Title

Is the current technology used by the UK Police in missing person cases effective?

Author

Amy Clarke

Student number

C015255j

Supervised by

Deborah SPROSTON-BEWLEY

FORE60363 Independent Project for Policing Students

BSc Hons Policing and Criminal Investigation

Word Count

10,542

Abstract

In this study, the researcher investigates the current use of technology used within UK police forces and looks at if officers believe they are effective at finding missing people. This will determine if police forces need to update and upgrade the technologies currently used to be more effective or if they should stay the same.

Previous literature was analysed to see other writers' tests and experiments with current and new technology to see what made them effective and if upgrading technology such as drones to have a frequency detector, will allow for missing people to be found a lot quicker and easier, overall reducing police time. GPS devices on dementia patients are also currently used to detect and track when the person is not supervised, limitations found included the battery life of the systems. All the experiments looked at were successful, having technology upgraded is proven to be more effective within this research.

The method of this research is the distribution of a questionnaire, aimed towards police officers and ex-officers who have worked or work in a UK police force. There is 12 questions total, asking about specific technology known to be commonly used within police forces and more specific questions like which type of missing person do they come across the most. This will allow the results gathered to be compared to one another to gain insight on which common technologies police officers believe need improving. A mixed method approach was used using both quantitative and qualitative analysis. Thematic analysis was used and found many themes including some participants saying current technology does not need improving.

It was found that many participants explain how technology such as CCTV cameras need to be upgraded with "better quality" cameras to make them more efficient at finding a missing person. This is the same found with drones, if money was invested into the systems, they would be used more frequently in missing persons cases. They also save on the cost of the deployment of helicopters. Most police officers who answered this questionnaire believe that technology is effective at finding missing people however, upgrades need to be added for them to be more effective and limitations such as "cost" were discovered. Teens was the most selected type of missing person the participant sample has dealt with. 45/67 people selected this response. Facebook and twitter were also found to be the most common social media to spread missing persons appeals for the police.

Acknowledgements

I would like to thank my amazing supervisor Debs for being there for me along the way of this whole journey, she never fails to make us all laugh and has kept me sane throughout this whole process. I would also like to thank my partner Benjamin for giving me the space when I needed it to finish my project and putting up with my meltdowns. My family has also been great, so I would like to thank my mum, especially my dad who pushed me to get a degree and I am forever thankful to him for pushing me to get and finish this degree.

Table of Contents

Introduction

This project aims to gain a better understanding of what technology is used by the police in the UK to assist in missing person cases. If it is effective and if any new modern technology, such as facial recognition, should be introduced to help find a missing person in less time and more effectively. Analysing of existing statistics on effectivity and efficiency will also be throughout this project to further help determine if the current use of technology, currently, is effective at finding these missing people and if it is not then why. This research will look at where there needs to be improvement within the different types of technologies such as CCTV being 'blurry', comparing Britain's technology to other countries who use more advanced systems such as Poland to see if Britain's use of technology needs to be updated and if they should be implementing different countries ideas and technologies.

84% of people are found within the first 48 hours of them being missing (Alys et al, 2016). The College of Policing, 2016 defines a missing person as an individual whose whereabouts are unknown and there are safety concerns about their wellbeing and/or to others. Finding a missing person quicker limits, the risk of harm coming to that person, as the longer someone is missing, the more in danger that person becomes. Improving current technology could help to limit the time it would take to find missing people and bring them home safely, however, there are different levels of risks involved within a missing person's investigation: low, medium, and high risk (Tarling and Burrows, 2004). Children, teens, and vulnerable adults such as elderly people and people with known mental health issues are automatically placed in the high-risk category (Kiepal and Dawson, 2012). Low risk consists of people who go missing frequently and is not out of character for that person. Specific technology could be implemented for each one of these risk categories to make sure efforts are proportionate and to improve efficiency for the British police at finding missing people.

The aim of this research is to analyse what type of technology is currently being used within UK police forces; focusing mainly on the English police, looking at how these have come from past technologies such as the introduction of AMPR and facial recognition and looking at other studies to see if these specific systems are effective at finding a missing person and if not then why. If it is established to not be very effective, then what types of new modern technology could be introduced and which current technology needs to be improved. The researcher will also be looking at how other countries, such as Poland, use effective technology in their police forces and if these should be introduced in the UK.

This research will be conducted with the distribution of a questionnaire aimed towards UK police officers who have worked on a missing person's case. This was insured by there being a 'have you worked in a missing persons case' question which, if the participant answers no, the questionnaire closes and thanks them for their time. The reason for this is to gain

professionalised data on this topic to get a realistic insight into what technology police officers use when finding a missing person. This research project is being conducted because there is limited research into how effective introducing new technologies could be at finding a missing person quicker and that police technology needs to be consistently improving and innovating to the modern society (Lum et al, 2017). Most of the human population owns a personal mobile phone and has it on their person on most days (Zorn et al, 2011). A considerably large amount of these will be up to date with new modern technology such as facial recognition and fingerprint scanning. Some questions asked on the questionnaire will be if CCTV cameras need to improve and be modernised due to a lot of CCTV cameras being of low standard and quality, making it much more difficult to see individuals and get a good description of them (Ritchie et al, 2018).

Previous literature on other countries' modern technology will be looked at and compared to the UK, this will allow the police forces in the UK to see modern technology working and if it is effective at finding missing people. There has been a lot of literature about CCTV and how this is implemented when finding a missing person. However, there is limited research on how this is effective and what police force, or CCTV companies, need to do to improve the CCTV overall (Norris and McCahill, 2006). A lot of research has been conducted regarding how social media has an impact on missing persons cases such as digital appeals and the sheer number of people the internet is able to reach. This, however, does have limitations as the media is not very reliable due to information being altered and misinformation spread which would impact an investigation (Guo et al, 2020). The best outcome for this research project would be that UK police forces consider different modern alternative methods, such as the use of facial recognition, higher quality CCTV footage and drones, that could be used to find a missing person and the forces build upon these findings and realize that there is limited technology compared to today's standards, such as high-quality cameras in mobile phones.

Literature Review

One of the most common types of technology used to find a missing person by the British police is CCTV (Closed Circuit Television). It was initially introduced when testing was being conducted in the 1960s in London and Liverpool. However, these tests failed as the funds invested in this technology was too high (Williams, 2003). British people are the most surveilled people in the world as there are known to be roughly 40,000 CCTV cameras (Armitage, 2002). This was as of 2002, many more CCTV cameras and systems would have been introduced after this time. A study was conducted by Mileva et al. (2021) which is based around two experiments that were both being used to compare to one another. The first experiment started with 20 students being shown one image of a supposed ‘missing person’ and asked to view CCTV footage of a crowd of people including the person in that one picture. After this the same group was shown four images of the same person and again shown the same CCTV footage, this was to show if seeing a face on multiple images would increase the likelihood the participants would be able to recognize a

‘missing person.’ The second experiment was the same concept. However, instead of using current CCTV quality and positioning, they used a clear HD video of the same street and a lower angle, as if it was taken on a mobile phone camera. The researchers concluded that the participants who were given the higher quality and positioned CCTV video to watch managed to quickly detect the person they were looking for in the photographs they were shown. This experiment shows that improving general CCTV cameras quality would result in finding a specific face in a crowd or from a distance due to the overall quality of the camera being improved. A negative of these experiments is that it was only tested using a sample size of the population, testing this on a much larger population would give more accurate results and prove more realistically if overall CCTV image quality needs to be improved.

A similar study was conducted by Keval (2009). The experiments consisted of 80 participants who were showed a randomly ordered CCTV video, this was done as there was 64 faces/videos to be recognized and 80 participants, this would avoid any bias, each participant was then given an image of a person and a look alike which were in the CCTV footage and were told to answer ‘yes’ or ‘no’ if the image of the person matched the CCTV footage. The participants were then shown a higher quality video and it was found that as the video quality increase, the number of correctly guessed people increased by 20%. They also included an ANOVA test which proved that as the quality of the CCTV footage increased the amount of correctly identified people increased. Linking back to Mileva’s study, these studies both found that the higher the CCTV image quality, the more effective people were at finding a person they were looking for. Keval’s study consists of a lot more people so will more likely be accurate, rather than the 20 participants in Mileva’s study. However, they found similar results. Waples et al. (2005) discovered that most CCTV systems ran at a very low frame rate, and some were as low as ¼ fps (frames per second), as Keval’s experiment proved, any CCTV quality with a low fps shows a decrease in people able to recognize someone they are trying to search for.

A study conducted by Surette (2005) reviews other literature surrounding the history of CCTV and the first and second generation of systems used and the problems both had and currently have. Their main conclusion was that evolving CCTV to second generation further overall added more concerns to already existing problems they found which were consistent with the first-generation CCTV systems. A positive found in relation to missing people is that CCTV often deters criminals into committing more emotional crimes including abduction and assault.

Missing persons' appeals is another example of technology which has benefited from being updated and upgraded from the past. Missing persons appeals were originally paper based, meaning that police officers would have to print and hand out posters with the information about a missing person to people around that area (Holmes, 2016). Many problems that came with being paper based such as losing crucial information or mixing information together. With the constant improvement of technology around the world and in the UK, this has made it so that people are able to share relative information about a missing person using online media such as

Facebook and Twitter as well as store all relevant information on computer systems, so nothing is misplaced (Inman and Picton, 2012). A benefit of this is that the post made about a missing person will be able to reach much further around the country due to the number of people sharing the posts around different areas. This overall improvement from paper based to more computer and media based is much more effective at finding a missing person due to the increase of people seeing posts. The main downside to this is that the media is mostly controlled by the public, meaning that any information can be changed and false information about a missing person spread (Guo et al, 2020) hindering the investigation and slowing the police down.

The media also plays a huge role in the effectiveness of policing as in the past, social media such as Facebook and Twitter, didn't exist. Solymosi et al. (2021) explains that the media is crucial at tackling crime in the UK and is overall a vital piece of technology used to track, locate, and help put together timelines of missing people. Solymosi's research is based on Twitter as this is where the public and police are most likely to post missing persons appeals other thank Facebook. They conducted a sample research project which contained 1008 tweets containing information about missing people, they made sure to use specific hashtags such as 'missing' to help with the engagement of the post. A hashtag is mostly used for other people to find a post quickly and easily such as the term 'missing' which, when typed into Twitters search bar, would come up with all the post with that specific hashtag used (Lyons, 2019). They were all closely monitored to see how many retweets each post managed to gather and how far these tweets would spread. Most of these tweets had little to no engagement, this could be an indication that appeals on Twitter need to be researched to find out which techniques work for better responses and which hashtags would increase this overall engagement. The only problem with this study is that they have only focused on Twitter, many missing person appeals are made on Facebook and there are different groups used to share missing persons appeals (International Association of Chiefs of Police, 2015).

GPS (Global Positioning Satellite) systems, over the recent 10-year period, have been used a lot more but are mostly used within cars or mobile phones to find a specific location. Recent studies have been completed for elderly people with dementia. McShane and Skelt. (2009) completed research about how GPS systems are being used to provide dementia patients, in homes, more freedom by making sure they always have a form of GPS system when they are not supervised, as their location is always known. Many people with dementia will end up going missing throughout their time with the disease (Landau and Werner, 2012). Which is why having effective technology to find these people quickly is so important. Getting lost, or 'wandering' as it's called is common in dementia patients and can appear as one of the earliest symptoms. McShane's research was conducted to gain more knowledge of the effectiveness of GPS tracking with people with dementia. Companies such as www.atdementia.org provide carers with information about GPS systems and how they would be used to locate and track an elderly person. This current use of technology not only helps the police find a missing person with dementia, but it gives the staff caring for these vulnerable people instant data on the whereabouts of that person so they can

either call emergency services or locate them themselves, overall saving police time and efficiency. Negatives within their research included some carers explained how some GPS systems data was showing the incorrect location and are 'unreliable'. They are also subject to a lot of human error due to their constant need to be charged and given to the patients. This implies that this current use of GPS technology needs upgrading to where there are minimal errors.

