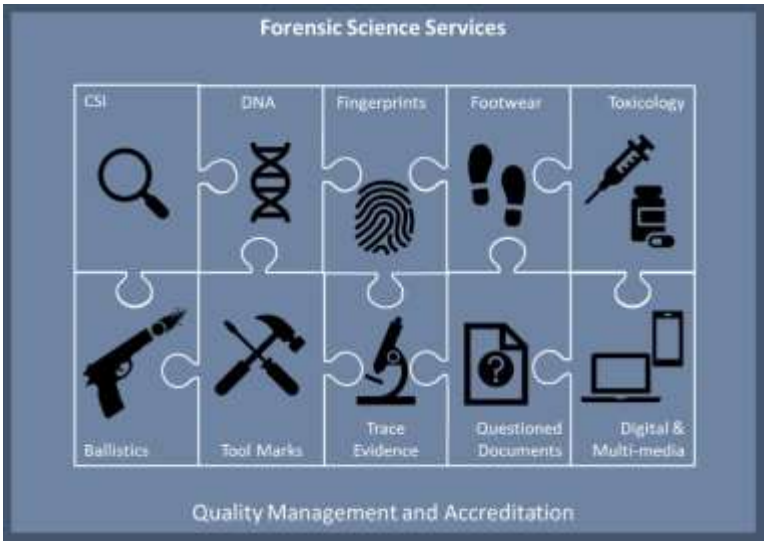
1. Appendix A – Forensics Background Brief

1.1 What is Forensic Science?

Forensic science, in the context of policing and the broader criminal justice system, is the application of science to criminal investigation and court proceedings. At its heart is the Locard Exchange Principle, which states that "every contact leaves a trace". It is this trace, which policing uses forensic science to try to recover and analyse in order to discover the identity of a person of interest, be this a victim, a missing person or, most commonly, the perpetrator of a crime.

Forensic science's span of influence is wide. Forensics plays a significant role right from the initial report of a crime and the initial scene investigation, through the analysis of the evidence collected and its role in guiding a criminal investigation, to its eventual presentation in a court of law. As illustrated in the figure below, forensic science covers a myriad of different specialisms including: crime scene investigation (CSI), DNA, serology[1], fingerprints, footwear, controlled substances, toxicology, ballistics, tool marks, trace evidence (glass, hair, paint, gunshot residue etc), questioned documents and digital and multi-media evidence (digital forensics).

Figure 1: An illustration of the scope of forensic science



[1] examination of blood serum

Forensic science usually also plays a greater individual role in bringing offenders to justice than any other type of evidence. Indeed, there are only three types of evidence admissible in a UK court of law: namely confession, eye witness and forensic evidence. Unsolicited confessions i.e. without other supporting evidence are very rare. Eye witness accounts are subject to significant levels of challenge and are often absent. Forensic evidence, on the other hand and owing to the standards surrounding it, is regarded as the most reliable. It is also the one type of evidence that will always be present at a crime scene in the absence of any human witnesses.

1.2 Digital Forensics

Digital Forensics is a branch of forensic science encompassing the recovery and investigation of material found in digital devices, often in relation to computer crime. It is an area of significant growth.

The increase in digital criminal activity is conservatively estimated at c. 29% year on year. Linked to this, Home Office analysis predicts a 116% increase in the number of digital devices requiring examination between 2015/16 and 2019/20, with the volume of data requiring analysis in each case growing as the processing power and data storage capabilities of devices expand.

The increasing availability of information and new technologies however offers policing huge potential to improve how it protects the public. It also sets new expectations about the services it provides, how they are accessed and levels of transparency. One of the key challenges facing forensics is therefore to ensure that the increasing abundance of digital evidence, from CCTV footage to emails to phone records, is accessible, readable and has long term integrity.

Equally important is the way policing enlists the help and support of the general public. Policing in the United Kingdom is underpinned by the principle of policing by consent and the link between communities and the police will continue to form the bedrock of everything it does. In the past, police forces have happily seized witnesses' phones and electronic devices to preserve vital evidence. People rely so much on their devices nowadays that seizure in such circumstances is no longer an option and, even if it were, it would soon erode public goodwill. Fortunately, technological advances offer us different opportunities e.g. digital kiosks, which allow appropriately trained police officers to download evidence captured by members of the public on their smartphones etc. in a matter of minutes, thereby avoiding a situation where the member of the public is unduly inconvenienced by being asked to surrender their device for longer than strictly necessary.

Similarly, there are new techniques available in digital intelligence and investigation, and we will be working closely with the Digital Intelligence and Investigation programme to maximise these opportunities.

1.3 Biometrics

Policing relies heavily upon biometrics, with fingerprint and DNA analysis being the most commonly used scientific processes in identification, investigation and intelligence. Capabilities and techniques are developing all the time, and this offers exciting opportunities to improve the way policing can prevent crime, protect and reassure communities, investigate crime and bring offenders to justice.

