Mobile technologies in front line policing: a case study of two Forces

Citation:
Norman, A., Forsgren, E., Allen, D.K., Williams, S.C., Gritt, E., Shaw, N. (2018). ***Mobile Technologies in Front line policing : a case study of two Forces.*** **Leeds University Business School, University of Leeds, UK.**
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Introduction.

Police have been mobile workers from the inception of the role through to the present day, and will continue to be so for the foreseeable future. Crime does not happen to a set timetable, nor does it always occur where it could be suggested that it is most prevalent. Nor will it stop changing in nature and location. As a result, police officers, and those supporting them, have always had to deal with the issues of mobility; whilst this mobility is vital for the discharge of the core function of policing it makes information and communication provision both to, and from, officers in the field harder than in other environments. Police work is, therefore, almost by definition subject to high levels of unpredictability, peaks and troughs in demand and shifts in the patterns and locations of crime both in the short term (such as problems of antisocial behaviour in a particular area being addressed by increased police visibility) and over the long term (such as the rise in the “cyber” elements in crimes with the recent, and continuing, developments in technology). Police officers are not ‘typical’ mobile workers carrying out tasks such as parcel delivery.

Police boxes gave way to voice-radio communication, and radio communication over voice has, in turn, given way to voice radio complemented by the ability to provision information systems in the field via the use of mobile data. Whilst Airwave does have a data capability it is limited. These data systems have, therefore, in the main been provided over the last decade in the United Kingdom through commercial providers such as Vodafone or O2. Whilst this has enabled officers in the field to receive and send information, and to benefit from a level of access to information systems which could only have been dreamt of by their predecessors a couple of generations ago, these systems have, although increasingly offering the facility to work off-line and synchronise once a connection is restored, remained vulnerable in times of crisis as a result of the inability to guarantee the appropriate levels of access, resilience and security which allow such systems to be used as business-critical or mission-critical tools in the everyday business of policing. Developments in the devices available for officers to transact business while mobile have, in part, been driven by the availability and increasing sophistication of such technologies (the level of computing power contained within a modern smartphone is almost unimaginable when compared to the sophistication of systems which were in place less than two decades ago for example) and, in part, by the efficiency drivers which were generated through the application of techniques drawn from the New Public Management of the late 1990s and 2000s, as well as the current drivers for cost reduction and increased efficiency which have been exacerbated by (although not originated from) the current austerity measures. Despite the issues of contention, resilience and security (among others), the value of mobile data technologies has been such that almost all police forces have dedicated considerable resource to the development of tools which allow their officers – often front line officers and often

uniformed frontline officers – to have access to information systems which were either unavailable to them while mobile or where access was, previously, mediated via information intermediaries in areas such as control rooms. The current process of shift to the Emergency Services Network (ESN) means that over the next few (currently 2-5) years the landscape for mobile data technologies within policing will shift to one where data transmission is as resilient, accessible, and secure as voice radio has been during the provision of the current Airwave technology which underpins current mobile voice communications and where this can be provided through a single ESN compliant device rather than, as is currently the case, by a second device over and above the Airwave radio set.

This case study is based on a composite of data collected from 2 police forces which have invested significant resources in the development of mobile data technologies to support their officers in their day-to-day business. It should be noted that this development is not new, either in these police forces or in others across the country and, indeed, across the world. Officers make use of mobile technologies over and above voice-radio communication on a day-to-day basis and do so to good effect. These developments have, however, been described in the past as “piecemeal” and doubt has been cast on the cost effectiveness of such developments both at an individual force level as well as in reports, including from the National Audit Office. Criticisms included the prevalence of technology-led implementations, a failure to baseline so that improvements and benefit could not be evidenced, a failure to identify effective processes by which such change was embedded and the benefits of change projects both achieved and retained/built upon, and an expectation that technology will provide a “silver bullet” in and of itself.

The landscape against which mobile technologies are currently being deployed in police forces has, therefore, changed significantly from that of even a decade ago. The technology has moved on both in the sense of the hardware which provides the interfaces through which police officers access information, and in the sense of the infrastructure which carries the data to inform these information systems. The drivers for change which delivers effective and efficient policing, and does so through a lean process – “doing more with less” – have not been reduced and, if anything, have been increased. The workforce is steadily seeing older workers – who may have had some historical resistance to technology as a way of doing business – retire and be replaced by younger workers who have both more familiarity use of technology in their personal lives and whose training and education, both at a general level and specifically as police officers, has provided them with the basis of thinking of technology as a normal way of doing business – if parcel delivery services can effectively make use of sophisticated information systems and tools then, to this generation and the ones that follow, not to do so in a policing context would not merely seem nonsensical, but almost inconceivable.