A similar observation was given by Rahman (2015), which was conducted a few years later than McShane's research. He instead believes that GPS is very accurate in the recent years which results could have differed due to this research being completed in 2015 instead of 2009. Many of Rahmans points are like McShane's such as that GPS tracking on people with dementia is crucial in their independence and helps them to have their own freedom. Due to this research being more UpToDate and recent, the found that most carers had their mobile phones linked to the GPS systems which had proven 'beneficial'. Overall, GPS tracking systems for people with dementia should be continuously researched and upgraded to more accurate technology such as self-charging systems. However, efficiency has seemed to increase when these GPS systems have been upgraded which is shown by the 2015 research compared to the 2009 research, mobile phones being connected to the devices was a major update and upgrade as they gave a more accurate response and allowed the patients location to be seen more accurately and instantaneously. GPS systems for dementia and older patients focus on the stage before they go missing for their own safety and allow them to have their own freedom without the fear of ending up as a missing person. As well as dementia patients, children are also placed automatically into the high-risk category when they go missing (Smith and Greene, 2014). Currently there are a lot of modern technologies that have been recently introduced to help track a missing child such as the use of a GPS wristband, this type of technology is yet to be researched.

Many countries are using technology such as the use of drones to help to find a missing person as they help to map out a large area which overall reduces police time, instead of having to call in a helicopter (Gao et al, 2021). One of the most common ways that the UK police use drones is in missing persons investigations (Omand et al, 2014). Drones are being used by the UK police a lot more than in the past due to technology advancing, they also use them in military operations (Bindemann et al, 2017). Bindemann states that their experiment was the first of their kind when it comes to human identification using aerial footage. The conducted experiments test how effective drones are at recognizing a specific person from film footage and comparing it to a picture of a supposed 'missing' person. To make this experiment realistic, a similar drone was used which was similar to the drones used in the UK police force and military. The experiment consisted of 40 students who were all from the University of Kent. They were all presented with images of a specific person's face, making sure that the image was HD (high definition) and were also given a set of three images taken directly from the footage provided by the drone. The students had to determine if the image of the HD person they were given was the same person on the footage from the drone or if they were different. Each of the drone images was 30fps

(frames per second). They found that the accuracy was 43% which means that the identifications of the people in the pictures would not be able to be made reliably. Bindemann did extend the experiment by adding another camera, GoPro, which was of a lower quality, it was found that the higher quality built in drone camera had a 61% accuracy and the GoPro at 52%. Both are of a low percentage of identifications which could suggest that, again the same as CCTV, camera quality overall needs to be improved for dealing with further away situations. This links to the theme of video/camera quality in CCTV as Bindemann found similar results as Mileva and Keval's research who share the outcome of there being better results in finding a specific person when the video quality was increased.

Research was conducted in Poland which focused on using drones to assist the police with planning out missing persons investigations by looking at points of entry and where cordons will need to be placed and focused on the search and rescue of a missing person (Tuśnio and Wróblewski, 2021). The experiment started with the specialized drone scanning the area in which the experiment was taking place by snapping multiple quick action photographs of the whole area. This took less than 20 minutes to scan almost 50 acres. This experiment consisted of two participant groups, one group had no GPS or any other form of technology with just the directions of the people piloting the drone through an earpiece. The second group was equipped with a GPS and a compass, they found it much easier to follow directions from the pilots of the drone. Despite some complications, both teams made it to the correct location, using the correct entrance. They concluded that the team with the GPS and compass, along with the drones' directions, made it to the point in considerably less time which proves that yes, drones are a great use of technology to find missing people, however, human error and complications can still be at fault so using past systems such as a compass combined with their drone helps massively. The British police should investigate Poland’s technique and apply the use of using drones to map out and plan their investigation and searches which would, overall, help search for a missing person easier and in less time.

Researchers in Switzerland developed a drone system that can follow forest paths and trails to be able to closely monitor and view the area as each year many hikers end up missing (The Science Teacher, 2016). These two studies are very similar to another experiment conducted within a mine where it was found that their drone was able to be used during search for someone who was missing within a mine. This used human frequency to track and locate the missing person so that the drone can fly deep down where rescue teams aren’t able to travel (Zimroz et al, 2021). This experiment was successful proving that with enough funds, upgrading drone technology within the UK police forces would be effective, not only for wide search areas, but for compact areas.

Methodology:

Design

This research will be a data project based around primary data. This is data which has been gathered and sourced from the researcher, instead of finding pre-existing sources online (Walliman, 2017). The used research strategy for this project will be a mixed method approach, using qualitative and quantitative data. Having a project that consists of both quantitative and qualitative analysis allows there to have a deeper level of overall analysis, allowing the data to have two different approaches making the outcome more accurate (Bazeley, 2017). Qualitative data mostly consists of observing people and interacting with each other using their own language (Kirk and Miller, 1986). This is most used with written responses to questionnaires including people's written opinions. Document analysis is a form of a qualitative strategy, which will be conducted in this research as the responses gathered from the UK police officers will have to be analysed for their ranging themes (Anfara and Mertz, 2006). Quantitative research is where the researcher can transform data such as opinions and actions into numerical data (Tracy, 2014). Methodology used by this form of data analysis is conducted to create mathematical data structures. Qualitative data will be used more than quantitatively in this project as there are only a couple of Likert scale questions and most of the other questions require a written response. The research design will be descriptive due to this being an observation of data being gathered by the researcher.

Sample

The method being used for this project will be the distribution of a questionnaire to different UK police forces using Facebook and Twitter groups. This will only be able to be completed by those officers/ex-offers who have taken part in a missing persons investigation. To make sure only officers that have worked or work in a UK police force and have been a part of a missing persons investigation, a specific question will be asked to the participant so if they answer that they haven't taken part in a missing persons investigation then the questionnaire closes. Adding this question will eliminate any person who the researcher doesn't want to answer the questionnaire to make sure that all data collected is relevant to the topic. This also allows for more professionalised data making it a lot more accurate than it would have been asking the public due to bias they may have on the police (Catwright and Shaw, 2020).

The target participants for this project is 100+, having a larger number of participants will allow there to be a significant amount of data to analyse and hopefully more themes will be generated to be compared to one another. Having less than 100 will run the risk of being underpowered due to unclear and biased results (Brysbaert, 2019).

Procedure

The questionnaire that will be distributed will be created on a website called Qualtrics which focuses on the use of sampling and requires participants to answer surveys using online links and portals (Miller et al, 2020). The questionnaire will be distributed through LinkedIn, a social

networking site used for businesses and professionals (Rutledge and Rutledge, 2010) and on Facebook and Twitter. The researcher will be using Twitter to relate to Solymosi's study with missing persons appeals as this social networking site has many police forces, using hashtags similarly to Solymosi's study will help to attract the target audience that the questionnaire is based upon, UK police officers that have worked on a missing persons case. An example of a hashtag is 'questionnaire' and 'police UK' this will allow these types of people to search and find the questionnaire easily to generate more responses. The questionnaire will also be posted in specific UK police officer/ex-officer groups on Facebook due to there being many groups dedicated to finding missing people, this will allow accurate and personal answers. An example of an active Facebook groups would be 'Ex and Current Police Officers UK' which the researcher found in a couple of minutes of searching for an example (Linz, 2021). Posting the questionnaire in specific groups like these will allow more of the projects' target audience to answer the questionnaire and should decrease the chance that someone who hasn't been part of any police force to answer (Thomas, 2004).

Materials

Materials used will include a personal computer which the researcher will be able to complete their SPSS research and design the questionnaire on. Internet access will also need to be able to be used due to the online program Qualtrics being used to create the questionnaire. A file will be kept on Staffordshire University's systems which will allow all the research to be kept in one area, limiting the risk of files getting misplaced. The SPSS software will also be used to analyse the quantitative data collected from the questionnaire's responses.

Treatment of data/ analysis

This project consists of qualitative and quantitative data therefore for the quantitative data there will need to be SPSS used to analyse the data. A crosstabulation test will be conducted to compart Likert scale responses to the years the participant joined the police force, doing so will allow any patterns from these two questions to be seen clearly. The second main test one will be a frequency test, a few questions will need to be analysed using this test as this shows what percentage of people had selected a specific option due to their being more than one variable available. It is likely that this test will be for any multiple-choice responses. Bar charts will also be included to show the results from questions where there are limited variables and having them visually in this project would help the reader better understand the results found.

Thematic analysis will be conducted using a software called NVivo by the researcher to gather specific themes each other the participants responses gather. These themes will be highlighted and labelled on the researchers personal iPad and saved to the Staffordshire University system in its own 'research' folder. Thematic analysis is a method for analysing qualitative data to gather coding and generate themes such as, 'poor quality CCTV' (Kiger and Varpio, 2020). Finding these themes will allow the researcher to see patterns in the responses and link them

to previously conducted research based around similar topics and see if they also found the same/similar results or if the results differ then explain why and how.

Ethics

This project will not contain very many ethical issues, however, there will be a couple. The first being that there will be no personal questions asked to the participant of their personal missing persons cases they have experienced as this could be a trigger for them and cause emotional harm. The second would be that there will not be any identifying information within this questionnaire such as their name and date of birth. A question will be asked about which force they are or were in so that the researcher can obtain specific results from a range of different areas and compare them to one another.

Null hypothesis: The current technology is effective in a missing persons case.

Alternative hypothesis: The current technology is not effective in a missing persons case.

Results

Qualitative

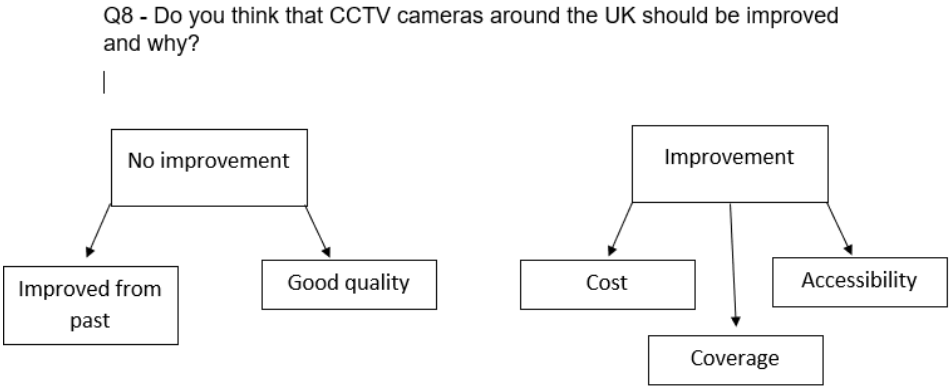

Figure 1: Thematic analysis of subthemes, generated form the main themes 'no improvement' and 'improvement'.

Theme 1: No improvement

This theme was generated due to some participants including that they believe CCTV systems do not need improving, when answering the question related to 'if CCTV systems should be improved'. From this, two subthemes were created; good quality and improved from the past.