The Home Office Biometrics Programme (HOB), for example, is delivering a biometrics platform to replace the existing IDENT1 system, the Immigration and Asylum Biometrics System (IABS) & the National DNA Database (NDNAD) and provide a scalable platform for future biometric services, including facial recognition.

Not only will this bring together several currently disparate systems, thereby increasing the likelihood and ease of obtaining a complete intelligence picture, but it will also deliver a significant improvement in matching capability, thereby generating an instant increase in forensic intelligence and outcomes. The

development of facial recognition and the use of passport and driving licence information also offer huge opportunities.

NDNAD developments are similarly impressive. The UK NDNAD now holds the DNA profiles of a larger proportion of its population (c. 5.5 million individuals – 8% of the total population) than any other country. Furthermore, the DNA match rates from crime scene profiles in England and Wales in 2016 was 67.5% [2] and this figure is gradually rising year on year as the number of DNA profiles increases. Add to this the technique of familial DNA matches, where criminals, whose own profiles are not on the NDNAD can sometimes be identified from the DNA of a relative whose profile is on the NDNAD, and the power of DNA analysis is very clear. The technique can sometimes also be used for identifying missing persons in the scenario where a body part has been found but no DNA sample from the missing person is available. In these cases, it is sometimes possible to match against a set of relations. The UK has been the pioneer in the field of familial DNA since 2002.

Current developments include:

- improving the matching algorithms, which will allow more complex search scenarios;
- deriving intelligence from collections of searches e.g. searches for similar profiles made across different regions, which might for example be associated with a travelling serial rapist;
- generally making available to investigations a greater proportion of the information inherent in the NDNAD;
- Next Generation Sequencing (NGS), which represents a step-change for forensic DNA. The amount of genetic information obtained through the NGS process provides vast discriminating power and enables matching on a range of incomplete samples. It also provides a wealth of additional information that can be used to further an investigation, including complex kin issues or ancestral background.

With opportunities of course come challenges. Manufacturers believe NGS will become the dominant technology over the next decade, fuelled by the personalised medicines market. This will require forensic science and policing to adapt, as current techniques and the support for them gradually become obsolete.

Advances in fingerprint technology are equally exciting. We cover some of these advances in the “Rapid” Forensics section below. However, four are particularly worth highlighting here, namely:

- digital capture
- auto-encoding, matching and elimination
- 3D fingerprint capture
- a ground-breaking fingerprint profiling method using mass spectrometry.

The first two relate to the use of digital technology to photograph and then auto-encode a fingerprint image, which can then be matched against HOB databases. Studies have shown that auto-coding is both faster and more accurate than manual coding, offering a higher overall case match rate (80% compared to 60% if relying solely upon manual coding[3]). With the enhancement of HOB matching algorithms, this figure is expected to be able to rise further. In addition, within the UK currently only 30% of the latents submitted to a fingerprint bureau are of sufficient quality for search on IDENT1. The introduction of digital fingerprint capture in The Netherlands has enabled Dutch police to increase this figure to 85%[4] of submitted marks being of sufficient quality for an accurate search. Add to this the ability to eliminate the

[2] Annual Report 2016 – Commissioner for the Retention and Use of Biometric Material
[3] Metropolitan Police Service Study
[4] Based upon recent trials in the Netherlands

victim's prints by comparing latents on the digital device or indeed hold watch lists on the digital device to provide an instant check against likely offenders and we can quickly see the potential to transform the way we manage fingerprints.

The third relates to the ability to capture fingerprints in 3D. Earmarked for custody suites, 3D fingerprint capture would replace the current process of manually taking fingerprints using the Livescan machine, one finger at a time rolled across the plate.

The fourth illustrates just how far forensic science is evolving. Recent work between Sheffield Hallam University and West Yorkshire Police has proved the applicability of new mass spectrometry techniques for fingerprint analysis and its acceptance in a court of law. The ground-breaking fingerprint profiling method, developed at Sheffield Hallam, can provide an in-depth analysis of fingerprints at crime scenes. The technique uses a form of mass spectrometry to detect traces of various substances within a fingerprint. The pioneering technology has been on trial with West Yorkshire Police which saw it successfully implemented during an investigation into a case of harassment. The technology can test for traces of drugs, blood, hair and other molecules to provide a bigger picture of the criminal and assist the case. The sophisticated technology can also detect whether the suspect had handled a condom, what gender they are and what food they had eaten. The technology has also been used to detect blood in a 30-year-old print, meaning it has great applicability for cold case reviews.

Taking fingerprints and DNA together, and using the new matching algorithms being developed, we have estimated that we would be able to generate over 7,000 additional matches per annum, with minimal increase in operational costs.

1.4 Digitised and "Rapid" Forensic Processes

As well as enabling us to perform new forensic techniques, technology is letting us perform existing techniques much faster and, in some cases, without some of the hitherto geographical constraints. This affords us three huge benefits.