In both of the police forces which have formed the basis for this case study there has been a history of the development and deployment of technologies which have both supported officers in access to the data and information systems which they need while working as mobile workers and which have enhanced the ability of the forces to capture, manage and make effective use of such data and information systems.. In line with other forces in the country much of the emphasis in these deployments have been on the frontline, and especially with the uniformed, officers who deal with incidents “on the ground”.

In both of these cases the deployment of mobile technologies to front line uniformed officers, and those associated with them such as supervisors, has formed a part of a larger policy based around agility in working and/or the digital transformation of work practices and services. The drivers for these developments have been, as noted above, the increasing capabilities and affordances of technologies at reasonable prices and the efficiency drivers put in place as a result of cuts to policing budgets in line with austerity.

Aims of the study.

The study was undertaken in line with the overall aims of the project and specifically to highlight practice within forces which are seen as representative of those making effective use of a particular area of technology. These forces are, therefore, ones which have committed both resource and planning to the introduction, development and use of these technologies at a significant level. The cases investigated:

- The types of technologies used to support mobile working – including both hardware and software
- The adaptations required to existing systems to make effective use of these new tools
- The effectiveness of the changes in delivering the benefits targeted by the forces concerned
- The expectations of future benefit realisation resulting from either the embedding of these new technologies and ways of working or the further development of them.

The cases were informed by the survey phase of this overall study which highlighted a number of key trends with regard to the provision of mobile tools supporting information access for officers:

- All forces have invested in such technologies, usually as a complement to the Airwave system.

- The popularity of handheld devices – almost without exception commercially available smartphones or tablets – is increasing at the expense of other forms of technology such as dedicated in car units and laptops although these are being retained in specialist functions (ARV for example).
- A key area of development is body-worn video which is being rolled out in many forces. This is usually a record-only tool rather than something which can be used to provision information systems in real time to act as a video feed.
- Laptops, desktops and in car systems continue to have a core user base and are unlikely to disappear in the foreseeable future as there are roles for which these tools are better suited than handheld devices – in car ANPR units being an obvious example.
- Relatively few forces are committing significant resource at this stage to the more 'innovative' technologies such as virtual reality / enhanced reality, aerial drone use or the integration of wearable technologies (other than in the sense of clipping devices onto vests) into vehicles or clothing. Neither are many forces actively pursuing the potentials of machine to machine communication (internet of things) outside the areas of evidence collection (mobile phone use while driving for example) or emergency notification through systems such as e-call.
- Forces expect this trend towards mobile information access / provision to continue, and regard the level of change in many forces as ' transformational'.

Data collection

Data was collected in both forces through a combination of:

- Access to, and analysis of, the results from the technology survey and interviews carried out for this study between Date and Date.
- Discussion with the key stakeholders in a composite meeting / focus group
- Interviews with stakeholders including the key areas of:
    - End users of the technologies and tools
    - Key managers setting direction for the adoption of such tools and technologies
    - Managers charged with the delivery of the projects for the introduction of the tools / technologies including from a business and technology perspective
    - Police officers and staff affected by the introduction of the tools other than as end-users – this included supervisors / managers (who may also be end users in their own right) and information intermediaries such as control room / 'back office' staff

Discussion and key themes

This section is divided into three sub-sections addressing current practice; setting and tools / technologies, benefits targeted and achieved, and challenges and barriers. A final section briefly addresses the issue of 'Futures'

Setting, tools and technologies

The forces which were used as the basis of this case have learned lessons from earlier implementations (which were often criticised as being technology led and not taking account of the needs of end users) and have developed their current initiatives as part of larger programs related to digital transformation/agile working. These programs are explicitly identified as programs in the project-management sense with individual projects making up larger programmes of work and managed in accordance with extant project-management methodologies including programme management. The aims of the specific programmes of work differ but the overall thrust is to exploit technology and, in particular, digital technologies, to improve the effectiveness and efficiency of policing as an activity. Mobility, and the ability for officers to access, or be provided with, information while they are out-of-station has been prioritised in both forces but it was emphasised by both that the projects were concerned with the activity of policing rather than with the provision of specific technologies. There is an acceptance that the technologies available and in use will change over time. In the short-term such changes may be incremental – such as updates to models of smartphones and, in the longer term, the shifts may be more than incremental and include development of wearable technologies, sensors utilising machine to machine communication and input methods such as voice-recognition. In both forces there is a recognised project-management process and, as a part of this process, both forces have senior management sponsorship for the overall programmes of work which ensure that there is strategic alignment between the programmes of work (and the individual projects within them) and the strategic needs and direction for the force. Both of the police forces who were involved in this case study are strongly aware that they are not unique in making the changes they have embarked on or in the selection of technologies to support these changes.