Sub-theme- Good Quality

9 (17.31%) of the participants included that current CCTV systems are up to date with good quality. A few of these responses included one-word responses making it difficult to pick up a sub-theme other than them disagreeing with the question. Within this research, it was found

that the people that disagreed with the question had identified other parts in the CCTV technology that needs to be improved and that CCTV 'is very good now'.

Sub-theme- Improved from the past

Closely linked to participants answering that CCTV systems are of good quality, comes that many of them had included that they have significantly improved from the past. 6 (11.54%) included this theme in their answer and many of them had included the other sub-theme of CCTV being good quality. "A lot of CCTV is very good now. Compared to 25yrs ago anyways" this was said by one participant, agreeing that the quality of CCTV has improved however, they then go on to say that there needs to be an increase in funds so that quality is able to be increased further.

Theme 2- CCTV does need improving

Many of the participants included one or more of these general themes and the sub-themes risen from it. From the results it has been found that many of the participants believe that the overall quality of the CCTV cameras should be upgraded and UpToDate with current technology standards. Sub-themes generated include cost, accessibility, and coverage.

Sub-theme- Cost

5 (9.62%) of participants mentioned cost in their answers, they mostly express how improving CCTV would be expensive if all CCTV around the UK were to be improved. Two of the responses included that CCTV is underfunded by the government, meaning that they can't be improved to better quality and more readily accessible. This relates to one participant who says they "should be more and more readily accessible" with another explaining how footage still only comes on "disks and tapes".

Sub-theme- Coverage

Coverage was mentioned in 6 (11.54%) of responses and there were comments on the lack of CCTV cameras and how there should be more set up around the UK and readily accessible. This was found to be because of the lack of areas without CCTV in operation, more areas can be surveilled with the increased amount of CCTV cameras installed.

Sub-theme- Accessibility

Accessibility was also spoken about in 7 (13.46%) of the responses. It is believed that CCTV isn't very readily accessible and that they need to be more 'user friendly' as many are still on 'disc or tape'.

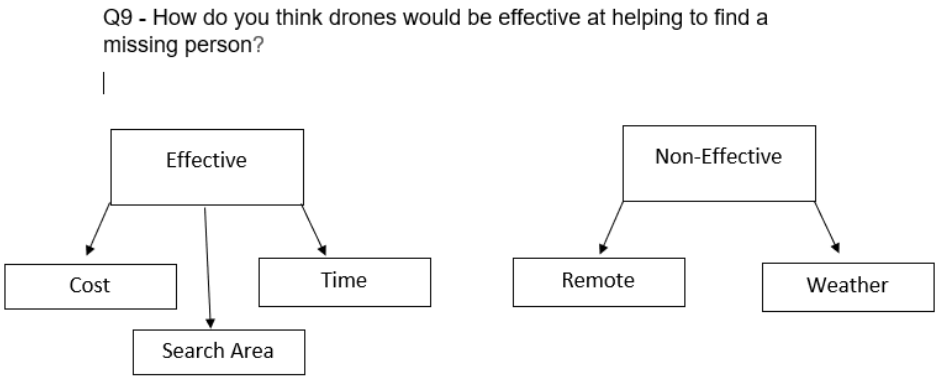

Figure 2: Thematic analysis of subthemes, generated form the main themes 'Effective' and 'Non-Effective'.

Theme 1: Drones are effective

A wide main theme is that drones are effective at finding a missing person, which many participants agreed with within their answer. Sub-themes were generated from this main theme such as cost, time, and search areas. With the most included being search areas.

Sub-theme- Cost

15 (28.85%) participants said that using drones in a missing persons investigation help the police forces with keeping the cost down as much as possible. The use of helicopters when searching large open areas is significantly reduced, also reducing the time.

Sub-theme- Search areas

The search area sub theme was picked out of 51 (98.1%) responses, which are based around how drones can search a wider area, this could be a disadvantage as some response added that open areas are the only places that are able to inhabit the use of drones.

Sub-theme- Time

Linking back to the cost theme, drones help to reduce the time it would take for services such as a helicopter to arrive. 21 (40.38%) of answers included this theme whilst explaining how drones are effective at finding missing people. Reducing the time, it would take to find a missing person would overall increase the rate they would be found safely.

Theme 2- Non-Effective

This theme was generated after finding a few negative sub-themes which link closely to drones not being very effective in the participants' opinion. These themes include drones being remote

and weather conditions. However, 4 participants included directly that drones are not very effective at finding a missing person.

Sub-theme- Remote

30 people included that the use of drones is only effective in 'rural locations' and that drones will not be useful in 'densely populated areas.' Despite this, drones will be effective in open areas to help police with the search aspect of finding a missing person.

Sub-theme- Weather

The theme weather wasn't spoken about a lot, with only 2 participants mentioning this in their answers. They explain how 'drones can only be used in good weather conditions' and would be much less effective in a windy environment.

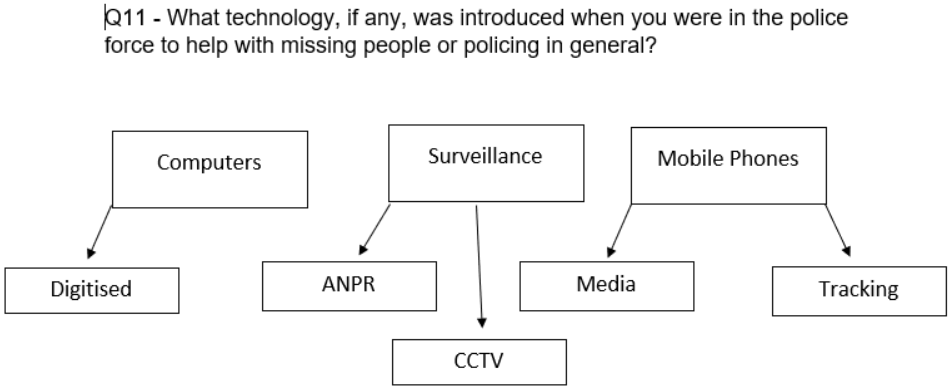

Figure 3: Thematic analysis of subthemes, generated form the main themes 'Computers', 'Surveillance' and 'Mobile Phones'.

Theme 1- Computers

Computers was generated as a main theme despite there only being one main sub-theme 'digitised' being produced as a code. Due to many officers joining the force recently, computers have been a part of the police force for many years. Only 8 people discussed the introduction of CCTV in their answers.

Sub-theme- Digitised

Most people who added computers to their answers also spoke about how their specific police force, 6/8 of the responses explained how case organisation has gone from being 'paper based' to having 'computerised' versions of cases and files, making it much easier to organise and be effective in a missing person's case.

Theme 2- Surveillance

Surveillance was included in 10 answers with ANPR having 6 mentioned and CCTV having 7. Meaning that a lot of people had included some form of surveillance, which has been introduced whilst they have been working for the force.

Sub-theme- ANPR

ANPR was included in 6 answers, all responses did not go into very much detail when talking about this sub-theme, they just listed 'ANPR' amongst other technologies such as 'CCTV'. With no explanation to why ANPR was used to help missing people or why it was effective.

Sub-theme- CCTV

When CCTV was mentioned 7 times explaining how the systems have 'improved massively' and how much CCTV has 'helped' to find a missing person.

Sub-theme- Drones

7 people had the sub-theme drones in their response which is the most talked about sub-theme under 'Surveillance'. Drones have been introduced for many of the participants whilst they have been working for their police force, meaning that out of all the technologies, drones would have been the most recent to be introduced. Similar to ANPR all the responses which included Drones did not expand on their answer and simply just listed it.

Theme 3- Mobile Phones

Mobile phones are the most popular theme spoken about within this question with 16 participants explaining how these have been introduced whilst they worked in the police force and have helped in missing person's case. This theme has been split up into two sub-themes media and tracking which was included in most answers.

Sub-theme- Media

13 responses spoke about the theme of 'media', most explain how social media has helped with missing persons cases whilst they have been a police officer. Some expand on their answer, adding that 'social media appeals' are the most helpful form of media when finding a missing person. Facebook was also included in a few responses.

Sub-theme- Tracking

The theme tracking was mostly linked to the usage of the mobile phone and a policing technique called 'phone pinging' as explained in a couple of the responses. Out of all the responses, 12, including tracking, 5 of these included the term phone pinging.

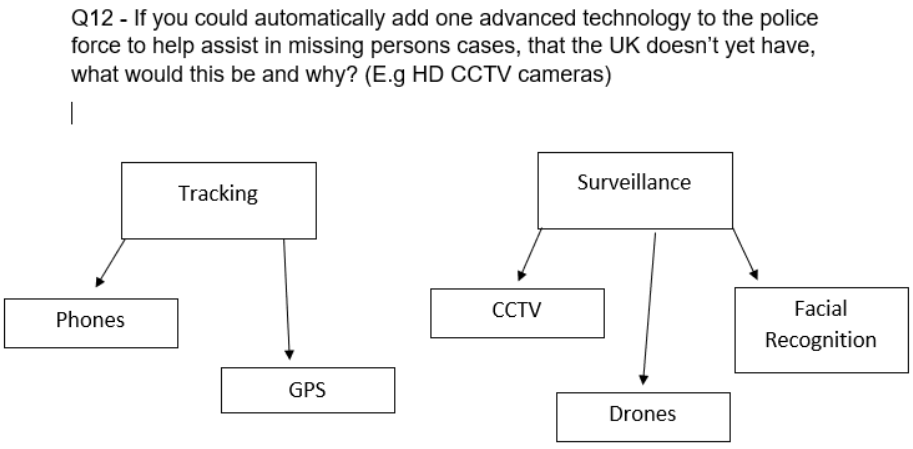

Figure 4: Thematic analysis of sub-themes, generated form the main themes 'Tracking' and 'Surveillance'.

Theme 1- Tracking

Tracking was the most mentioned theme throughout this questions responses. For the figure 3, tracking was a sub-theme for phones however, tracking was mentioned significantly more times in this question making phones a sub-theme. Two answers included the use of tracking on 'elderly people' which has already been introduced however, could be improved further (Rahman, 2015).

Sub-theme- Phones

Only 4 people included that they would upgrade the usage of mobile phones in the future, in their answer. 2 of these closely linked to the sub-theme 'tracking'. The other two expanded on their answer talking about how social media should be upgraded such as 'Facebook/WhatsApp'.

Theme 2- Surveillance

The theme surveillance was mentioned in many answers which were separated into three different sub-themes: CCTV, drones, and facial recognition, with CCTV being the most frequent occurring with it being mentioned 10 times throughout.

Sub-theme- CCTV

Many participants believe that CCTV should have 'higher quality cameras' and more 'CCTV access'. 7/10 of the CCTV responses explained how the quality needs to be improved and that these improvements would 'help tremendously'.

Sub-theme- Drones

Drones were singerly identified in 3 responses however, nothing much was said why they should be added to the police forces everyday equipment.

Sub-theme- Facial Recognition

This sub-theme was identified within 8 of the responses with many of them just stating the words 'facial recognition' with one specifically mentioning that there should be facial recognition within 'all train stations.'

Quantitative

Q1

What policing profession are you/have you worked in?

Out of 75 participants who answered this question, 52 of them are currently officers working for a force around the UK. 21 of these are ex-officers and have worked in the police force at some point in their career. Only two people selected none of the above which would have led them, to the end of the questionnaire as that is not the researchers target audience for this study.

Q2

What police force were you/are you in?

