexual offences portfolio lead at British Transport Police, stated that:

*"At its peak, we had something like a 175% increase in reports of sexual harassment. This shows an increased awareness and confidence in reporting. We must ensure that we have the capability to effectively investigate and support all the victims who are coming forward... my view is that if people do have the courage to come forward, they report something to us and then they get a poor service because we don't have the capacity to fulfil that, then that is a risk that may undermine and undo all the really good work." **

*Time frame for statistics: 1 April 2019 – 27 February 2020, compared to 1 April 2021 – 27 February 2022.

3.2.4.2 Stakeholders' views on what should be done

Stakeholders suggested several interventions that they felt could reduce incidents of VAWG and other problematic behaviours or improve perceptions of personal safety on the transport system, including:

- Increased staff and police presence, with the confidence that staff and police are trained to respond to incidents of VAWG.

- Greater efforts to encourage more women to work in the transport industry. The assumption is that having more women in the industry would invite more discussion around women's travel experiences, which could change how transport systems and processes are designed, making them more aligned with the needs of female travellers. Furthermore, having more front-line female staff would increase the presence of women and improve perceptions of personal safety.

- A platform to share best practice between local authorities, police, transport operators, and charities.

- More bystander education to empower other travellers to intervene in an incident of VAWG and other problematic behaviours.

- Increased funding for improvements to transport infrastructure, for developments of targeted transport services for local authorities, police forces, and charities to improve data collection, and for local authorities and police forces to deploy interventions specific to transport safety of women and girls.

- Simpler and clearer reporting mechanisms to police and transport organisations to enable a better understanding of the problem.

3.3 Exploring the experiences and perceptions of personal safety for sub-groups of women and girls

3.3.1 Purpose of research

SMPL Research and Open Inclusion interviewed six disabled women and eleven school-aged girls, respectively, to explore factors that impact perceptions of personal safety and assess if existing interventions met their needs while travelling. Whilst the number of interviews conducted is small, and the findings are indicative, they provide rich insight into some of the experiences that disabled women and school-aged girls have while travelling and contribute to understanding the intersecting factors impacting female travellers' personal safety. The detailed findings can be found in the supplementary material.

3.3.2 Findings

The insights from these interviews supported some findings from the desk research and stakeholder workshops. The findings echoed that:

Travelling in the dark and unfamiliar journeys can reduce perceptions of personal safety.

Increased staff, lighting, and CCTV surveillance could contribute to increasing perceptions of personal safety.

The interviewed disabled women and school-aged girls used various coping strategies to make themselves feel safer while travelling. They were not aware of many interventions related to transport safety. They suggested that campaigns to change potential

perpetrators' behaviour and spread awareness of how to report incidents of VAWG and other problematic behaviours on the transport system could be valuable.

3.3.3 Factors that impact perceptions of safety for disabled women

In the interviews, the disabled women largely agreed with the list of factors impacting perceptions of personal safety identified through the desk research and workshops. Such factors include time of day, the location of bus stops, unfamiliar routes, and disrupted travel.

Some of their insights highlighted how being disabled can bring additional factors that reduce perceptions of personal safety. For example, some of the interviewed disabled women reported accessibility failures, such as emergency alarms being out of reach or not having visibility of others while waiting on the platform. The unique challenges disabled women face on the transport system show why an intersectional approach is essential when designing interventions and transport systems to support women and girls. One disabled woman who participated in an interview stated:

"I think one important thing to note is I don't usually get to make choices about where I sit or wait because there's only one wheelchair spot. I remember a time when I was on a train with a friend, and the carriage was nearly empty—there were two men inside. One was being loud and combative—what a woman would often do is move to another [carriage]. I can't do that." – 20-29-year-old woman with dexterity impairment using a power wheelchair

Additionally, some interviewees reported facing discrimination when using transport services or requesting help from transport staff. One disabled woman who participated in an interview stated:

"As a guide dog owner there is a struggle to get rides using Uber and other rideshare apps. App-based taxi drivers have always cancelled my journey as soon as they have seen me and my guide dog." – 20-29-year-old woman who is deaf and blind

Furthermore, when travelling alone on public transport, the interviewed disabled women reported being highly dependent on staff or other passengers, especially when completing unfamiliar journeys or when travel disruptions occur. One disabled woman who participated in an interview stated:

"You've got to ask someone where the lifts are, where the steps are. It's navigating those help points. I meet the best and the worst people, members of the public." – 20-29-year-old woman who is deaf and blind

While the small sample size cannot show if these issues are specific to disabled women only, or if they also apply to non-disabled women or women with other protected characteristics, the insights indicate that the accessibility of the transport system can influence actual and perceived personal safety.

3.3.4 What should be done? From the perspective of disabled women

When asked what the transport system could do to improve perceptions of personal safety, the disabled women who participated in the interviews reported wanting more front-line transport staff, especially female staff. They also noted that staff should be trained to respond to an incident of VAWG and other problematic behaviours, which echoes sentiments from the stakeholders that the Catapult engaged with. One woman reported using a tech-based intervention, the Passenger Assistance App, which notifies staff when she is travelling by train. She suggested that this app, or a similar one, could be expanded to offer support while travelling to and from the station.

Some interviewees suggested that better design of infrastructure or transport systems could improve their perceptions of personal safety. Such design improvements could include positioning bus stops nearer to entrances and exits of buildings or having mechanisms to alert bus drivers that someone is waiting for a bus, particularly in remote and dark areas.

Some of the interviewees suggested running campaigns to support bystander intervention and identify problematic behaviours. They highlighted that including disabled women in the design of these campaigns is essential to ensure that they are represented appropriately.