Both of the forces are actively involved in collaboration either at a formal level – one of the forces has an explicit and formal arrangement with a neighbouring force to share technologies, implementation processes and learnings – or at a less formal level (which is, nonetheless, officially sanctioned and sponsored) of having contact with other forces with similar programmes of development and actively encouraging information exchange in order to ensure that there is not either a massive duplication of effort or a situation where a force stumbles into problems which have already been solved in another. Such arrangements are, however, by no means comprehensive due to the current piecemeal nature of developments across policing as a whole. There have been efforts to ensure that learnings from one project are available to other forces and the consensus view from those interviewed at a management level as a part of this process was that "things are better than they used to be".

In the case of both of the forces participating in this research there is also a significant level of collaboration with commercial providers. This collaboration is more than simply a sales contract whereby the commercial provider delivers tools which are then implemented by the force, although clearly there are some elements of this, but is more concerned with the coproduction of the system which delivers efficiency and effectiveness. This emphasis on benefit and project success (as opposed to project management success which it has been argued has been a feature of many of the mobile technology development projects of the past) requires a level of ongoing commitment from commercial providers and also requires a level of openness from the forces concerned. This openness, within the sensible limits imposed by the nature of the work that police officers do, has clearly provided some benefit within the current provisions in both forces. Collaboration with hardware providers has ensured that devices are suitable and has also helped in the development of tools and processes which have enabled the customisation of a stock commercial product to operate effectively in the policing environment. This customisation has not necessarily been of huge complexity or sophistication but has included issues such as advice and assistance with cases, with battery life and with mobile charging as well as advice and assistance with customisation of software and the enabling (or disabling) of particular functions. Collaboration with software providers is, arguably, more far-reaching; as already mentioned forces are clear that mobile technologies and tools enable changes in business process rather than being an end in themselves. The ability for forces to give access to information systems to officers out-of-station and for those officers to update information systems without need to return to station enables business process change and does so, in the main, through the provision of appropriate software, either web-accessed or through apps, which can be used on the mobile devices while out of station. Probably the single most influential of these software developments is the Pronto tool which has been provided to both of the forces in the case study. This is discussed further below.

In part as a result of the factors above there has been, in both forces a focus on business process change enabled by the introduction and use of technologies providing mobile access to information systems rather than on the introduction of the systems themselves.

With regard to the actual tools and technologies in use there is, again, a significant level of similarity between the two forces which have formed the basis of this case. Both have rolled out body worn video (or are well advanced in the process of doing so) and have also rolled out smart phones to frontline, mainly uniformed, officers as a personal-issue device. In both forces the intention is that the technologies become the usual way of doing business and that systems and business processes are amended in order to take advantage of the of audiences of these tools and technologies rather than the tools being used to simply automate existing business processes. The smart phones which have been deployed in both cases are Android operating system devices and in both cases the forces have chosen Samsung as the suppliers for these. The implementations of smart phones and a body worn video

have tended to be treated as separate projects but both forces have been very clear that they form a part of an overall digital strategy and that there is the possibility, in the future, of convergence to a single device; this could be particularly attractive in the light of the recently-released specifications for a first-generation of an E S N compliant device.

Both forces provide a range of facilities through their smart phone devices and these include access to policy and guidance resources, access to reference material with regard to force and colleague information (such as telephone directories for example) and access to a range of policing workflows. These workflows are principally provided via the Pronto application. Pronto was originally developed as an “electronic pocketbook” to replace the use of paper to record the manner in which incidents were handled and managed. The tool has, however, moved on from its earliest form, which was simply an electronic replacement for a paper notebook with limited connectivity while out-of-station, to be a workflow and process tool which allows for the management and recording of incidents end-to-a end while out of station. The system now provides both online and off-line connectivity with synchronisation taking place of off-line transactions once connectivity has been restored. This has led to an increased ability to rely on the devices and for workflows to be continued when connectivity fails. This is especially important in the rural areas which form a large part of one of the force areas examined for this case study and is also potentially an issue with the earlier stages of ESN introduction when coverage issues may need to be resolved. Workflows and processes within this application have, in both cases, been agreed and developed collaboratively between the forces concerned and the technology provider. Both forces were clear that they regarded themselves, as the customer, as being “in the driving seat” with the technology provider customising tools and workflows to meet their policing needs rather than their policing activities needing to be modified around the demands of the application/software.