From all the responses, there were a total of 27 different police forces names out of the 45 total forces across the UK. This included 'Police Scotland' and 'North Wales' was the second most mentioned police force alongside 'Greater Manchester Police' with 7 participants selecting this police force. Many of the forces mention had only been included once such as 'North Yorkshire' and 'Sussex' police.

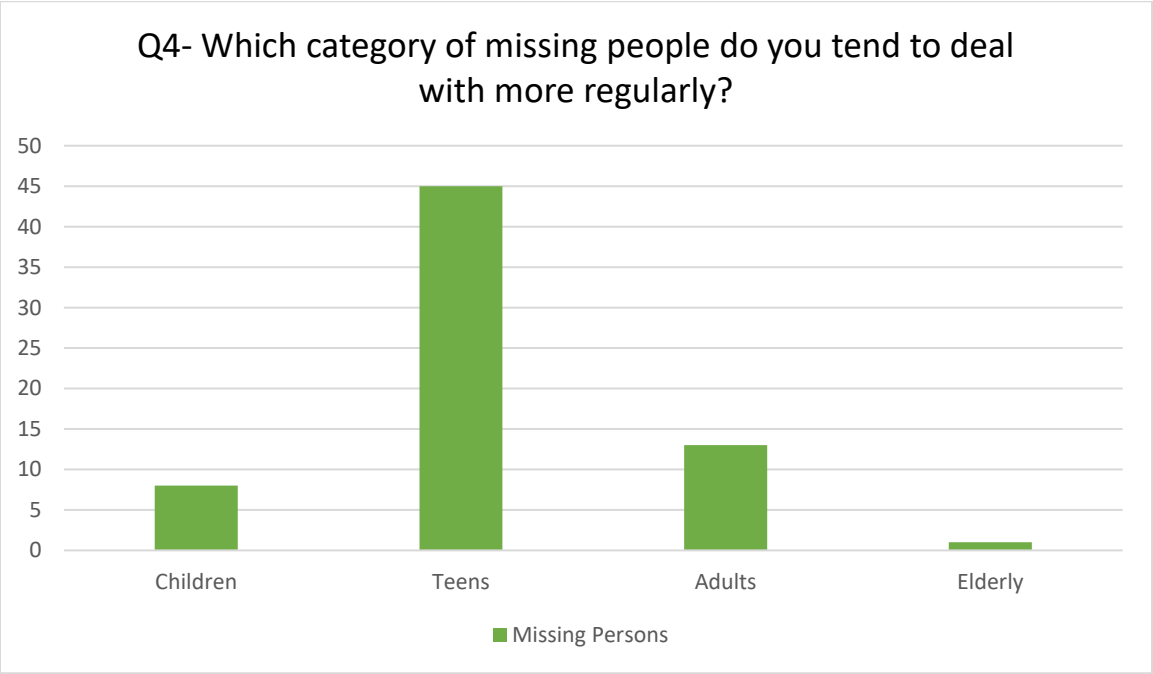

Figure 5: bar chart representing responses for question 4.

Figure 5 shows that the most dealt with missing persons age group is teens the least being the elderly. 45 people out of 67 people, who answered this question, selected teens. 8 selected children, 13 adults and 1 elderly.

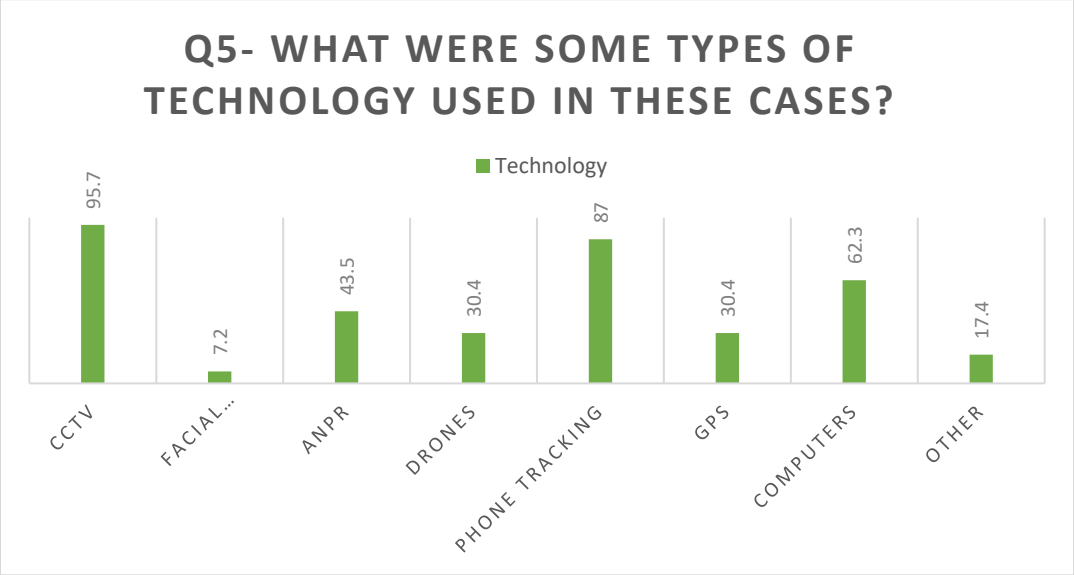

Figure 6: bar chart representing data from question 5. Appendix 2 and 3.

Figure 6 shows the results found from a frequency test which was used for the multiple-choice responses so that percentages were able to be seen for each individual type of technology. This was so the most used and the least commonly used were shown. This was out of 69 respondents who answered this question. Results were then inputted inti a bar chart to clearly see the differences.

The most selected category of technology used when finding a missing person is CCTV with 95.7% of participants selecting that they have seen this be used or use it themselves. The least used is Facial Recognition with only 7.2% of people checking this box. The 'other' category consists of 'social media' and 'financial.'

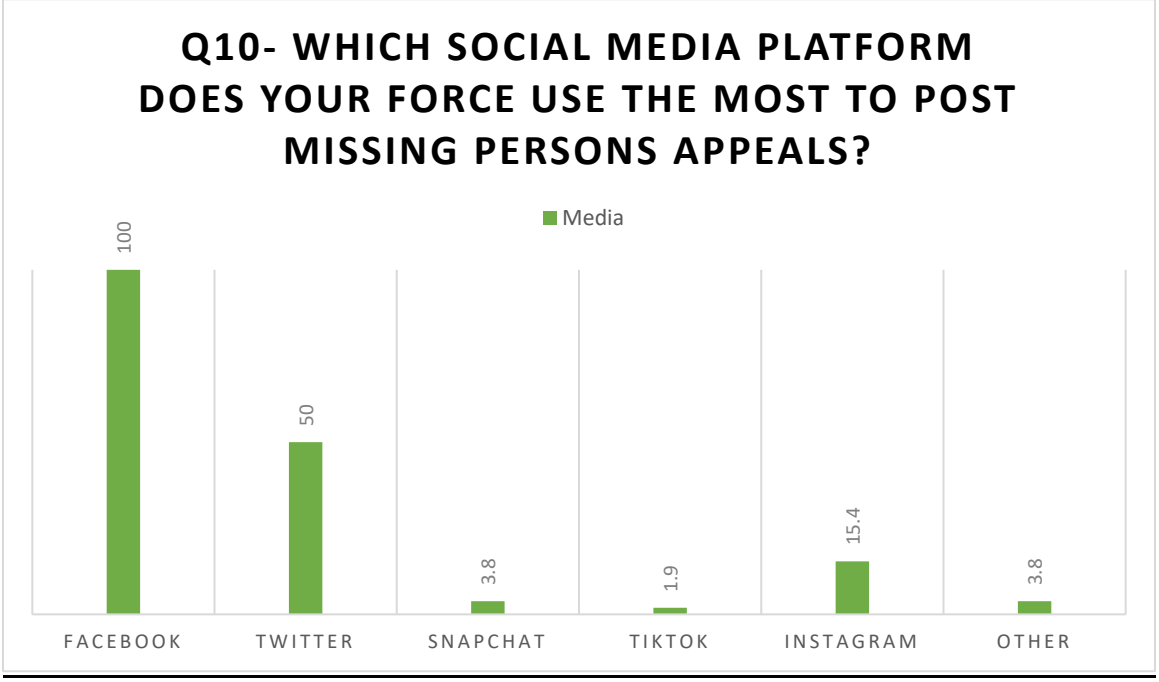

Figure 7: bar chart representing data from question 10. Appendix 4 and 5.

Figure 7 shows the second multiple choice question, this was also analysed using a frequency test to see the percentages of each answers selected. Facebook has a 100% selection rate whereas TikTok only has 1.9% which are both significantly different percentages of the question. Facebook and Twitter are the most used social media that these officers/ex-officers have seen or used when dealing with missing persons cases.

Q7

A crosstabulation test was conducted to show the differences in the Likert scale answers compared to when the participants joined a police force to see if there are any connections between the two variables for example if they joined in the 1980s are they more likely to disagree with the use of technology as a whole? This type of test also allows for the researcher to see how many participants selected which response more frequently. To make this study fair and more understandable, the researcher has made sure to put in, alongside the number, the percentage of people from a specific group (Haider, 2015). This will be because there is a significant difference in the number of participants who have selected that they joined the force between years such as 2021-200 with 28 people and 1989-1980 with only 10.

Q1- Technology is effective at finding a missing person.

Q2- Drones can assist an investigation and be successful.

Q3- The quality of CCTV needs to be improved

Appendix 6 shows that 65 people answered these statements out of the 110 participants gathered. 28 people joined the police force in 2021-2000, 24 in 1990-1990 and 10 in 1989-1980 with only 3 people selecting 'other'.

For Statement one it is shown that participants who joined the police between 2021-2000 are more likely to agree with this statement rather than disagree with 10 (35.71%) people selecting 'strongly agree' and 13 (46.4%) 'somewhat agree' with only 1 (3.6%),3 (10.8) and 1 (3.6%) in the other categories. This pattern is consistent with all the other years such as 1999-1990 where 10 (41.7%) people selected 'strongly agree' and 11 (45.9%) 'somewhat agree.'

Statement 2 gathered slightly different results with 14 (50%) people from 2021-2000 selecting 'somewhat agree' and 12 (50%) people who joined in 1999-1990 selecting 'strongly agree' no people from the 90s, 80s and 'other' selected 'strongly disagree'. However, one participant did in the 2000s category.

Statement 3 stayed consistent with all the answers however, not one person selected 'strongly disagree' from any of the years joined. The 2000s year has 15 (53.6%) respondents select 'strongly agree' with similar results for the 1990s, 80s and 'other' with this being the most selected answer. 90s had 13 (54.2%)'strongly agreed' selected, 80s had 4 (40%) and other had 3 (100%).

Q4- More technology needs to be introduced to find a person quicker and more efficiently.

Q5- social media is helpful in a missing persons case.

Q6- Technology is not effective at finding a missing person.

Referring to appendix 7, question 4 shows that participants who selected 2021-2000 mostly agreed to this statement with 10 selecting 'strongly agree' and 11 'somewhat agree.' this differs to the 90s category as they have a large portion of their responses, 7 (29.2%), within the 'neither agree nor disagree' answer whereas only 3 (10.7%), in the 2000 category, selected this. The 80s and other category are like to the 2000 choices.

Within Statement 5, nobody had selected both 'somewhat disagree' or 'strongly disagree' this is showing that all categories have the same belief of that social media does help in missing persons cases and their opinions are similar other than a one (4.2% and 10%) participant from the 90s and 80s tab selecting 'neither agree nor disagree.' strongly agree was the most selected with 34 (52.3%) people selecting.