3.3.5 Factors that impact perceptions of safety for school-aged girls

The school-aged girls participating in the research largely agreed with the factors impacting perceptions of personal safety that the Catapult had uncovered during the previous research activities. Most of the interviewed girls reported how behaviours of men and boys, including catcalling, rowdy behaviour, sexual comments, sitting too close to them on the bus or train, and inappropriate touching, made them feel unsafe on public transport. A school-aged girl who participated in an interview stated:

"On the top of the bus, a man behind me had his arm between me and the window and kept touching my arm, I felt very uncomfortable." – 16-year-old girl

Additionally, some of the interviewed school-aged girls shared that when taking the school bus, boys being rowdy and misbehaving caused them to feel less safe, yet some felt that neither the bus company nor the school was dealing with the issue.

The interviewed school-aged girls also reported that environmental factors, such as travelling in the dark, can make them feel less safe and consequently influence their travel choices. Similar to findings from the interviewed disabled women, having travel disruptions, travelling on unfamiliar routes, and being in very busy or empty carriages contributed to interviewees feeling less safe. A school-aged girl who participated in an interview stated:

"I've had to miss out on a few clubs/activities and stuff when my friends aren't going, because I couldn't get home and wouldn't feel safe getting home by myself…if it's really dark I won't go." – 13-year-old girl

3.3.6 What should be done? From the perspective of school-aged girls

When asked what can be done to improve personal safety, school-aged girls who participated in the interviews echoed some of the findings from other research activities as part of the project. Their suggestions included more lighting, more visible transport staff, and greater confidence that staff are trained and able to respond to an incident of VAWG and other problematic behaviours.

The school-aged girls also wanted more information on how to report VAWG and other problematic behaviours. They suggested that it could be helpful to have apps advising on what to do in different situations when feeling unsafe. They also felt school-based lessons on how and where to report VAWG and other problematic behaviours while travelling would be useful, as well as having more posters and campaigns to support bystander intervention and reporting.

The interviewed school-aged girls also reflected on two specific interventions they use or are aware of in relation to improving personal safety. They were aware of the 'See It, Say It, Sorted' campaign but felt this was for emergencies only and would not be relevant for behaviours they perceived as more minor, such as comments from men. The interviewed girls were unable to remember any other campaigns. Some girls also reported using a personal safety app called Life360, which allows users to make 'circles' of trusted people who are kept aware of their location. They said this improved their feelings of personal safety while travelling because they felt their parents or other family members were watching them.

3.4 Identifying interventions aimed at reducing VAWG and improving perceptions of personal safety – Findings from the market scan

3.4.1 Purpose of research

Before assessing the market challenges and opportunities, Connected Places Catapult sought to understand what interventions already exist. The market scan aimed to identify interventions related to VAWG and other problematic behaviours and personal safety that could be applied to the transport system. The scan also aimed to capture each intervention's characteristics (including its purpose, target audience, geographical reach, transport mode, and year of deployment).

3.4.2 Findings

The market scan found 116 interventions that actors in the system could use to potentially reduce VAWG and other problematic behaviours and increase personal safety on the transport system in England. Many of the identified interventions duplicate each other and are not coordinated in their efforts with other interventions. For example, personal safety apps are not always integrated with other services (e.g., emergency services), or travellers are presented with several different phone numbers or apps for reporting an incident of VAWG and other problematic behaviours. The number of options could make it difficult for travellers to decide which phone numbers or apps are best for their situation. It is also

unclear how the data collected from these apps is synthesised or how comprehensively it is analysed.

Most of the identified interventions were not solely implemented to reduce VAWG on the transport system but could still impact it. Most interventions aim to reduce VAWG and other problematic behaviours, or improve personal safety in various ways, and are targeted at victims, bystanders, and potential perpetrators.

Overall the evidence on how effective interventions are at reducing incidents of VAWG and other problematic behaviours, or improving perceptions of personal safety, is limited especially regarding evidence related to their use on the transport system. However, some evidence suggests that lighting and CCTV improve perceptions of safety for women and girls while travelling (13,15).

3.4.3 Overview of interventions

The Catapult reviewed interventions across the globe that aim to reduce VAWG or improve personal safety. They then sorted the interventions into five categories, with guidance from the EMPOWER framework. The main categories and subcategories are detailed in Table 2. This scan is not exhaustive but provides an overview of various relevant interventions. The strengths and limitations of the scan are discussed in Section 2, 'Methodology and limitations.'

A complete list of the 116 interventions can be found in the supplementary material.

Table 2: Intervention categories included in the intervention list

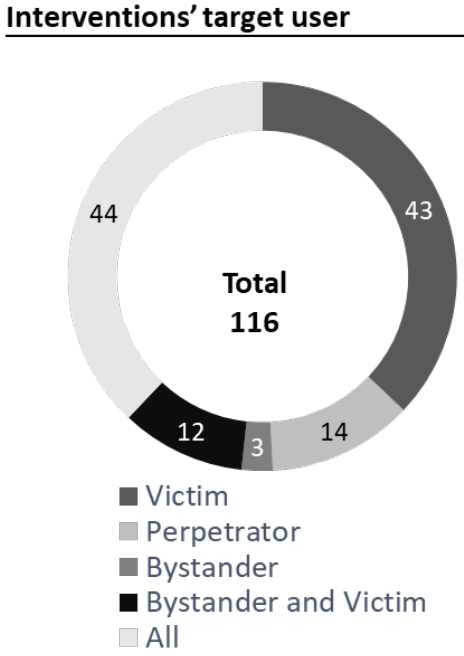
Main Category	Subcategory
Surveillance and policing *(27 interventions)*	Digital interventions (CCTV, live tracking apps and alarm apps, safety auditing tools, prediction tools)
Surveillance and policing *(10 interventions)*	Physical security guard/policing interventions (security guards, transport staff positioned at stations, body-worn cameras, plainclothes police, high visibility policing, neighbourhood watch groups, taxi marshals)
Education *(21 interventions)*	Campaigns (posters and stickers on transport system, web-based campaigns)
Education *(19 interventions)*	Education/training (school-based lessons, working with boys and men for appropriate behaviour, bystander interventions)
Built environment *(6 interventions)*	Infrastructure (lighting, emergency buttons, clean streets with good visibility, safe transport hubs, Wi-Fi connectivity,

	good maintenance of transport infrastructure, visible help desks, bus shelter design)
Management *(11 interventions)*	Centralised feedback mechanisms (hotline or texting service to report incidents, safety, and security apps)
Management *(5 interventions)*	Support services (advice for survivors of VAWG, spaces to share experiences)
Management *(12 interventions)*	Strategies and initiatives (campaigns for more women in the transport industry, innovation toolkits, multidiscipline task force teams)
Management *(2 interventions)*	Customer-centric focus (technologies that communicate disruption of services/real-time information)
Design *(3 interventions)*	Vehicle (onboard emergency systems, seating design)

Most interventions which fall within the surveillance and policing, built environment, and design categories are broader crime initiatives that may also improve actual and perceived personal safety more generally. Contrarily, most education and management interventions are specifically aimed at reducing the prevalence of VAWG and other problematic behaviours.