The applications which are provided on the mobile technologies are relatively intuitive but these have been supported, in both cases by a comprehensive provision of training and change-management efforts to ensure that hearts and minds have also been taken along with the development of technologies and the implementation of the new tools. These have included regular updates to staff to both signal as well as manage expectations, the provision of champions able to support frontline users at the point of need and training for supervisors both to make them aware of the potentials and use of mobile tools and to make them aware of the likely changes which will be needed to working practices and the manner in which those changes can be embedded and capitalised upon.

The situation therefore is that both forces have rolled out smart phones as the principal tool for the officers to have access to information systems and to be able to manage policing workflows while out-of-station. The smart phones are the principal devices for Information Systems access and the applications on them are designed,

primarily with end-users, to support frontline policing activities. In both forces the devices, or similar ones, are also available to supervisors and managers but it should be noted that often the use of these devices will be more biased towards access to email and monitoring of workflows rather than participation and completion of work within them. Body-worn video is the other key initiative which is being rolled out and while this is different in nature to the smart phone developments there are some commonalities with regard to project management and the need for training and expectation management in order to drive adoption and effective use. Both forces have managed training actively with suppliers and both have collaboration/awareness of activity and delivery in other forces. In both forces there is buying an active participation from senior managers as well as a clear statement of alignment of the projects which form the programmes of work with the strategic priorities of the forces concerned. It should be noted that both forces do have deployments of other tools such as iPads, laptops and ToughBooks, but in both cases it is also clear that the key thrust of development is with smartphones and body-worn video. This is supported by national evidence, drawn from the National survey, which has highlighted the rise of these smartphone technologies across virtually all forces, often at the expense of laptop provision and dedicated in-car terminals.

Targeted / delivered benefits

Both of the forces in the case study have ,as noted, entered into the specific projects with regard to mobile technologies as part of larger programmes / portfolios of work engaged with digital transformation. The key aims targeted at the strategic level are mainly around the transformation of work, the accommodation of policing to the demands of society and the austerity drivers of “doing more with less”. Key aims at the specific mobile technologies level include (but are not limited to):

- reduce time in station / return to station,
- reduce process time for policing workflows,
- increase accuracy and availability of information to and from officers
- increase speed of access to, and completeness of, records and transactions
- support police officers and staff in policing efficiently, effectively and safely

Taken as a whole these are a comprehensive set of efficiency and effectiveness gains. The evidence to date is that these are being , broadly, delivered.

Time in station / return to station.

This is, clearly, role dependent and also depends at a granular level on the mix of tasks and demands on a given officer on a particular day. However, both forces report significantly reduced time in station and both case study

sites estimate that the overall gain is on the order of 90 minutes per shift as a modal average. Return to station is clearly bound up with time out of station and while this is reduced both Forces have noted that there are drivers for return to station which these devices cannot address effectively. The key one of these is file-building, and this is further discussed below.

Process time for workflows

The Pronto application allows for a range of transactions including traffic, DASH and Missing Person to be completed using the mobile tools. In the case of the processes currently moved to a mobile workflow the forces both estimate that the process time has reduced. This allows for better information to be made available faster and this is especially valuable in the case of workflows such as Missing Persons where the ability to disseminate information widely and quickly has been shown to be material to quick resolution of the issue.

Increased accuracy / completeness and faster information access for both officers and central systems users

The completion of forms on digital platforms offers some basic advantages over paper forms and notebooks. These include the ability to mandate completion of fields prior to progressing workflows, the elimination of handwriting errors (although not always typos) and the ability to update central systems either real time or after a short delay (for example the off line working capability when out of mobile coverage). Both forces indicate that these benefits are being seen although it was noted in one of the forces that there is a tendency to 'front load' the time needed to address form completion and that this can make processes seem, initially at least if not in the longer term, less efficient for front line users. The ability to access the electronic pocketbook and mine data from this has also materially added to the ability of the central systems to capture and use what was previously 'dark' data.

Supporting officers to police efficiently, effectively and safely.