The sixth statement was included into the questionnaire as a test for participants to see if they were paying attention when answering these questions. The results show that within every year category, some participants have selected differently from their answer from question one.

Q7- Technology used when finding a missing person doesn't need improving/modernising at all.

Q8- Using more facial recognition technology will help find missing people faste*r.*

Appendix 8 shows question 7 had a similar concept to the sixth statement of the questionnaire as it has negative wording. Most people in the 2000 category chose 'somewhat disagree' with 46% (13) selecting this option. The 90s category had the same amount of people select 'strongly disagree' and 'neither agree nor disagree' both had 6 (25%) participants each. The least chosen response for this question is 'strongly agree' and 'somewhat agree' with only 4 people each choosing this, with 50% (2) being within the 'other' date category.

The last statement, labelled question 8, showed comparable results from the 2000 and the 90s categories with 7 (25% and 29.2%) participants selecting 'neither agree nor disagree' which proves to be the same for 'somewhat agree' and 'strongly agree.' However, from the 2000 category, 3 (10.7%) chose 'somewhat disagree.' the 80s category leaned more towards 'somewhat agree' and 'somewhat disagree' options.

Discussion

The questionnaire originally received 69 responses, which was below the target of 100 total responses the researcher was aiming for. This limited the data and would have made it less accurate. A lot of participants had not worked on a missing persons case, making them select the answer which automatically closed them out of the questionnaire. This led to only 35 fully complete responses out of the 69 total. A minority of participants partially answered the questionnaire, making the responses for specific questions differ in total participants. The researcher decided to re-release the questionnaire into different groups on Facebook and managed to gather an extra 41 new responses making the total complete responses 60 and the responses 110. Having these new responses made this research more reliable due to being closer to the target amount of 100. Some people might not have answered certain questions for the reason of the either didn't understand or they disagree with the question in some way and felt there was no need to respond. A small limitation was found within the format of question 5, 'ANPR' was spelled incorrectly, 'AMPR', leading to a handful of participants choosing 'other' and typing ANPR in the text box. To fix this, in preparation for the results section, the researcher made sure to add 1 to the ANPR response every time somebody made this mistake to make sure the data was accurate to be analysed.

Figure 1 shows that a lot of responses put forward how the “quality of images” needs to be improved along with the “accessibility” of the systems. Having these two main sub themes being consistent in many responses, overall, shows that CCTV systems do need improving, with higher quality cameras and accessibility. This showed similar results to Mileva et al. (2021) who proved that having better quality CCTV, within his experiment, made finding missing people a lot quicker and much more effectively. This was due to the increase in quality of the CCTV footage shown to the participants. One participant explained that “some CCTV has vastly improved over recent years and as a result is now of a high standard” which goes against most responses this question obtained. However, when it comes to CCTV in the past this statement is correct as CCTV has improved greatly from the 1960s when they were first introduced (Williams, 2003). Such as the introduction of rotating cameras which can have a further view than a stable camera (Khair et al, 2019). Statement 7, within the Likert scale question, proves that most of the participant sample believes that technology should be improved, this links to why many of the responses included that the quality of CCTV needs improving.

The issues surrounding smaller companies and police forces upgrading CCTV systems is mostly “cost”. A participant stated that “CCTV is only as good as the money that’s spent on it” referring to the lack of money that is invested within CCTV systems. A lot of CCTV in this generation are 10 or more years old and the cost to upgrade these systems is too expensive and consistently rising in price, making it difficult for smaller companies, who own CCTV cameras or the CCTV companies, to upgrade the overall quality of their systems (Webster, 2009). When linking to previous literature, there has been limited research on if CCTV is able to be upgraded at a limited cost due to CCTV being, not only the most used technology for missing persons cases within the researchers results, but in many different studies spoken about within the literature review of this project. This proves that public and police officers are aware that CCTV systems need to have more funds invested in the technology to make sure that missing people are found faster and more efficiently, not only to bring them to safety, but to limit police time and to enhance effectivity.

One participant said that having higher quality CCTV “reduces reliance on witnesses” which is a vitally effective point due to witnesses not being as reliable as raw video footage of a missing person, especially because small details such as the clothes and identifying features such as tattoos are crucial in finding missing people (Morewitz et al, 2016). Witnesses could have only seen the missing person for a few seconds and accidently give incorrect information, hindering the case and slowing the police down. Having more CCTV would make it so that the witnesses wouldn’t need to go through the traumatic experience of speaking in court especially if the person who is missing was found diseased or a witness was a family member of the person missing (Parr and Stevenson, 2015).

Question 9 showed a surprising number of participants included that drones are effective at wider ‘search areas’. Due to there being 98.1% of people including this in their response suggests that the current use of using drones to find a missing person is effective. This research has found that drones are proved to mostly be effective at searching more open spaces

however, linking back to the research conducted in Poland by Tuśnio et al, 2021 the UK is able to look at other countries succession with upgrading their drone technology and implement this into their missing persons investigations. Upgrading policing drones in the UK would allow them to search more populated areas such as streets and walkways making drones much more effective at tracking and locating missing people deceased or alive. One reference linking to this statement is the study conducted by Zimroz et al. (2021) which proved that, with the right technological adjustments, drones can be effective in tighter spaces. Testing this theory in a mine was the perfect example of how close these drones can fly and how effective they are at hearing human sound frequency. The issue with drones surrounds the pilots and the specialised training the police need to pilot these drones (Rogers and Scally, 2018). This would add to the cost of the overall use of the drone which was spoken about within the same question forming the theme 'cost'. This increase in cost would make drones more expensive to run than hiring a helicopter, especially if the majority of the UK police drones were upgraded with the technology shown by Zimroz's experiment. The theme 'weather' was mentioned a couple of times by participants despite this, the weather does play a massive role in how drones are used and their reliability, especially with time restricted investigations such as finding a missing person (Gao et al, 2021). A common drone, named Mavric Air 2's manual displayed that the drone is unable to be used in "severe weather conditions" this includes high wind speeds "snow, rain, and fog" (Mavic Air 2 User Manual, 2020). This further supports the point of if current technology needs to be upgraded to be more effective at finding missing people, drones definitely need to be upgraded for both weather conditions and the ability to travel within smaller places.

Question 2 managed to receive a lot of responses, due to this being the first question asked and there were significantly less ex-officers than there were police officers still working for their police force across the UK. This allowed the rest of the answers to be much more reliable and up to date rather than there being most ex-officers who may have left the force a while ago and aren't familiar with the current technology used. Although it was great to have their insight to see, if they had technology, how it may have impacted their career. For example, participant 20 is an ex-police officer and they joined between 1990-1999, they think that the current CCTV forces use today doesn't need improving and modernizing at all however, they responded with 'pronto' for question 11 meaning that whilst they were in the force policing became mostly computer based rather than using paper. The movement from paper based to digitalized policing, especially within missing persons appeals was significant in the rise in effectiveness of finding a missing person (Holmes, 2016). Looking back to Solymosi's research, social media is a very effective tool when sending appeals rather than there being just physical posters prone to weather damage and they don't expand to a wide variety of locations all over the UK. This proves that today's current technology, specifically social media, is an efficient tool to be used by the police forces in the UK.

The researcher did not expect the results for question 4, as the most chosen category was teens. It was expected to be either children or the elderly due to the amount of previously conducted research found. Adults are less likely to go missing than children (Greene et al,

2017) within this research, the participants selected that they deal with more adult cases than children and elderly cases. 2/3 of all missing persons cases across the UK are children and young people, or the category 'teens' which was present in the results section. This is proven to be correct within the teen or young adult category of the results however, teens, and children are often categorized under the same research due to the age of 18 being a legal adult in England (Office for National Statistics, 2019). For teens and children to be researched separately, this one categorization needs to be made into two separate categories as research conducted could be much more accurate. The participants could have chosen the teens category however a child is considered below the age of 18, 'teens' are considered from anywhere between 13-19 but 19 is considered an adult in England the correct phrase that the researcher should have used is 'young adult' which refers to age 18-25. This confusion with ages should have been made clearer in the questionnaire with the help of labelling. Having specific age groups would have helped make this question much more accurate as what they consider a 'teen' could be legally a child.

The most used technology by the participants within a missing persons investigation is CCTV. CCTV is very interesting as all results so far have indicated towards CCTV needing the biggest funds invested in them and upgraded the most, linking back to question 8, most responses included that there needed to be improvement within CCTV camera quality. Despite this, CCTV systems are the most used according to the researcher's participant sample. This creates the question of why CCTV is used to locate and find missing people more than facial recognition and why the systems aren't being upgraded, which gained the least amount of recognition within responses. Automatic facial recognition (AFR) was tested by the South Wales Police however, this violated the right to private life and rights to freedom meaning that this type of technology would have to be constructed in a way which it could avoid human rights (Keenan et al, 2021). This would be the reason why facial recognition is not used very much within the UK and the lowest selected type of used technology. Phone tracking was also selected many times, phone tracking is consistently improving with many different tracing apps and devices being available such as the study of GPS with dementia patients by McShane in 2009 (Qie et al, 2020). Within the results phone tracking and GPS were displayed in two different categories, similarly, to figure 5. Another recent tracking technology has been recently tested, a demo was completed which sends an automatic SOS to emergency services when a fall is detected and gives them the users exact location. IOS emergency call is also available for apple watches and iPhone. The user must click the power button the side of their phone and a loud siren plays and automatically calls emergency services which the new apple watch idea was based upon (PR Newswire, 2021). This upcoming technology would be effective if someone with dementia left their home and had a fall. For missing people in general, phone apps such as 'Find my iPhone can be used to see the exact location of someone's phone. This can only be accessed for people with iPhone and connected to the same home location (Davis, 2018). The sheer amount of current phone tracking technology is the reason why this category was the second most selected in the multiple-choice.

The most used social media platform used by the participant sample for missing persons appeals is Facebook and Twitter, Facebook was selected in 100% of the responses this will be the result of the specific groups dedicated to each police force around the UK where they post updates and information to be able to contact the public whenever they need to (Lieberman et al, 2013). The responses from the questionnaire being mostly Facebook could be a result of Facebook being used in 91% of police forces across the world including the UK as of 2015 to keep in contact with the public and post updates (International Association of Chiefs of Police, 2015). Twitter, on the other hand, like said in the literature review, uses specific hashtags to place them into different groups for people all over the world to click and find (Lyons, 2019). Despite these two social medias were selected the most, platforms such as TikTok and snapchat are mostly used by young people in the modern day (Eric, 2021). The reason why limited people chose TikTok and snapchat will be because they are mostly sights for the younger audience and focuses on trends rather than news and missing persons appeals despite this, it is one of the top medias used today out of all listed in the question (Weimann and Masri, 2020). Having police post missing persons appeal on software such as TikTok would reach much more young people all over the world. Police forces current use of social media to find missing people is effective however, could be more beneficial to post to different popular medias. Statement 5, on the Likert scale question, not one participant selected that social media wasn't effective, they all agreed in some way and only a couple of people chose neither, this proves that the participant sample believes that social media is very effective in a missing persons case, suggesting that using Facebook and twitter as their main social media is effective due to these being to most selected options in question 10.