Furthermore, 44 (38%) of the interventions are designed to impact all audiences (victims, bystanders, perpetrators), and 43 (37%) are designed specifically for victims or potential victims. A smaller proportion are targeted at perpetrators or potential perpetrators, or bystanders. For example, campaigns that educate travellers on problematic behaviours impact victims, bystanders, and perpetrators. In contrast, personal safety apps that allow users to reach emergency contacts quickly are specifically aimed at potential victims. Figure 1 represents this graphically, indicating that interventions in the market are primarily targeted at victims (even if they also target other audiences).

Figure 1: Interventions categorised by the target population



Approximately half are UK-based interventions, with about half of those being specific to a local area. The remaining interventions have been developed outside of the UK or also exist internationally (i.e., apps that are available in multiple countries). This indicates that interventions are varied in their geographical scope.

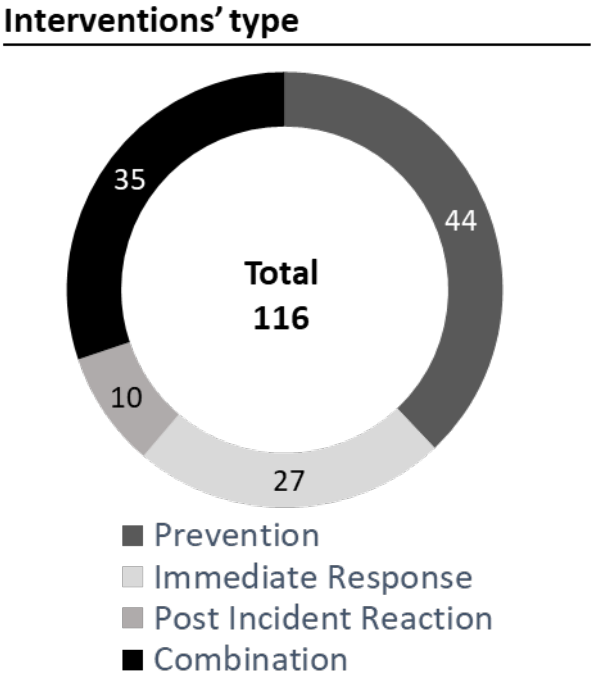
Of the 116 interventions, 44 (38%) can be classified as "preventative": they may prevent an incident of VAWG from happening by raising awareness, educating, providing safer infrastructure, predicting crime "hot-spots," and improving policies to both reduce incidents of VAWG and better understand perpetrators.

27 (23%) interventions focus on "immediate response," including training staff to deal effectively with incidents of VAWG. Other immediate response interventions (such as personal safety apps allowing users to sound an alarm), seek to improve the user's ability to respond during an incident and increase their sense of safety.

Ten interventions (8%) solely focus on what happens after an incident of VAWG (i.e., a post-incident reaction). These interventions include tools to increase intelligence through feedback and reporting, identifying perpetrators effectively and promptly, and supporting victims of VAWG.

Notably, 35 (30%) aim to tackle VAWG at multiple phases of an incident and combine the qualities of prevention, immediate response, and post-incident reaction. For example, initiatives such as 'Project Guardian' both deployed police officers to prevent and respond to sexual harassment on public transport in London and created a text-messaging service to report sexual harassment. This demonstrates how interventions can tackle VAWG at multiple phases. Figure 2 represents the stage at which interventions intervene, graphically.

Figure 2: Interventions categorised by stage at which they intervene in an incident of VAWG



3.4.4 Evidence on the effectiveness of interventions at reducing VAWG and improving perceptions of personal safety

This section summarises the evidence found regarding the effectiveness of interventions in improving personal safety and, where applicable, summarises reflections from the engagement with stakeholders, disabled women, and school-aged girls.

Overall, the evidence on the impact of interventions is insufficient to draw conclusions about their efficacy. Notably, the interventions with more evidence are those not specifically tailored to VAWG or specific to transport (i.e., CCTV and lighting).

3.4.4.1 Surveillance and policing

CCTV

Transport operators widely use CCTV surveillance as a crime prevention strategy to capture, monitor and record images in real-time (15). However, the Catapult found that the association between CCTV and reducing violent crime or sexual harassment on public transport or in public spaces is weak. In one international literature review, the authors found that installing CCTV effectively reduced crime in some cities (specifically planned crime such as robbery) but could not find evidence about the impact on sexual harassment (15). These findings are similar to an evidence review conducted by the College of Policing (2022), which found that CCTV reduces crime but not violent crime. They also could not find any evidence of the effectiveness of CCTV at reducing VAWG (13).

Similar to the findings from the desk research, the interviewed stakeholders had conflicting views on the use of CCTV in reducing VAWG or other problematic behaviours on the transport system. Some viewed CCTV as a beneficial tool for apprehending suspects and to support charging those suspects with offences, where appropriate. They also suggested

that staff can use CCTV to better respond to an incident, for instance, allowing bus drivers to gain visibility of the upper decks of buses. However, others questioned the feasibility for every camera to be actively monitored and, therefore, felt less confident that CCTV is a capable guardian. The school-aged girls interviewed also suggested that more CCTV cameras could help increase perceptions of personal safety, but they did not feel confident that the cameras were being monitored. The desk research findings echoed this, as it found that women are sceptical about the effectiveness of CCTV and would prefer a greater presence of police and transport staff (15).