Both forces support that this holistic benefit is being delivered. There is anecdotal evidence of improved officer safety as a result of better information - although there are also concerns, noted below, with regard to the safety of use of the mobile technologies in some situations. Users, supervisors and managers in both forces are clear that the overall benefit is being delivered and that the force has seen material gain from the introduction of these tools. It is also accepted that this is not a panacea and that there will be instances where users dislike the technology, where it does not provide benefit and where there are operational issues which mean that it should be put away and not used

There are, however, some caveats around this overall positive picture. Some of these are addressed further in later sections but key ones to be noted at this stage include:

- There is no standard methodology across forces for determining the areas of benefit, or measuring them.
- Baselining is not consistently carried out and as a result one manager (Senior Manager, Force 2) commented that statements of gain are based on *'A recognition that 'It's less of a problem than it was' rather than knowing how much of a problem it was to start with and where we are now'.*
- Judgements of benefit can be made from a range of perspectives. A success for a systems developer may not be seen as a success by some (or all in extreme cases) users for example.
- Measures drawn from system statistics may raise an issue for investigation but do not provide explanation. For example one force in the case introduced fleet monitoring tools and used the data to inform evaluation of the time spent out of station by officers. They found that cars are spending longer in station than the force had expected. What is not clear is whether this is due to officers spending more time than had been thought in station, or to excess capacity in the fleet.

Issues / challenges

Both forces have noted that there are some issues and challenges with the development and implementation of these mobile technologies and tools. Many of these are known issues which have been seen in other technology and change projects. They can broadly be divided into three key areas, loosely based on the TOE (Technology, Organisation, Environment) structure; user issues, technology issues and process / organisation issues.

User issues

Both of the forces in the case study have recognised from the early stages of these projects that there would need to be planning in the project delivery for appropriate change management, in order to effectively deliver and embed changes to ways of working and acceptance of new tools and technologies. The issues which are noted below are, in the main, not new and may to an extent be regarded as inevitable within implementations of projects of this type.

Generalised resistance to the introduction of changes can lead to acceptance issues with some users. Ways of working which people have become used to, and comfortable with, are adapted and changed and this process can be uncomfortable for some users. This resistance can be exacerbated by length of service – that is to say that some users have had longer to become accustomed to ways of working than others and so, as a result, may become more attached to those ways of working and less open to the introduction of new tools and technologies. Equally

important is the volume of change – policing has seen many initiatives, and pressures, in the last decade and there is a level at which staff may experience a level of 'change fatigue'. Both of the forces in the case study were well aware of this as a potential issue and both took effective steps to try to reduce and minimise this generalised resistance. These included:

- Regular updates to staff highlighting both the potential of the technologies and the progress of the project by which they would be introduced. The intention of these updates was both to "trail" the introduction of the technology and to start to acclimatise users to the nature of the change.
- Formal training to assist users in the initial setup and use of the tools both in terms of the purely practical training, described by one user as "how to turn it on and which buttons to press to make it work" (experienced sergeant), and the use of the workflows which are provided through the mobile technologies.
- The designation and support of users able to support others in frontline situations and to do so within the context of the teams within which technologies were deployed rather than as formal one-off training events. These users were variously described as "super-users" or "champions".

There was concern expressed by some users, from frontline uniformed officers through to senior managers, that technologies such as this offer the potential for a blurring of work life balance. The fact that the technology is personal issue, and carries a conventional mobile telephone number means that many officers have provided that telephone number to a range of people, and will continue to do so. The nature of police work, however, means that officers are not necessarily available in what the public would regard as "normal business hours" and this can lead to both frustration from the public at having to leave voicemails or not being able to contact an officer through a number they have been given and frustration from the officers concerned that they are receiving calls and messages outside of normal shift times. Users also commented, in the same vein, that they felt there was some pressure (mainly internal pressure coming from themselves rather than pressure applied explicitly by the force) to check emails and to access information in order to progress tasks outside of normal shift times. This phenomenon has been observed in other settings both in the public and private sectors and across a range of countries, and although there have been attempts to tackle this – for instance by synchronising the availability and delivery of emails with shift times – these have had mixed levels of success. It is also evident that where devices are enabled to allow officers to add applications there are potentials for further blurring of worklife balance by the creation of social media contact groups in applications such as WhatsApp. Users – primarily supervisory – in one force commented that it was extremely rare that they could go through a weekend or a rest day without receiving work-related queries from colleagues, "*Will it be okay to have next Friday off boss?", "Can I have 10 minutes with you on Monday about that call I did yesterday?"* And they highlighted

that these contacts primarily came through social media type channels and groups set up on devices. Managers also commented that these groups, often set up within teams, had attracted adverse attention from Professional Standards within forces as they blur the distinctions during social and professional communications with “Do you want to go for a coffee after work?” type communications sitting alongside comments on, and potentially information pertaining to, policing activities.