The Likert scale question gathered a few surprising results however, statements 1, 3, 5 and 6 showed that all the different year categories chose similar results meaning that for these statements, the answer did not change depending on what year they joined the police. Statement 2 having more people from the 1990s category selecting 'strongly agree' was surprising as these officers joined earlier than 2000s, yet they believe that drones are successful when finding a missing person. Having most participants select that they agree with this statement implies that, according to the participant sample, drones are an effective piece of technology when finding a missing person. Looking back at previous literature and the answers for question 5, drones were selected as one of the least out of current technology used by the participant sample. Having most people agree that drones are effective at finding a missing person and not being used currently in some UK police forces shows that there needs to be more drone use and the drones that are in current use need upgrading and updated, as mentioned previously. Having most participants strongly agree to statement 3 implies similar results to the usage of drones in statement 2, CCTV is the most mentioned and selected piece of technology throughout the entirety of the questionnaire, having most participants agree that the systems aren't up to the standard they need to be proves that some of the most important current technology, CCTV, isn't very effective at finding a missing person due to the technological disadvantages they have. Having these cameras updates, yes would cost a lot in

funds, however, will be necessary some time in the future as having better quality CCTV "may lead to more information that can be used to find a missing person."

The results for statement 4 was not expected as a large group of participants selected neither agree nor disagree which could be the result of them thinking that, yes current technology used within the police is effective at finding missing people however, there could be some advancements added to further assist. This is proven by the responses for questions 8, 9 as most responses explain why drones and CCTV are effective and then they will list what needs improving such as this quote: "there are some good quality CCTV systems" but "the older ones need upgrading." Statement 6 was included as a negatively worded question; from the results it was found that some of the participants chose slightly different compared to statement 1. The most changed response was strongly disagreed, for statement 6, this had a decrease of 4 participants, which chose strongly to agree in statement 1. This could be because the participants were not paying attention when answering the Likert scale questions and a handful of people could have rushed through it without giving their responses thought. The only answers that had stayed the same was somewhat agree and somewhat disagree, both in the 2000 category. This suggests that opinions have changed in the more strongly agree and disagree selections for all year groups.

Conclusion

Analysing a population sample of UK police officers and ex-officers this demonstrates that current technology is effective in a missing persons case however, these used technologies need to be upgraded and UpToDate with modern standard technology. This conclusion was found based on the qualitative and quantitative analysis conducted. The results indicate that CCTV needing more systems installed, for both smaller companies and the police forces and increasing the quality of these CCTV cameras. As for the use of drones, there needs to be more readily available for all UK police forces to use and these devices should be upgraded with technology that allows to search fewer open areas such as narrow walkways. Limitations were found including the cost and time it would take to have specially train pilots, so the drones are able to be used effectively. Social media was found to be very effective in a missing persons case however, different platforms such as TikTok need to be included within missing persons appeals to reach a young adult audience which stretches across the globe. As for the literature surrounding this topic, there is few studies or research conducted to see if the current use of technology is effective at finding a missing person or not, many studies include small samples tested and was tested on a random individual in a crowded school or city centre, instead of streets or at night. The research conducted hopes to spread light on missing people and how upgrading technology will help to find these people quickly and effectively to bring them safely home as fast as possible, with the sheer number of new devices coming out such as apple watches and apps to track locations, these alone will help to find missing people. However, when it comes to the UK police force, they need to understand that upgrading technology

would be beneficial for the police resources, e.g., the deployment of a helicopter when drones can be used which limits cost and policing time, overall being more effective at finding a missing person.

The methodology made sure that the research was conducted ethically, and the questionnaire reached the correct target audience, without the methodology, there would have been responses from people who weren't officers making the research more about the public than it was for UK police officers.

The challenges the researcher faced when conducting this research included not having enough people who fully answered the questionnaire, making it so that it had to be re-released. Luckily this managed to get closer to the target responses. Having the extra responses made the results section more accurate and easier to analyse. To comprehend these studies results and findings which were found within this project, more studies need to be introduced to find out if any upcoming technology such as the apple watch and apps would be used when finding a missing person and if they are effective. Studies could also include the impact of technologies specifically towards missing people and their different categories: children, young adults, and adults, this will help to identify which current technology is useful and which are not, the ones that are not would need to be analysed why. A lot of research has been conducted focusing on how CCTV has helped in cases where the missing person was found diseased. However, not much has been studied on how CCTV has helped find and locate a missing person before they come to harm.

While research, included in this project, focused on experimentation with a student and public sample, this study provides an insight into police officers across the UK's thoughts about the current technology. Doing so has allowed the researcher to reflect on these results to find out what technology is useful and what isn't instead of focusing on one main idea. The most useful technology includes social media and CCTV, despite these systems needing upgrading. Overall, the police officers within the participant sample believe that current technology is effective at finding a missing person but upgrading these would allow for more effectivity for both the missing person and the UK police forces.

References

Anfara, & Mertz, N. T. (2006). Theoretical frameworks in qualitative research. SAGE.

Armitage, R. (2002). To CCTV or not to CCTV?: A review of current research into the effectiveness of CCTV systems in reducing crime.

Bantry White, E. and Montgomery, P. (2015) 'Dementia, walking outdoors and getting lost: incidence, risk factors and consequences from dementia-related police missing-person reports', Aging & mental health, 19(3), pp. 224–230. doi:10.1080/13607863.2014.924091.

Bazeley, P. (2017). Integrating Analyses in Mixed Methods Research. Sage Publications.

Bindemann, Fysh, M. C., Sage, S. S. K., Douglas, K., & Tummon, H. M. (2017). Person identification from aerial footage by a remote-controlled drone. Scientific Reports, 7(1), 13629–10. https://doi.org/10.1038/s41598-017-14026-3

Brysbaert, M., 2019. How many participants do we have to include in properly powered experiments? A tutorial of power analysis with reference tables. *Journal of Cognition*, 2(1), p.16. DOI: http://doi.org/10.5334/joc.72

Cartwright, & Shaw, C. (2020). Evidence based social media use: an exploratory UK investigation into residents' perceptions of police Facebook use. Safer Communities, 19(2), 61–71. https://doi.org/10.1108/SC-09-2019-0033

Drones May Search for People Lost in the Woods. (2016). The Science Teacher (National Science Teachers Association), 83(4), 17–17.

Eric J. Savitz. (2021). Teens Like Snapchat and TikTok. Facebook? Except for Instagram, Not So Much. Barron's (Online).

Gao, Hou, R., Gao, Q., & Hou, Y. (2021). A Fast and Accurate Few-Shot Detector for Objects with Fewer Pixels in Drone Image. Electronics (Basel), 10(7), 783–. https://doi.org/10.3390/electronics10070783

Greene, K.S. and Alys, L. (2017) Missing persons a handbook of research. Abingdon: Routledge.

Guo, Ding, Y., Yao, L., Liang, Y., & Yu, Z. (2020). The Future of False Information Detection on Social Media: New Perspectives and Trends. ACM Computing Surveys, 53(4), 1–36. https://doi.org/10.1145/3393880

Haider, M. (2015) Getting Started with Data Science: Making Sense of Data with Analytics. Upper Saddle River, New Jersey: IBM Press.

Hart-Davis. (2018). Teach yourself visually iPhone 8, iPhone 8 Plus, and iPhone X (1st edition). Visual, a Wiley Brand.

Holmes. (2016). Missing Person Appeals: A UK Perspective. In Handbook of Missing Persons (pp. 19–35). Springer International Publishing. https://doi.org/10.1007/978-3-319-40199-7_3

Inman, & Picton, H. J. (2012). Finding official British information : official publishing in the digital age (1st edition). Chandos Publishing.

International Association of Chiefs of Police (IACP) (2015), "IACP social media survey", IACP, available at: www.iacpsocialmedia.org/Portals/1/documents/FULL%202015%20Social%20Media%20Survey% 20Results.pdf

Keenan, B. (2021) 'Automatic Facial Recognition and the Intensification of Police Surveillance', Modern law review, 84(4), pp. 886–897. doi:10.1111/1468-2230.12623.

Keval, H.U.; (2009) Effective design, configuration, and use of digital CCTV. Doctoral thesis , UCL (University College London).

Khair, Lestari, Y. D., Perdana, A., & Budiman, A. (2019). CCTV Camera Controller Simulation Using Arduino Uno and Joystick. Journal of Physics. Conference Series, 1361(1), 12086–. https://doi.org/10.1088/1742-6596/1361/1/012086

Kiepal, Carrington, P. J., & Dawson, M. (2012). Missing Persons and Social Exclusion. Canadian Journal of Sociology, 37(2), 137–168. https://doi.org/10.29173/cjs10114

Kiger, & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. Medical Teacher, 42(8), 846–854. https://doi.org/10.1080/0142159X.2020.1755030

Kirk, & Miller, M. L. (1986). Reliability and validity in qualitative research. SAGE.

Landau, & Werner, S. (2012). Ethical aspects of using GPS for tracking people with dementia: recommendations for practice. International Psychogeriatrics, 24(3), 358–366. https://doi.org/10.1017/S1041610211001888

Llian Alys, & Karen Shalev Greene. (2016). Missing Persons: A handbook of research. Taylor and Francis. https://doi.org/10.4324/9781315595603

Lieberman, J., Koetzle, D. and Sakiyama, M. (2013), "Police departments' use of Facebook", Police Quarterly, Vol. 16 No. 4, pp. 438-462.

Linz, L. (2021) *Ex and Current Police Officers UK* [*Facebook*] Available at: https://www.facebook.com/groups/784332495572897 (Accessed: 04/03/2022).

Lum, Koper, C. S., & Willis, J. (2017). Understanding the Limits of Technology's Impact on Police Effectiveness. Police Quarterly, 20(2), 135–163. https://doi.org/10.1177/1098611116667279

Lyons, A.P., 2019. Hashtag Syllabus. *Contexts*, *18*(4), pp.16-21.

Mavic Air 2 User Manual (2020). https://dl.djicdn.com/downloads/Mavic_Air_2/20200615/Mavic_Air_2_User_Manual_v1.2_en_.pdf. (Accessed 3 April 2022).

McShane, R. and Skelt, L. (2009), "GPS tracking for people with dementia", *Working with Older People*, Vol. 13 No. 3, pp. 34-37. https://doi.org/10.1108/13663666200900049

Miller, Guidry, J. P. D., Dahman, B., & Thomson, M. D. (2020). A Tale of Two Diverse Qualtrics Samples: Information for Online Survey Researchers. *Cancer Epidemiology, Biomarkers & Prevention*, *29*(4), 731–735. https://doi.org/10.1158/1055-9965.EPI-19-0846

Mileva, Hancock, P. J. B., & Langton, S. R. H. (2021). Visual search performance in "CCTV" and mobile phone-like video footage. Cognitive Research: Principles and Implications, 6(1), 63–63. https://doi.org/10.1186/s41235-021-00326-w

Morewitz, & Sturdy Colls, C. (2016). Handbook of Missing Persons. Springer International Publishing AG. https://doi.org/10.1007/978-3-319-40199-7

Norris, & McCahill, M. (2006). CCTV: Beyond Penal Modernism? British Journal of Criminology, 46(1), 97–118. https://doi.org/10.1093/bjc/azi047

Omand, D. et al. Te security impact of drones: challenges and opportunities. Birmingham Policy Commission at. http://www. birmingham.ac.uk/Documents/research/policycommission/remote-warfare/fnal-report-october-2014.pdf (2014).

Ons.gov.uk. 2022. *Milestones: journeying through adulthood - Office for National Statistics*. [online] Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/milestonesjourneyingthroughadulthood/2019-12-17> [Accessed 4 April 2022].

Parr, & Stevenson, O. (2015). No news today: talk of witnessing with families of missing people. Cultural Geographies, 22(2), 297–315. https://doi.org/10.1177/1474474014530962

PR Newswire (2021) ‘FallCall Solutions’ Smart Fall Detection Adds AI-Powered Monitoring to Identify Increased Fall Risk on Apple Watch’.