Presence of Others

The presence of others (including uniformed police and high visibility staff, plainclothes officers/undercover units, and trained members of the community/voluntary guardians) can increase the perception of personal safety. However, there is limited evidence in the literature to support that the presence of staff reduces incidents of VAWG or other problematic behaviours on the transport system. Gekoski and colleagues (2015) reported several international studies that found women and girls would feel safer on public transport with increased formal surveillance (i.e., police and/or transport staff) (15). This was supported by insights from the interviews with stakeholders, disabled women, and school-aged girls.

Furthermore, a survey conducted by London Travel Watch (2022), which explored personal security of London transport users, found that compared to White British people, those who identified as Black, Asian, and Minority Ethnic (BAME) were less comfortable talking to British Transport Police officers (10). These findings indicate that while increased staff presence might improve perceptions of safety for some, careful consideration of the relationship between police, transport staff, and travellers would need to be considered if deploying more personnel.

In a review by the College of Policing (2022), the authors found that hot-spot policing and increased police presence effectively reduced crime, including violent crime, in public spaces (13). This was supported by Gekoski and colleagues' findings (2015), which suggest that some specialist police operations can be effective at identifying and apprehending offenders of sexual harassment (15).

3.4.4.2 Education

There was varied evidence on the effectiveness of campaigns and educational initiatives at tackling VAWG and other problematic behaviours or improving perceptions of safety on the transport system.

Some transport-related campaigns appear to have increased reporting of unwanted sexual behaviour on the transport system. Transport for London (TfL), the Metropolitan Police Service, and the British Transport Police launched a campaign called ‘Report It to Stop It’ in April 2014, encouraging people to report any behaviour that made them feel uncomfortable. A press release published by TfL in 2016 reported that almost eight million users had watched the ‘Report It to Stop It’ film, and an evaluation of the campaign’s effectiveness found that it had increased the reporting of unwanted sexual behaviour without negatively impacting travellers’ fear of transport (29,30). The increased reporting also helped police better understand where incidents of VAWG were happening. In 2008,

the Massachusetts Bay Transportation Authority in the USA ran a similar campaign on Massachusetts public transport using posters. In their review, Gekoski and colleagues (2015) referenced an evaluation which found that in the four years after the campaign launch, the number of sexual offences reported to the transport authority increased by 32% (15).

There are also several British interventions that focus on engaging with men and boys to prevent or reduce the perpetration of VAWG (e.g., 'Enough' campaign, 'Have a Word'). The 'Enough' campaign, launched by the Home Secretary in 2022, is a multi-year national communications campaign including television adverts, billboards, social media and radio explaining VAWG and simple acts to challenge perpetrators of VAWG. Similarly, 'Have a Word' was launched by the Mayor of London in 2022 and aims to speak directly to men and boys to encourage them to "have a word" with themselves and their friends to change sexist attitudes and inappropriate behaviour. In the reviewed literature, there was some promising evidence that interventions which actively engaged with men to discuss gender norms, healthy relationships, and their roles as bystanders reduced perpetration of sexual violence (primarily within school or university contexts) (12,13,16). However, there was no evidence of the effectiveness of more passive measures, such as poster-based publicity campaigns. It is not possible to extrapolate these findings to the transport system in England, as the interventions were not tested in transport-specific contexts.

'See it, Say it, Sorted' is a rail-specific campaign by the British Transport Police aimed at encouraging passengers to report unusual activity. The interviewed school-aged girls and stakeholders specifically mentioned the campaign. However, the interviewed school-aged girls perceived the campaign as relevant to preventing terrorism rather than VAWG. The Catapult could find no evidence to indicate whether the campaign improved perceptions of personal safety on the rail network.

3.4.4.3 Built Environment

1. Lighting

Of the 116 interventions reviewed, improving street lighting has the strongest evidence to support its effectiveness in reducing crime (13,15). A literature review conducted by the College of Policing (2022) found that, from the 13 studies reviewed, improved street lighting reduced violent and property crime by an average of 21% (13). Furthermore, stakeholders, disabled women, and school-aged girls who participated in this research felt that lighting improved their perceptions of safety, echoing some findings from the literature (15).

Choosing the right type of lighting is not straightforward. For example, in their review, Gekoski and colleagues (2015) found one study which noted that some artificial lighting can cause glare and temporary "light blindness," preventing women and girls from spotting or reacting to threats (15). When the lighting is suitable for the environment and context, it can enable women and girls to navigate to safe places along their journey and allow them to identify potential threats.

2. General Upkeep and Maintenance of Public Areas

General maintenance and upkeep of transport facilities appear to improve perceptions of personal safety because it encourages positive behaviour and discourages potential perpetrators from committing a crime (32). A consultation launched by the London Legacy Development Corporation in September 2021 noted that neglected areas could make women and girls feel less safe when they travel. For example, waiting rooms or toilets with low usage or that are poorly maintained can become a focal point for anti-social behaviour (33). The stakeholders also stated that unkept areas and graffiti could inspire a sense of "lawlessness" at public transport stations and stops, which can increase the frequency of anti-social behaviour, making women and girls feel less safe. The school-aged girls participating in this research also remarked that neglected areas made them feel less safe. Hence, maintaining transport hubs and nearby environments could improve women's and girls' perceptions of personal safety.

3.4.4.4 Management of VAWG-related incidents

The Catapult found 32 interventions (27% of the reviewed interventions) designed to support the reporting and management of VAWG. Interventions include apps that allow users to report an incident of VAWG and other problematic behaviours or instances when they felt unsafe, apps which provide real-time information on transport services, and product evaluation tools used by organisations to consider the gender sensitivity of their systems or products. However, the desk research found that apps for reporting or crime prevention have yet to be evaluated for their effectiveness in reducing VAWG and other problematic behaviours or improving the perception of personal safety (13,17).