Both forces are acutely aware that the technologies of this type may be used, and be seen to be used, to empower officers by providing them with information which allows them to make decisions, and do so independently and that they may, equally, be seen to be used in a manner which officers will tend to see as prejudicial in the same way that automatic vehicle location systems can be seen as either an agent for officer safety or as a “spy in the cab”. One user on one of the forces which formed part of this case study commented that although this was not the situation they found themselves in “*I have this fear that eventually these things are going to act to make us a bit like pickers in an Amazon Warehouse – instead of you’ve got 40 seconds to get to aisle seven and pick up a kettle it’ll be, you’ve got 20 minutes to get to this postcode and deal with this job, and when you’ve done that you’ll get the next one.”*

Another issue highlighted within both forces is that mobile tools – both smartphones and body worn video – are yet another thing to carry on what is already a fairly crowded piece of real estate – namely the officers’ vest. Users also highlighted that both body worn video and smart phones are also yet another thing to charge, to remember, and to try not to damage. Whilst in the slightly longer term it is likely that the move to ESN will bring about a reduction in the number of devices carried, as the current Airwave terminal and smart phone converge, this issue of device inflation remains a concern for users and is unlikely to disappear in the short term.

Users have also voiced some disquiet about the role of the devices in terms of the way that they can potentially de-skill users. This concern is based on the development and implementation of electronic workflows which will be determined by forms to be completed on the mobile devices and, in effect, driven by those forms. The fear expressed by some users is that over time the devices may be used to reduce training and reduce discretion, reducing officers from the role of investigators of issues with discretion to resolve in a range of ways to reporters whose role is to complete information systems and workflows in a standardised manner.

Technology issues.

No device is perfect and the smart phones and body-worn video issued to police officers are no exception to this. In both forces a range of concerns have been expressed with regard to the devices themselves and these include:

- Limited battery life. From their own experience of smart phones officers are aware that battery life is limited and, also, that it tends to decrease over the life of the device so that what may start as an acceptable level of battery life is unlikely to remain so and may well, by the end of life of the device, be well below what is needed for the device to be effective across a shift. There will, clearly, be some users who make greater use of these tools than others and it is those heavier users – that is to say the people who are more dependent on the devices – who are more likely to be frustrated by battery problems and to encounter issues of limited battery life. Whilst there are external battery packs, in car chargers and other workarounds this issue of battery life remains central to the user experience and is likely to remain a source of frustration for officers using these as professional work tools for the foreseeable future. This is, however, not necessarily fatal as the issues are ones which many users are already well aware of and which they have come to accept as an almost inevitable part of the use of tools such as this in their personal lives. The increasing trend, with smart phones particularly, towards non-replaceable batteries also means that the option of carrying a spare battery to be swapped out during a shift is already relatively rare and is likely to disappear completely in the near to medium term future.
- Any mobile device carries some level of tension within its design between the size of screen real estate and its portability. Smart phones within the policing environment have become by far the most popular and numerous mobile technology but there is, and will remain, some frustration with screen size and the ease of input using virtual keyboards. This frustration is likely to vary with role, with incident, and with environment rather than being directly linked to an individual user. That is to say that an individual user may experience devices being perfectly usable in one particular context, environment and workflow but find that while carrying out another workflow, in another environment or at another time (perhaps when time pressure is significant) they may find the same device presents a far lower level of usability.
- Users have also commented on the potential for loss of, or damage to what is essentially a stock commercial device when it is used within a policing environment. Project teams and forces are well aware that there is the potential to provide officers with “toughened” versions of the smart phones (or, indeed, cases which have the effect of making the devices less vulnerable to damage) but have to make a trade-off between the price and portability of toughened versions and the potential for damage to, or loss of, the stock commercial version. Both of the forces in this case study, and most of the forces with which we have come into contact, have determined that, unless

users fall into particular categories where a toughened device is clearly necessary, that trade-off falls firmly into the provision of a normal commercial device which is smaller, lighter, and easier to put in a pocket. The loss of, or damage to, a few (under 5% pa in both forces) is outweighed by the reduced cost and improved portability overall.