Qie, Y. et al. (2020) ‘Toward a Mathematical Definition of Reconstruction Operation for ISO GPS Standards’, Procedia CIRP, 92, pp. 152–157. doi:10.1016/j.procir.2020.05.183.

Rahman. (2015). *Living better with dementia good practice and innovation for the future*.

Ritchie, White, D., Kramer, R. S. S., Noyes, E., Jenkins, R., & Burton, A. M. (2018). Enhancing CCTV: Averages improve face identification from poor-quality images. Applied Cognitive Psychology, 32(6), 671–680. https://doi.org/10.1002/acp.3449

Rogers, C. and Scally, E.J., 2018. Police use of technology: insights from the literature. *International Journal of Emergency Services*.

Rutledge, & Rutledge, P.-A. (2010). Using LinkedIn (1st edition). Que Pub.

Smith, R. and Greene, K.S., 2014. High risk?: attitudes to the risk assessment process in missing person investigations.

Solymosi, Petcu, O., & Wilkinson, J. (2021). Exploring public engagement with missing person appeals on Twitter. Policing & Society, 31(7), 798–821. https://doi.org/10.1080/10439463.2020.1782409

Surette. (2005). The thinking eye: Pros and cons of second generation CCTV surveillance systems. Policing : an International Journal of Police Strategies & Management, 28(1), 152–173. https://doi.org/10.1108/13639510510581039

Tarling, R., & Burrows, J. (2004). The nature and outcome of going missing: the challenge of developing effective risk assessment procedures. *International Journal of Police Science and Management*, 6(1), 16–26.

Thomas, S. (2004). Using web and paper questionnaires for data-based decision making from design to interpretation of the results. Corwin.

Tracy. (2014). Qualitative research methods collecting evidence, crafting analysis, communicating impact. Wiley.

Tuśnio, & Wróblewski, W. (2021). The Efficiency of Drones Usage for Safety and Rescue Operations in an Open Area: A Case from Poland. Sustainability (Basel, Switzerland), 14(1), 327–. https://doi.org/10.3390/su14010327

Voinov, Balakrishnan, N., & Nikulin, M. S. (2013). Chi-squared goodness of fit tests with applications (1st edition). Academic Press.

Walliman, N 2017, Research Methods: the Basics : 2nd Edition, Taylor & Francis Group, Florence. Available from: ProQuest eBooks Central. [25 October 2021].

Webster, C.W.R., 2009. CCTV policy in the UK: Reconsidering the evidence base. *Surveillance and society*, *6*(1), pp.10-22.

Weimann, & Masri, N. (2020). Research Note: Spreading Hate on TikTok. Studies in Conflict and Terrorism, 1–14. https://doi.org/10.1080/1057610X.2020.1780027

Williams. (2003). Structuring in community policing: Institutionalizing innovative change. Police Practice & Research, 4(2), 119–129. https://doi.org/10.1080/15614260308021

Zimroz, Wróblewski, A., & Trybała, P. (2021). Detection of a predefined acoustic pattern by a measurement system on a drone and its application to search for a missing man in an underground mine. IOP Conference Series. Earth and Environmental Science, 942(1), 12018–. https://doi.org/10.1088/1755-1315/942/1/012018

Zorn, Bozsik, G., Rose, R., Goetz, A., Weigel, R., & Koelpin, A. (2011). A power sensor unit for the localization of GSM mobile phones for search and rescue applications. *2011 IEEE SENSORS Proceedings*, 1301–1304. https://doi.org/10.1109/ICSENS.2011.6127162

Appendices

USED BY THE POLICE RESEARCH ETHICS

Proportionate Review Form

The Proportionate Review process may be used where the proposed research raises only minimal ethical risk. This research must: focus on minimally sensitive topics; entail minimal intrusion or disruption to others; and involve participants who would not be considered vulnerable in the context of the research.

PART A: TO BE COMPLETED BY RESEARCHER

Name of Researcher:	Amy Clarke
School	School of Justice, Security and Sustainability.

Student/Course Details (If Applicable)			
Student ID Number:			19015255
Name of Supervisor(s)/Module Tutor:			Deborah Sproston-Bewley
PhD/MPhil project:			
Taught Postgraduate Project/Assignment: Undergraduate Project/Assignment:		Award Title: Module Title:	Policing and Criminal Investigation Independent Project

Project Title:	Is the current use of technology, used by the police, effective in missing persons cases?		
Project Outline:	This project will focus on the current use of technology within police forces, when it comes to missing people, how effective this is and how it can be improved for the future, or if nothing needs improving.		
Give a brief description of participants and procedure (methods, tests etc.)	This project will focus on primary sourced data gathered by the use of a questionnaire which will be sent to people who work, or have worked, within the police, these participants will be chosen by the handing out of the questionnaire on social media (Twitter) and LinkedIn. The limitations of handing out this study is that there will be no paper version of the questionnaire. The researcher will send it to a contact, who works within the police service This will also be posted on social media to try and reach out to any officers willing to take part in the study. The types of people answering the questionnaire will be police officers who have worked on missing persons cases or worked with the technology used in missing person cases. To ensure only this target audience is met the questionnaire will be posted on LinkedIn and only on relevant Twitter hashtags and @ such as the Staffordshire police page. Facebook has specific group pages for ex officers and officers around the UK which the questionnaire will be posted in to ensure all participants have or have had involvement in the police. The questionnaire will be a mixture of open and closed ended questions which will allow there to be accurate answers. The project aims to have 100+ participants on the questionnaire, having a wide range of answers will ensure that the study has a variety of opinions into how technology is effective or if it needs updating. The method used for analysing the data is a mix of qualitative and quantitative data as there will be numerical data such as how many people have worked on a missing persons case and written data such as officers' personal opinions using their experience and knowledge. The quantitative data will be analysed using a program called SPSS. The tests used to analyse the data will be chi-square tests for the yes and no answers and parametric/nonparametric tests to analyse the Likert questions. The qualitative data, from the written responses, will be analysed using thematic analysis which is a method used for written data where answers are coded and themes are generated.		
Expected Start Date:	04/12/2021	Expected End Date:	08/04/2022

Relevant professional body ethical guidelines should be consulted when completing this form.

Please seek guidance from the School Ethics Coordinator if you are uncertain about any ethical issues arising from this application.

There is an obligation on the researcher and supervisor (where applicable) to bring to the attention of the School Ethics Coordinator any issues with ethical implications not identified by this form.

Researcher Declaration

I consider that this project has no significant ethical implications requiring full ethical review	YES

I confirm that:		
1.	The research will **NOT** involve members of vulnerable groups. Vulnerable groups include but are not limited to: children and young people (under 18 years of age), those with a learning disability or cognitive impairment, patients, people in custody, people engaged in illegal activities (e.g. drug taking), or individuals in a dependent or unequal relationship.	YES
2.	The research will **NOT** involve sensitive topics. Sensitive topics include, but are not limited to: participants' sexual behaviour, their illegal or political behaviour, their experience of violence, their abuse or exploitation, their mental health, their gender or ethnic status. The research must not involve groups where permission of a gatekeeper is normally required for initial access to members, for example, ethnic or cultural groups, native peoples or indigenous communities.	YES
3.	The research will **NOT** deliberately mislead participants in any way.	YES
4.	The research will **NOT** involve access to records of personal or confidential information, including genetic or other biological information, concerning identifiable individuals.	YES
5.	The research will **NOT** induce psychological stress, anxiety or humiliation, cause more than minimal pain, or involve intrusive interventions. This includes but is not limited to: the administration of drugs or other substances, vigorous physical exercise, or techniques such as hypnotherapy which may cause participants to reveal information which could cause concern, in the course of their everyday life.	YES
6.	The research **WILL** be conducted with participants' full and informed consent at the time the study is carried out: • The main procedure will be explained to participants in advance, so that they are informed about what to expect. • Participants will be told their involvement in the research is voluntary. • Written consent will be obtained from participants. *(This is not required for self-completion questionnaires as submission of the completed questionnaire implies consent to participate).* • Participants will be informed about how they may withdraw from the research at any time and for any reason. • For questionnaires and interviews: Participants will be given the option of omitting questions they do not want to answer. • Participants will be told that their data will be treated with full confidentiality and that, if published, every effort will be made to ensure it will not be identifiable as theirs. • Participants will be given the opportunity to be debriefed i.e. to find out more about the study and its results.	YES
7.	A risk assessment has been completed for this research project	YES N/A

If you are unable to confirm any of the above statements, please complete a **Full Ethical Review Form**. If the research will include participants that are **patients,** please complete the Independent Peer Review process.

8. Information and Data Please provide answers to the following questions regarding the handling and storage of information and data:
a) How will research data be stored (manually or electronically)? Data will be stored electronically on the University drive. I will also be keeping a copy on my iPad so the project can be worked on wherever. The data will be kept for 5 years, after 5 year all data and information, digitally or on paper, will be deleted and/or destroyed.
b) How is protection given to the participants (e.g., by being made anonymous through coding and with a participant identifier code being kept separately and securely)? The questionnaire will be anonymous with each participant having a code such as P1 instead of their names is they are able to be referred to in the study.
c) What assurance will be given to the participant about the confidentiality of this data and the security of its storage? There will be an introduction section to the questionnaire which explains that the data will be anonymous and will be deleted after the study is completed.
d) Is assurance given to the participant that they cannot be identified from any publication or dissemination of the results of the project? Yes, I will make sure to explain this to them on the information and consent sheets.
e) Who will have access to this data, and for what purposes? Deborah and I will both have access to this data, I will need to analyse the data and interpret findings into my work and my supervisor will be checking over my project, therefore having access to the information given.
f) How will the data be stored, for how long, and how will it be discarded? The data will be stored on multiple files on my iPad and my computer at home, when finished with the project, the files will be deleted permanently.

Supporting Documentation

All key documents e.g. consent form, information sheet, questionnaire/interview schedule are appended to this application.	YES

Signature of Researcher:		Date:	21/10/21

NB: If the research departs from the protocol which provides the basis for this proportionate review, then further review will be required and the applicant and supervisor(s) should consider whether or not the proportionate review remains appropriate. If it is no longer appropriate a full ethical review form **MUST** be submitted for consideration by the School Ethics Coordinator .

Next Step:

STUDENTS: Please submit this form (and supporting documentation) for consideration by your Supervisor/ Module Tutor.

STAFF: Please submit this form to your Head of Department or a Senior Researcher in your School. Once they have reviewed the form, this should be forwarded to the Research Administrators in RIIS (ethics@staffs.ac.uk) who will arrange for it to be considered by an independent member of the School's College of Reviewers.

PART B: TO BE COMPLETED BY SUPERVISOR/MODULE TUTOR (If student) OR Head of Department/ Senior Researcher (if staff)

I consider that this project has no significant ethical implications requiring full ethical review by the Faculty Research Ethics Committee.	x
I have checked and approved the key documents required for this proposal (e.g. consent form, information sheet, questionnaire, interview schedule).	x

Signature of Supervisor/ Head of Department/ Senior Researcher:	Deborah Sproston-Bewley	Date:	27th October 2021.

Next Step: Please forward this form to the Research Administrators in RIIS (ethics@staffs.ac.uk) who will arrange for it to be considered by an independent member of the School's College of Ethical Reviewers , having no direct connection with the researcher or his/her programme of study.