Some evidence suggests that travellers favourably viewed the use of apps to report an incident of VAWG and other problematic behaviours or crimes. The London Travel Watch (2022) found that women and people from ethnic minority backgrounds were more likely to value using an app to report a crime on the transport network compared to White British people and men (10).

3.4.4.5 Design of transport infrastructure

Limited evidence suggests that the design of vehicles and transport stops and stations improved perceptions of personal safety, for example having an emergency alarm on a bus. However, overall, the evidence was limited and did not conclude that better design of transport infrastructure reduced VAWG or other problematic behaviours (15).

3.4.5 Conclusion

As demonstrated in this sub-section, various interventions aim to reduce VAWG and other problematic behaviours or improve personal safety on the transport system. However, most interventions have not been evaluated, and, therefore, the Catapult cannot conclude if they are effective. Some interventions that have been assessed for impact (i.e., CCTV and lighting) have been found to increase women's and girls' perceptions of safety, but the evidence is not specific to reducing incidents of VAWG and other problematic behaviours. National and international evidence indicates that campaigns aimed at encouraging reporting of sexual harassment on the transport system led to increased reporting.

The market scan identified many interventions already being used (or that could be used) to reduce VAWG and other problematic behaviours or improve personal safety on the transport system in England. They target various audiences, have been developed and implemented in various countries, and try to tackle VAWG and other problematic behaviours and personal safety through various methods. However, they can be duplicative and it is unclear how comprehensively the data collected from them is being analysed.

3.5 Identifying market challenges and opportunities – Insights from interviews with intervention developers

3.5.1 Purpose of research

The Catapult interviewed twelve intervention developers to gain a deeper understanding of the market. The Catapult explored various types of interventions and the interviews sought to understand each intervention's purpose, finance and revenue models, stakeholders involved, and assessed the existing positive and negative market trends. This section provides an overview of each intervention and concludes with an overall market analysis.

3.5.2 Findings

Supporting the findings from the market scan, interventions are varied in how they aim to reduce VAWG and other problematic behaviours or improve perceptions of personal safety, and most interventions have multiple aims. The Catapult found limited evidence on whether and how interventions achieve their intended aim. Notably, only two out of the twelve intervention developers reported actively engaging with end users (i.e., staff receiving training) to ensure their intervention is meeting user needs. This suggests that the market has interventions that may be developed without the engagement of users, and which are not fully evaluated.

Interviewees who had developed apps and other feedback tools felt it was difficult to integrate with existing systems, for example, with authorities or emergency services. They noted this could be facilitated by having introductions to other organisations and a clearer understanding of regulations around data sharing. Lack of integration can make data collection siloed and potentially duplicative. This also created competition amongst interventions that have similar functions.

The interventions were funded by a mix of private and public grants and generated revenue through consulting or charging for utilisation of their technology or service. Funding was perceived to be limited and awarded on short timeframes, making it difficult for intervention developers to receive the funding they needed.

The intervention developers that participated in this research were motivated on a personal level to tackle VAWG and other problematic behaviours on the transport system, indicating that other actors in the system may be motivated to design and deploy effective interventions to tackle this issue.

3.5.3 Overview of the twelve interventions

A description of each intervention and the finance and revenue models (at the time of the interview) are listed in Table 3. Note, one intervention developer wished to remain anonymous, so the table describes eleven of the twelve interventions.

Table 3: List of interventions that were analysed for further review

Intervention Name	Overview	Intervention Finance and Revenue Model	Location of operation
Becon	Mobile app that supports and protects people during their everyday journeys by detecting unusual changes in a user's speed, motion, or location as they travel and alerting their emergency contacts automatically if necessary	Funding from angel investors and a venture capital firm; Revenue through a freemium model	International – Founded in the UK
BSafe	App and technology platform aimed at travellers, emergency centres, and businesses. It is an emergency management system developed to offer prevention, handling, and documentation of incidents (in particular, incidents of VAWG)	Funding from fundraising; Revenue generated by charging organisations for the provision of its platform	International – Founded in Norway
Bus Safety Feedback Tool	App/website that allows bus users in West Yorkshire Combined Authority to provide feedback on the bus network	Funding from Home Office Safer Streets Fund	West Yorkshire, UK
Goodnight Out Campaign	Campaign, which aims to create safer, accountable, and inclusive nightlife spaces by training and educating workers through a one-year accreditation programme	Initial funding from Rosa Fund; Entirely operational from client-based revenue	UK based
Journeo	Business that provides infrastructural solutions (i.e., consultative design and development of technology for transport hubs, installation of CCTV, next-stop	Funding from share and revenue-based capital;	UK based

Intervention Name	Overview	Intervention Finance and Revenue Model	Location of operation
	announcement displays, passenger counting systems, Wi-Fi on buses, and displays of real-time travel information). They also provide maintenance support for these technologies.	Revenue generated from the installation of solutions, access to the portal and maintenance of services	
PT4ME Campaign	Campaign by International Association of Public Transport to advocate for inclusive public transport	Funding from the World Bank	International – Based in Belgium
Safetipin	Social organisation with a mobile app (My Safetipin) to crowdsource data on safety and two other apps that collect data on physical infrastructure and social usage of streets and public spaces, allowing for safety audits	Funding from foundations and grants; Revenue generated from technical consulting and big data analysis. My Safetipin app is free and does not generate revenue	International – Founded in India
SpacetimeAI	Technology that generates actionable insights from geo-located and time-stamped data (using big data prediction, profiling, visualisation, and simulation)	Funding from Innovate UK	International – Founded in the UK
Various activities by The Suzy Lamplugh Trust	Charity aiming to reduce the risk of violence, abuse and aggression through influencing policy, campaigning, training, victim support and perpetrator intervention	Various funding sources including government, Mayor's Office and private funding. Revenue from clients for consulting work and bystander intervention training	UK

Intervention Name	Overview	Intervention Finance and Revenue Model	Location of operation
TInnGO	Initiative by the European Union, which generated a global data repository, incident reporting tool, and inclusive evaluation tool	Funding from EU	International – Founded in the UK
The TravelSafe Partnership Merseyside	Multi-institutional partnership aiming to maintain a safe transport environment in Merseyside	Funding from HO Safer Streets funding	Merseyside, UK

To summarise, these interventions are sustained through various sources of funding and revenue generation. The following list shows the variability in how intervention developers/organisations fund and sustain their intervention(s).