Process issues

This is concerned with issues relating to the nature of the processes carried out on the mobile technologies. Whilst, as already noted, most users found that the mobile devices allowed for improved workflows there were some concerns expressed by users and these included:

- Rigidity of process. This being the issue that the workflows required officers to deal with incidents and situations in a particular sequence and manner. As one user put it "*with a paper form you can dance around a bit, you can do this bit here and come back to that bit there later, but with this you sort of need to go the way it tells you to and it's a bit of you feeding the machine and being aware that that's what you need to do".* It should be emphasised that most users did not see this as a major issue but it was raised by significant minority.
- The point above is clearly connected to the vision of paperless processes which quite a lot of users felt to be drivers of the shift to mobile technologies. The issue for the ones who commented on this was not that they objected, per se, to such a vision but that they felt the technologies were, potentially, not at a sufficiently advanced stage to be able to support this. Whilst most systems are designed to work off-line and synchronise when connectivity is restored officers were concerned as to what happens when the technology completely dies. Whether this is as a result of battery life, or as a result of damage is, to an extent, irrelevant; the concern is that the paper systems will cease to exist creating a total dependence for process completion on the technologies.
- Users in both forces commented that while there was room for workflows to be improved by making use of mobile technologies to facilitate more effective and efficient ways of working there were other potential drivers for systems and process change. These workflow and process changes could be motivated by a desire not to improve frontline policing but a desire to reduce the overall cost of policing as an activity. This could mean a shifting of work from back office to front line and this was acknowledged explicitly in one of the forces as being a "front-loading" of work to frontline officers without a commensurate reduction in other tasks.
- A concern was expressed that while the systems provided via mobile technologies may, themselves, help to provide benefits such as the ability to stay out-of-station there are other systems which tend to have the opposite

effect. Officers commented on the increasing levels of documentation which they see becoming a part of their jobs and specifically commented on the file-build processes which they see as being difficult (or well-nigh impossible) on mobile tools. This incompatibility between systems means that officers are pulled back into environments where they can use desktop tools such as full-sized keyboards and larger real-estate screens.

- There is a concern, particularly in one of the forces, that the coverage provided by the ESN will be inferior to that currently provided by Airwave. Whilst the mobile technologies are designed to work off-line and synchronise once connectivity is restored this is, nonetheless, a workaround and is seen as potentially endangering safety in the future. It should be noted that there is, generally, little awareness of, or concrete information around, ESN with the majority of frontline users.
- A concern expressed in both of the forces which formed the basis of the case study is that, in the longer term, there will be a need to integrate other platforms and other criminal justice partners (and their workflows). The ability to integrate data drawn from, for example social platforms, and provide this to frontline users is something which, currently, does not form part of the tools provided. The issues of security which will also be raised by the potential connection of other criminal justice partners into police systems, accessible through mobile technologies, are also a concern.

Futures

Users and stakeholders in both of the forces were also asked to comment on what they saw as being potentials in the future of the use of mobile technologies in policing. While this was intended to be, in the main, aimed at the mid-term future, inevitably there were some longer-term issues which were raised in the discussions. This section of the case has been divided to discuss the issues of futures under four headings; technology, users, the organisation, the environment for the organisation.

Technology

All of the users and those involved with the provision of mobile technologies and forces recognise that there will be constant change in devices available and the facilities which those devices provide. Both of the forces concerned are clear that they have larger goals than the provision of a particular model of smart phone or body worn camera and are confident that they are focused on making use of technology as it advances to provide benefit to policing as it changes.

Users in both forces expect that there will be convergence between Airwave handsets and ESN-compliant smartphones as a first stage. It is also suggested that a further integration of body worn video into a single device is also feasible. The suggestion is, however, tempered by further suggestions

that, in the longer term, wearable computing (such as incorporating screens into sleeves and battery charging into clothing) will mean that the devices as identifiable boxes become less important and that the computing power and processes are distributed in different ways.

The rise of the Internet of Things was also highlighted with both forces identifying that this will mean that some functions of frontline policing may, in the future, be shifted from police officers to other agencies. An example given was that somebody exceeding the speed limit could be automatically ticketed on the basis of evidence provided by their car rather than as a result of triggering a speed camera or a roadside speed trap operated by an officer. Such a shift would mean that some routine issues would no longer require police attention and would free up resource to concentrate on other issues. It was also noted that there are potentials, with sensor technologies, to automate some aspects of surveillance and investigation using technologies such as facial recognition. The ability to use voice-recognition to dictate statements and complete other workflows was also noted.