PART C: TO BE COMPLETED BY A MEMBER OF THE SCHOOL'S COLLEGE OF ETHICAL REVIEWERS

This research proposal has been considered using agreed University Procedures and is now approved. **Or** This research proposal has not been approved due to the reasons given below. **Recommendation (delete as appropriate)**: Approve/ Amendments required/ Reject	

Name of Reviewer:		Date:	
Signature:			

Signed (School Ethical Coordinator)		Date:	

Appendix 1: ethics form signed by researcher and supervisor.

CCTV

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	3	4.3	4.3	4.3
	selected	66	95.7	95.7	100.0
	Total	69	100.0	100.0	

FacialRecognition

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	64	92.8	92.8	92.8
	selected	5	7.2	7.2	100.0
	Total	69	100.0	100.0	

ANPR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	39	56.5	56.5	56.5
	selected	30	43.5	43.5	100.0
	Total	69	100.0	100.0	

Drones

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	48	69.6	69.6	69.6
	selected	21	30.4	30.4	100.0
	Total	69	100.0	100.0	

PhoneTracking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	9	13.0	13.0	13.0
	selected	60	87.0	87.0	100.0
	Total	69	100.0	100.0	

GPS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	48	69.6	69.6	69.6
	selected	21	30.4	30.4	100.0
	Total	69	100.0	100.0	

Computers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	26	37.7	37.7	37.7
	selected	43	62.3	62.3	100.0
	Total	69	100.0	100.0	

Other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	57	82.6	82.6	82.6
	selected	12	17.4	17.4	100.0
	Total	69	100.0	100.0	

Appendix 2 and 3 showing the frequency test between all the currently used technology within a missing persons investigation.

Facebook

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	selected	52	100.0	100.0	100.0

Twitter

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	26	50.0	50.0	50.0
	selected	26	50.0	50.0	100.0
	Total	52	100.0	100.0	

Snapchat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	50	96.2	96.2	96.2
	selected	2	3.8	3.8	100.0
	Total	52	100.0	100.0	

Tiktok

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	51	98.1	98.1	98.1
	selected	1	1.9	1.9	100.0
	Total	52	100.0	100.0	

Instagrame

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	44	84.6	84.6	84.6
	selected	8	15.4	15.4	100.0
	Total	52	100.0	100.0	

Other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not selected	50	96.2	96.2	96.2
	selected	2	3.8	3.8	100.0
	Total	52	100.0	100.0	

Appendix *4 and 5 showing the frequency test between all the currently used social media within a missing persons investigation.*

Date * Q1 Crosstabulation

Count

		Q1					
		Strongly agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Strongly disagree	Total
Date	2021-2000	10	13	1	3	1	28
	1999-1990	10	11	2	1	0	24
	1989-1980	4	4	0	2	0	10
	otherr	0	1	1	1	0	3
Total		24	29	4	7	1	65

Date * Q2 Crosstabulation

Count

		Q2					
		Strongly agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Strongly disagree	Total
Date	2021-2000	5	14	5	3	1	28
	1999-1990	12	5	7	0	0	24
	1989-1980	2	6	1	1	0	10
	otherr	1	2	0	0	0	3
Total		20	27	13	4	1	65

Date * Q3 Crosstabulation

Count

		Q3				
		Strongly agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Total
Date	2021-2000	15	10	2	1	28
	1999-1990	13	7	3	1	24
	1989-1980	4	2	3	1	10
	otherr	3	0	0	0	3
Total		35	19	8	3	65

Appendix 6 showing statements 1,2 and 3 of the Likert Scale answers compared to the date the participant joined the police.

Date * Q4 Crosstabulation

Count

		Q4					
		Strongly agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Strongly disagree	Total
Date	2021-2000	10	11	3	3	1	28
	1999-1990	8	8	7	0	1	24
	1989-1980	5	2	2	0	1	10
	otherr	2	0	1	0	0	3
Total		25	21	13	3	3	65

Date * Q5 Crosstabulation

Count

		Q5			
		Strongly agree	Somewhat agree	Neither agree or disagree	Total
Date	2021-2000	13	15	0	28
	1999-1990	12	11	1	24
	1989-1980	6	3	1	10
	otherr	3	0	0	3
Total		34	29	2	65

Date * Q6 Crosstabulation

Count

		Q6					
		Strongly agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Strongly disagree	Total
Date	2021-2000	2	3	2	13	8	28
	1999-1990	1	1	0	14	8	24
	1989-1980	0	0	3	4	3	10
	otherr	0	0	2	1	0	3
Total		3	4	7	32	19	65

Appendix 7 showing statements 4, 5 and 6 of the Likert Scale answers compared to the date the participant joined the police.

Date * Q7 Crosstabulation

Count

		Q7					
		Strongly agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Strongly disagree	Total
Date	2021-2000	1	1	6	13	7	28
	1999-1990	1	2	6	9	6	24
	1989-1980	0	1	3	2	4	10
	otherr	2	0	0	0	1	3
Total		4	4	15	24	18	65

Date * Q8 Crosstabulation

Count

		Q8					
		Strongly agree	Somewhat agree	Neither agree or disagree	Somewhat disagree	Strongly disagree	Total
Date	2021-2000	7	11	7	3	0	28
	1999-1990	6	11	7	0	0	24
	1989-1980	2	4	0	3	1	10
	otherr	3	0	0	0	0	3
Total		18	26	14	6	1	65

Appendix 8 showing statements 7 and 8 of the Likert Scale answers compared to the date the participant joined the police.

Participant Information Sheet

Title:
Is the current use of technology, used by the police, effective in missing persons cases?

Purpose of the study:
The researcher is an undergraduate student at Staffordshire University studying Policing and Criminal Investigation and, for their Independent Project module, they are conducting research into the current use of technology by the police and if it's effective when dealing with missing persons cases from when they initially go missing to when they are found. The research gathered will allow the researcher to analyse different police forces and what types of technology is successful and unsuccessful and where, or if, this needs to improve.

Why you have been invited?
You have been invited to take part in this study to help gain an insight into policing and how technologies are used within different police forces when it comes to missing persons cases. Your data will be analysed alongside many others to try and evaluate if policing technologies are currently effective enough in missing persons cases or if upgrades and improvements need to be made. This collected primary sourced data will be compared to pre-existing literature to see if research into this specific topic is limited.

What does participation entail?
Participating in this research includes filling out a questionnaire regarding your perspective and knowledge of missing persons and the technology behind the investigations. The questionnaire will take approximately 5-10 minutes to complete. After completion your data will get automatically put into the researcher's system in SPFF. The data will be analysed using chi-squares, to analyse the quantitive data and thematic analysis to analyse the qualitative data. You will get an unidentifiable unique code that can be used to withdraw if you so wish.

What are the risks associated with taking part in the research?
There will be no risks linked to taking part in this study. All data is anonymous and will remain anonymous at all times.

What are the benefits of taking part in the research?
There are no personal/direct benefits of you taking part in this research, you are being asked to help with your knowledge and insight into this topic within the police. You will not be mentioned, as stated previously, any identifying data will be kept anonymous.

Are there any reasons why I might not be eligible to take part in the research?
We require that all participants taking part in this research is over the age of 18. Any officer or ex officer, who has worked on a missing persons case, will be able to take part and there will be a yes and no question on the questionnaire stating If they have very worked or been a part of a missing persons case, if not then the questionnaire will be ceased. This will allow the data to be from experienced people with knowledge of the main research area, which is missing people.

How will any personal information use during the research kept confidential?

All the information collected from the questionnaire will be kept confidential and anonymous, no identifying information will be needed to take part in this study. Demographic questions such as age, gender, ethnicity, this will allow the research to be analysed to its fullest. After 5 years all data and information, digitally or on paper, will be deleted and/or destroyed.

Right to decline or withdraw

You are not obligated to complete or take part in this questionnaire, and you have the right to. Decline the invitation to participate. You also have the right to withdraw from the questionnaire at any point or withdraw all or part of your answers at a future date. Please be. Aware that you will not be able to withdraw anonymous information after the final analysis has been completed; this is expected to be 24th Apr 2022.

Contact

If you have any concerns or questions about this research, if there is a concern you may have, or on how this study is conducted and the people involved plea contact the researcher's supervisor, Deborah Sprosten-Bewley on deborah.sproston-bewley@staffs.ac.uk or Tel +447538744748.

Complaints

We hope you take part in the study and. Find it interesting and enjoyable. however, problems may arise. If there is any concerns, please contact the supervisor listed above. We will do our best to answer any problems.

Appendix 9: Participant Information Sheet.

Consent form- Participant Copy

By consenting to take part in this research, you agree that the information given is understood correctly and agree to the following statements.

I agree that I am over the age of 18.

I agree that I have read and understood the information sheet provided for the research and I have answered to the best of my knowledge and abilities.

I understand that my involvement in this research will be anonymous, and my data will be replaced with a unique code. I also understand that if I want to remove my data at a later stage, I must refer to this unique code.

I understand that my identity will be anonymous and not used or published, all identifying data will be kept out of the study.

I understand that I can withdraw at any point when taking part in this research and I can also withdraw after I've sent it in by referring to my unique code.

I understand that my data will be used to gain a better understanding of policing technologies within missing persons cases, how effective and or ineffective it is and if changes need to be made.

I agree to take party in this study:

Date:

Participant Signature:

Appendix 10: Participant Consent Form.

What policing profession are you/have you worked in?

- ○ Police Officer
- ○ Ex-Police Officer
- ○ None of the above
- ○ Other

Are you from the UK?

- ○ Yes
- ○ No

What police force were you/are you in?

Have you ever worked on a missing persons case?

- ○ Yes
- ○ No

Which category of missing people do you tend to deal with more regularly?

- ○ Children
- ○ Teens
- ○ Adults
- ○ Elderly

What were some types of technology used in these cases?

- ☐ CCTV
- ☐ Facial Recognition
- ☐ AMPR
- ☐ Drones
- ☐ Phone tracking
- ☐ GPS
- ☐ Computers
- ☐ Other

When did you first joing this profession?

- ○ 2021-2000
- ○ 1999-1990
- ○ 1989-1980
- ○ Other

The current use of technology is effective in a missing persons case

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Technology is effective at finding a missing person.	○	○	○	○	○
Drones can assist an investigation and be successful.	○	○	○	○	○
The quality of CCTV needs to be improved.	○	○	○	○	○
More technology needs to be introduced to find a person quicker and more efficiently.	○	○	○	○	○
Social media is helpful in a missing persons case.	○	○	○	○	○
Technology is not effective at finding a missing person.	○	○	○	○	○
Technology used when finding a missing person doesnt need improving/modernising at all.	○	○	○	○	○
Using more facial recognition technology will help find missing people faster.	○	○	○	○	○

Do you think that CCTV cameras around the UK should be improved and why?

How do you think drones would be effective at helping to find a missing person?

Which social media platform does your force use the most to post missing persons appeals?

- [ ] Facebook
- [ ] Twitter
- [ ] Snapchat
- [ ] Tiktok
- [ ] Instagram
- [ ] None of the above
- [ ] Other

What technology, if any, was introduced when you were in the police force to help with missing people or policing in general?

If you could automatically add one advanced technology to the police force to help assist in missing persons cases, that the UK doesn't yet have, what would this be and why? (E.g HD CCTV cameras)

We thank you for your time spent taking this survey.
Your response has been recorded.

Appendix 11: Blanc copy of the questionnaire.

Opened on the 19/11/2021.

Closed at 22/03/2022 due to needing to gain more responses.