- Technical consulting and selling datasets to large international organisations;
- Installation charges for infrastructure-based interventions or utilisation of application platforms;
- Subscription fees for maintenance of infrastructure and access to portals of data;
- Selling services (such as bystander training) to clients;
- Freemium models for applications, which means that basic functionalities are free, but more advanced or customisable functions require a paid subscription; and
- Revenue sharing with technology partners.

Many of the shortlisted interventions were financed through grant funding from institutions or private donations. One of the interventions also received funding from angel investors and a venture capital firm.

Note: Angel investors are types of investors or investment bodies that invest money in companies by purchasing shares in that company, to see the value of these shares increase as the company grows and therefore, make a profit when re-selling the shares.

The twelve interventions aimed to reduce incidents of VAWG and other problematic behaviours in various ways, as listed in Table 4, and most sought to reduce VAWG through a combination of efforts. The purpose of the intervention, as listed in the table, is from the intervention developer's perspective and has not been validated with the end user.

Interventions directly or indirectly affect many stakeholders including local authorities, police forces, innovators, and transport operators. Notably, only two of the twelve

intervention developers reported actively engaging with women and girls or other users to ensure the intervention was meeting user needs and achieving its aim.

Table 4: Interventions categorised by type and purpose for the twelve interventions reviewed

Type	Interventions aim to reduce incidents of VAWG by…	Intervention Name(s)
Prevention	Raising awareness and educating	PT4ME; TravelSafe Partnership; Suzy Lamplugh Trust; TInnGO
	Designing and providing safer infrastructure	Safetipin; Bus Safety Feedback Tool; Journeo; TravelSafe Partnership; TInnGO
	Predicting crime “hot spots”	SpaceTimeAI
	Improving policies regulating VAWG	Suzy Lamplugh Trust; Good Night Out Campaign
	Better understanding of perpetrators of VAWG	Suzy Lamplugh Trust
Immediate response	Training staff to deal effectively with incidents of VAWG	TravelSafe Partnership; Bus Safety Feedback Tool; Suzy Lamplugh Trust; Good Night Out Campaign
	Improving personal safety and ease of intervention during incidents	Becon; bSafe
Post-incident reaction	Increasing intelligence through feedback and reporting	Bus Safety Feedback Tool; TravelSafe Partnership; TInnGO
	Supporting investigation of perpetrators by identifying them effectively and timely and providing evidence	Journeo; bSafe
	Supporting survivors of VAWG	Suzy Lamplugh Trust; Safetipin

3.5.4 Market analysis

The intervention developer interviews and findings from the market scan highlighted several market opportunities and barriers for interventions related to transport safety for women and girls.

3.5.4.1 Strengths and opportunities

Interviewed intervention developers felt that gender equality and responding to incidents of VAWG are prominent topics in public discourse, but work needs to be done to keep these at the top of the agenda among the actors in the system.

New technologies are emerging on the market. Interviewed intervention developers felt that if they are integrated into existing transport and surveillance systems, these technologies could provide an opportunity for travellers to be quickly connected to police, transport operators, and local authorities.

Interviewed intervention developers demonstrated a personal interest in developing solutions to reduce incidents of VAWG and other problematic behaviours and improve perceptions of personal safety. This echoes the feelings expressed by stakeholders who participated in the stakeholder workshops.

3.5.4.2 Weaknesses and threats

Of all the intervention developers interviewed, only two reported engaging with users (i.e., people or organisations directly targeted by the interventions) to design interventions or validate they are successfully achieving their aim. However, in these cases the intervention 'user' is not the same as the intervention beneficiary (i.e., women and girls). The two intervention developers reported engaging with recipients of the training they delivered, and therefore no intervention developers reported actively engaging with women and girls travelling. This means interventions are being developed without considering the populations they intend to support and without collecting evidence about their effectiveness and overall impact.

The scarce availability of gender-disaggregated data and data on the prevalence of VAWG and other problematic behaviours on the transport system makes it difficult for intervention developers to know where to focus their intervention and how best to measure impact.

Interventions, such as personal safety apps or feedback tools, have experienced difficulties integrating into other systems (i.e., emergency services or police and crime commissioners) and have had difficulties sharing data with other organisations. This could be due to complicated data regulations and a poor understanding of how to stay compliant with data protection rules. Whilst valuable data is being collected at a localised level, the lack of integration with larger authorities can create siloed and potentially duplicative data collection. Furthermore, some intervention developers suggested that their intervention could be improved with access to security, mobility, and CCTV data. Intervention developers favourably viewed integrating technology into larger authorities; however, it is important to recognise that authorities may have limited resources to analyse data, may have their tools, and may not be set up to respond to reports.

Furthermore, organisations such as SpaceTime AI rely on data collected by other organisations. The quality of data analysis and the intervention can be reduced if the other organisations' data has been compromised because of data compliance issues.

The interviewed intervention developers noted that funding to develop, test and market interventions can be limited, inaccessible, and allocated over short timeframes, which generated difficulties for interventions relying on external resources to have an impact and reach commercial sustainability. For example, the Safer Streets Fund from the Home Office was only available to local authorities, police forces and some community groups. This meant that travel partnerships could not directly apply for the funding and had limited time to partner with local authorities and police and crime commissioners.

4. Key Findings and Recommendations

Through reviewing desk research and engaging with various stakeholders, Connected Places Catapult aimed to better understand the personal safety of women and girls on the transport system, the market of existing interventions, and to generate recommendations on how to grow the market of interventions related to the personal safety of women and girls. This section summarises the key findings elicited through the research and provides recommendations for next steps.