Image management was noted as an area where forces expect to see advances – ranging from facial recognition for security log-ins to devices through the use of the same technologies to track criminals and identify persons of interest. Such technologies will, however, need to develop further and there will also need to be investment in the technologies which support image management including image processing software drawing on mobile tools.

The development of drones is also seen as a potential area of development for mobile technologies in the future. Such tools could provide oversight into areas giving officers a view on smartphones of what the drone can see of a situation.

Users

There is some truth in the complaint that *"police officers are getting younger"* in the sense that younger people are entering the workforce and, as a result, those members of the workforce who grew up prior to the rise of technologies which are now commonplace are now becoming a minority. Both of the forces have identified that while it is not possible to say that older members of staff have less facility with technology, and have many shining examples of older members of their workforce who have embraced technology enthusiastically and effectively, they are seeing young staff coming into policing who have never known another way of doing business. They are issued with a smart phone during training in the same way that their predecessors were issued with paper notebooks. They are introduced to computerised workflows as a norm and already have high level of facility with mobile technologies when

they join the police. For these younger staff coming into the workforce digital is business-as-usual.

Both forces have, however, also noted that the pace of change, both in policing and in technology, means that as new technologies are introduced and as the affordances of these technologies provide possibilities which open up new ways of dealing with the demands on policing there will be, as there have always been, pressures for significant change. Such change processes are hard to predict in their particulars but what is regarded as certain is that the pace of change in policing, driven in part by technology, is unlikely to reduce. This will, in turn, place an organisational demand on the effective project management of mobile technology projects to deliver change in line with an overall level that is acceptable to an organisation. Such change will impact on users.

Organisation

It is recognised in both of the forces concerned that policing is not a static activity and that as society (and crime) changes and develops so does the nature of policing and role of officers – whether frontline or otherwise – in that process. It could be argued, for example, that the advent of driverless vehicles should both dramatically reduce the volume of traffic -related work for police officers and equally dramatically change the nature of that work. Accident investigation and forensic analysis of computer-based systems and sensors would become mainstream while traffic offences such as speeding or dangerous driving should become virtually extinct. There is, therefore, a clear recognition that technologies and workflows which have a place today may not do so in the future.

There is an expectation that this may become a more distributed environment with some functions of current policing (such as traffic tickets) being entirely automated, others (such as shoplifting) being increasingly outsourced to private providers and automated systems and some roles integrated with those in other agencies (such as the enforcement of parking regulations).

Forces are also aware that as the nature of society changes, and policing adapt to meet those demands whilst there is a willingness to adapt there is also a need for an effective awareness of what the changes will bring and the manner in which they will require forces to adapt in the future. The example was given in one of the forces of the design of police stations including areas dedicated to file-building, known as “writing rooms”. Whilst there is a need for officers to be able to use the systems which support this activity it may well be that their workplace of the future does not require the specific facility. Such future gazing is particularly difficult if it is primarily undertaken by older officers

(in senior positions) who are away from the routine and demands of frontline policing as it develops.

Linked with changes in society and the role of officers there is also the issue of the potential reworking of roles in policing. Some of this may be by incremental shift – adding digital skills and an expectation of mobile working using such technologies as the workforce embraces more millenials and Gen Z officers in the future. Other changes could be more far reaching with an evaluation of the existing command structures and supervisory mechanisms, for example, being enabled by the increased use of mobile tools

Environment for the organisation.

Both forces identified that with the rise of the Internet of Things and the increasing preference, particularly from younger members of society, for using social tools for communication, there will be a need to broaden the manner of communication with the police. Some of this communication (such as e-call) may be automated but much will not be. At the moment police forces are relatively ill-equipped to receive notification of incidents through social channels and, particularly, the more recent and less formalised social channels (such as WhatsApp). It was also noted that there is currently an expectation, and an assumption, that face-to-face contact is “better”. Whilst such face-to-face contact is inevitable and very much desirable in many cases it is also the case that for the people who live much of their lives online and through social tools online contact may be at least as acceptable and may in fact be preferable. Business processes and workflows may need to be adapted to this new reality whilst also recognising that a wholesale change may disadvantage the digitally excluded and those (primarily older) members of the population who do not have such access to, and facility with, common social and similar tools and may very well need, or prefer, face-to-face contact.

As already noted society changes and the nature of crime will do so too. There has already been a significant rise in the number of crimes with a ‘cyber’ element to them and as society and technology develop there will be further opportunities and drivers for change in the tools that are used to keep officers mobile, and the activities they have to undertake.