4.1 Summary of findings

Overall, there was limited insight and data to understand the occurrence of VAWG and other problematic behaviours and related interventions on the transport system. Studies that sought to assess the prevalence of VAWG and other problematic behaviours were not all specific to transport, or some were small in scope, and hence, it was challenging to have a comprehensive overview of this issue on the transport system. Stakeholders and intervention developers echoed the lack of data available to understand and tackle VAWG and other problematic behaviours and perceptions of personal safety on the transport system. While the Catapult and actors in the system cannot assess the true scale of the problem, it is well recognised this is a critical issue which needs addressing.

The Catapult found that socioeconomic and demographic factors appear to impact experiences of VAWG and other problematic behaviours on the transport system. Furthermore, factors such as time of day, busyness of transport systems, travel disruptions, and presence of transport staff and CCTV can impact women and girls' perceptions of personal safety. These factors and how socio-demographic characteristics intersect with them are important for actors in the system to understand when designing and deploying interventions which support women and girls when they travel.

The research suggests there is underreporting of VAWG incidents and other problematic behaviours on the transport system, which could be due to victims and bystanders:

- Not knowing who, how, and where to report;
- Not knowing what behaviours are reportable and not viewing the incident as serious enough to report; and
- Thinking that reporting would not help or was not worthwhile.

Lack of reporting makes it difficult for actors in the system to understand the true scale of the problem.

The Catapult found 116 interventions related to transport safety for women and girls. Some interventions were specific to VAWG and other problematic behaviours (although they were not transport-specific), and others were broader initiatives that can also impact personal safety on the transport system. However, these interventions were often not integrated into existing systems and tended to be uncoordinated with interventions on other transport modes, geographical locations, or those monitored by other authorities.

Notably, the Catapult found very little evidence to indicate if and how interventions are effective at reducing VAWG or improving personal safety. Interviews with intervention developers reiterated this, with only two out of twelve actively engaging with users to assess if their intervention is meeting the user's need and achieving its intended outcome. The intervention developers and stakeholders that participated in this research were personally interested in tackling VAWG and other problematic behaviours and wanted to continue working on improving personal safety on the transport system.

4.2 Recommendations

Connected Places Catapult believes that better evidence collection and more collaborative action are needed to grow the market and accelerate effective and impactful interventions in this area.

Based on the research, four key recommendations stand out:

- Develop, test, and validate all interventions with impacted users;
- Build capabilities for shared metrics and data;
- Coordinate shared learning; and
- Continue to support all intervention development through targeted funding.

4.2.1 Recommendation 1: Develop, test, and validate interventions with those impacted

The research found a lack of evidence in determining the effectiveness of all the interventions examined as part of this research, at reducing VAWG and other problematic behaviours, or improving personal safety for women and girls. This also included a lack of consultation, testing and validation with women and girls and other target users of interventions. The evidence gaps mean that actors in the system do not understand if and how interventions are impactful.

Therefore, the Catapult recommends that transport systems and interventions be developed, tested, and evaluated, working directly with women and girls and other user groups. To help explain this point, a few examples are listed:

- If an intervention aims to improve women and girls' perceptions of personal safety by allowing them to be connected to family or friends via an app, then the app developers should be engaging with women and girls to test how using the app impacts their perceptions of safety. Their learnings should guide the design and refinement of the app.

- If an intervention relies on the actions of staff in the transport system, the intervention must be proven to be operationally effective for them.

- If the intervention aims to change the behaviour of potential perpetrators of VAWG and other problematic behaviours, it should evaluate with the intervention recipients that the knowledge of and the exhibition of appropriate behaviours have improved.

The learnings captured from developing, testing, and validating interventions with user groups are fundamental to supporting the establishment of an evidence base for what works in improving the personal safety of women and girls on the transport system.

4.2.2 Recommendation 2: Build capabilities for shared metrics and data

4.2.2.1 Standardised frameworks to collect data and measure the impact

Valuable data about VAWG, other problematic behaviours, and perceptions of personal safety on the transport system is collected differently by different organisations. There is inconsistency in the data points collected, and stakeholders felt that accessing and being knowledgeable of existing datasets is difficult. Therefore, the Catapult recommends creating standardised frameworks and guidance on how to robustly collect and share data on incidents of VAWG and other problematic behaviours and personal safety on the transport network.

Establishing shared measures to collect data on VAWG and other problematic behaviours and personal safety on the transport system could improve the understanding of the problem and enable intervention developers and implementers to design and deploy interventions with a more targeted approach. This could lead to better guidance on what to measure, how to measure, and how to report impacts regarding incidents of VAWG and other problematic behaviours and the perceived safety of women and girls on the transport system. There may be conflicting measures (e.g., the prevalence of VAWG and other problematic behaviours could decrease, but in early stages, perceived safety might get worse), and therefore, actors in the system must be very specific in what they are measuring and how they evaluate the impact.

Furthermore, the Catapult recommends supporting the creation of shared metrics to measure the effectiveness of interventions. Establishing success criteria on how to measure if an intervention is effective should be done through various means in consultation with police, transport operators, local authorities, academics, and charities that represent victims and survivors. Further, findings from Recommendation 1, 'develop, test, and validate interventions with those impacted,' can be used to support establishing the success criteria by including measures important to user groups. As the repository of research grows, actors in the system will have a greater understanding as to which

interventions currently exist, which work and in what context, how to optimise them, and how to identify the needs which are left unaddressed and require new interventions.

4.2.2.2 Addressing research gaps

The research elicited several research gaps that could be further explored, including, but not limited to:

- Understanding intersectionality and the variation of transport experiences based on socio-demographic characteristics, including differences between urban and rural areas.
- Understanding similarities and differences of experiences of VAWG and other problematic behaviours and perceptions of personal safety across transport modes.
- Understanding bystander behaviour on the transport system and how to design interventions to support bystander involvement.
- Understanding behaviours of perpetrators on the transport system.
- Understanding the integration of VAWG-related interventions relative to the context of a specific place.

4.2.3 Recommendation 3: Coordinate shared learning

Numerous interventions exist in the market, and the stakeholders the Catapult spoke to were passionate about tackling this issue. However, interventions operated in silos and were often not fully informed about the complexities involved. Moreover, actors in the system lack evidence and research to evaluate the impact of interventions.

As such, the Catapult recommends activities that support transport providers, local authorities, police forces, intervention providers and charities to share best practice This could be done through a central data platform easily accessible to stakeholders, which contains evidence and information about VAWG and other problematic behaviours on the transport system and associated interventions. It could also be done through facilitating opportunities for stakeholders to meet and share ideas.

A centralised platform to aggregate data related to this topic could contribute to building a stronger evidence base and encourage the sharing and accessibility of data across various stakeholders. This could support organisations to evaluate their intervention and could allow for comparison and synthesis of large-scale data.

Furthermore, intervention providers perceived a benefit from having introductions to other intervention providers, potentially sparking new partnerships and integrations. This could be done through innovation clusters or evaluation programmes. Innovation clusters convene organisations across the system to tackle shared challenges and to support market growth within related contexts, with the aim of:

- Bringing together different stakeholders to generate collaborative commercial ventures and research partnerships;
- Driving equality (and equity), diversity, and inclusion;
- Educating organisations on the diversity of funding opportunities and supporting them benefitting from it;
- Offering organisations the opportunity to contribute towards the scoping of challenges; and
- Sharing learnings and mentoring one another.

Evaluation programmes involve testing interventions in a real-world location with relevant stakeholders. This issue is complex, and other research has indicated that multiple interventions must be implemented to have an impact. An evaluation programme could be an opportunity to trial and coordinate multiple interventions and allow various stakeholders to assess the effectiveness and validate interventions in a given context.

4.2.4 Recommendation 4: Continue to support intervention development through targeted funding, with a focus on supporting evidence collection

Conversations with stakeholders and intervention developers suggested that limited funding opportunities was one of the main barriers to intervention development.

While recent funding opportunities such as the 'Safer Streets Fund' (worth £180 million across five rounds of funding between 2020-2025) from the government have been deployed and utilised for interventions related to transport safety, stakeholders and intervention developers suggested that the short timeframes for applications and short-term nature of the grants negatively affected collaborative applications and made it difficult to sustain the intervention beyond the duration of the grant. Additionally, they felt that some funding opportunities were too loosely defined (i.e., they were not specific to women and girls or not specific to transport) and can lead to the challenge being absorbed into larger issues, and hence dilute a focus on incidents of VAWG and other problematic behaviours on transport.

Therefore, the Catapult recommends encouraging public and private funding opportunities specific to personal safety challenges on the transport system with tightly defined objectives. This could include encouraging larger programmes that seek to innovate infrastructure and transport hubs to allocate funding for addressing VAWG and other problematic behaviours. It could also involve integrating gender toolkits into existing funding mechanisms to make them more responsive to transport safety for women and girls. Funding opportunities should have sufficiently long application periods and duration of funds to encourage collaboration across the system and proper design, deployment, and evaluation of interventions. Funding could also support data analysis, marketing interventions to users, or expand interventions to other target audiences or transport modes.

4.3 Conclusion

More collaborative action and better evidence collection are needed to grow the market of interventions that support the personal safety of women and girls on the transport system. Connected Places Catapult recommends that to do this, actors in the system should develop and validate interventions with relevant user groups. From this research and with consultation with other stakeholders, actors in the system should create shared metrics to collect data, measure impact of interventions, and address research gaps. These shared metrics can support a coordinated approach to understanding the problem and building an evidence base. Further, supporting opportunities for stakeholders to share learnings and trial interventions together could support coordination across the system. Finally, the development and improvement of interventions would be facilitated through more targeted funding from both public and private sector sources.

Appendix 1: Participating organisations for workshops and interviews with stakeholders

Transport Workshop	**Charity Workshop**	**Interviews**
Bath and Northeast Somerset	Research Institute for Disabled Consumers	Dr. Shola Apena Rogers, from the University of Birmingham
Coventry City Council	Sharan	Nia Mellor from British Transport Police
Nexus	Solace Women's Aid	Stephen Burrell, from Durham University
Norfolk County Council	Suzy Lamplugh Trust	Daisy Chapman-Chamberlain, KTN Innovate UK
Stagecoach Bus, Stagecoach Group, Stagecoach West	Visible Platform (SME)	Sasha Langeveldt, from London Travel Watch
Transport for Greater Manchester	Other charities working to reduce VAWG	Sian Lewis, from the University of Plymouth
Transport for London		Iaine Yates, from West Yorkshire Combined Authority
Transport for West Midlands		Other academics researching sexual violence, who wish to remain anonymous
Transport Northeast		

West Yorkshire Combined Authority		

Appendix 2: Demographics of disabled women and school-aged girls interviewed

Demographics of disabled women

Total of six participants

- Gender: all participants identified as cisgender or transgender women
- Age: 20-70 years
- Ethnic background: One woman who is South Asian British, four women who are White British, and one woman who is White American
- Geographical Location: London, Bristol, East Midlands, Scotland, Windsor
- Participants included women who have different access needs:
- Deafblind (one participant);
- Blind (one participant);
- Mobility (three participants);
- Dexterity (three participants);
- Neurodivergent (ADHD, Dyslexia) (one participant); and
- Mental health condition (one participant).

Several participants identified as having more than one co-occurring access need.

Demographics of school-aged girls

Total of 11 participants

Age in years:

- 12 (one participant);
- 13 (two participants);
- 14 (one participant);
- 15 (two participants);
- 16 (three participants); and
- 17 (two participants).
- Ethnic background: One girl who is Asian British Pakistani, one girl who is Black British African, one girl who is Mixed White/Black Caribbean, eight girls who are White British.
- Geographical Location: Essex, Oxfordshire, Gloucestershire, Yorkshire, and Merseyside.
- Transport modes: Participants used a range including bus, walking, train, private car.

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