Firstly, it means we can act more swiftly. By being able to capture, transmit and match a forensic trace more quickly, we will be able to deliver usable forensic intelligence to the investigative lead much sooner, thereby improving the direction of the investigation during its initial "golden hours", providing actionable outcomes, securing evidence and potentially leading to the arrest of the perpetrator before they have a chance to offend again.

Secondly, it means we will be able to accelerate business processes, manage risk more effectively, revolutionise the criminal justice process and potentially eliminate significant amounts of administrative / manual input.

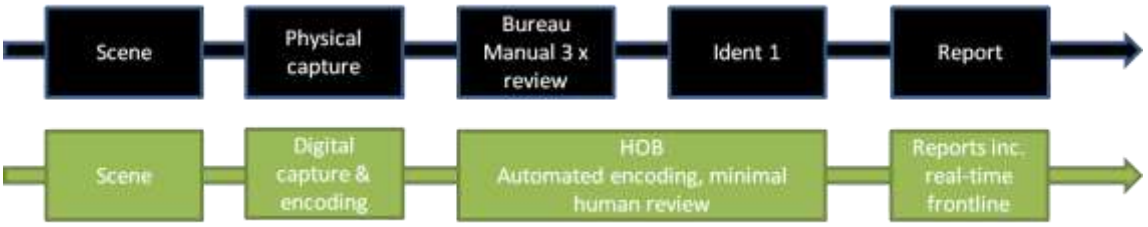
Thirdly, it means that we will be able to aggregate some of our more bureau-based activities and create the economies of scale needed to be able to operate on a 24/7 basis where required.

If we can achieve all three of these benefits in parallel, policing will be able to deliver enormous benefits to the public it serves, both in terms of improved outcomes and public confidence.

Some of these technologies exist now and are being trialled under the auspices of the TF Programme. In

fingerprints, for example, new digital technology, which is now being trialled in the Yorkshire and the Humber region, offers the opportunity to automate the clear majority of fingerprint submissions, thereby reducing time and logistics costs and simultaneously automating many of the interpretive steps undertaken in fingerprint bureaux. The technology also supports better 'weeding' of fingermarks at the scene, discounting those that originate from legitimate sources and thereby helping the Crime Scene Examiner / Investigator to prioritise capture and minimise nugatory database searches. The approach is illustrated below.

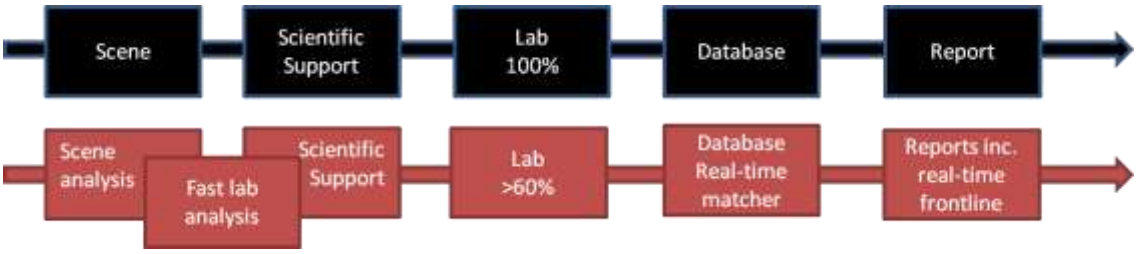
Figure 2: Fingerprints Process Transformation



Digitalising the whole process from capture to match promises to transform our fingerprint operations and enable outcomes to be achieved in as little as 20-25 minutes, compared to the current average of 1 ½ days, even allowing for checking by up to three fingerprint experts. It also promises to deliver significant reductions in workload for fingerprint bureaux, which translates to large potential cost savings. Recent estimates have placed this potential cost saving at up to £11 million[5] per annum.

The same principle applies to DNA analysis, as set out in the diagram below.

Figure 3: DNA Process Transformation



Over the last few years, technologies have emerged that can take the complex lab-based processes and condensing them into a desktop printer sized device. The potential exists for these rapid DNA devices to produce DNA results in a timeframe of 60 to 90 minutes, compared to the current 3-7 day average for laboratory testing. This is the case for both operational crime scene testing and DNA sampling from custody suites, where DNA could be routinely checked within bail limit times (in a manner similar to current Livescan fingerprint processes).

The technology is not yet fully proven but rapid DNA testing could in time assist a gradual transition to a hub and spoke model, potentially with three tiers: rapid devices deployed at the scene, local fast-labs and regional or central technical centres able to deliver the most complex laboratory work. As set out in chapter 4 and Appendix A of this document, this would align very well with the aspirations set out in Policing Vision 2025.

1.5 Quality Management and Accreditation Standards

Meeting accreditation standards is a significant challenge for police forensic capabilities and the deadlines for compliance are demanding: October 2017 for digital forensics, October 2018 for fingerprints and October 2020 for crime scene examination. In her 2016 Annual Report, the Forensic Science Regulator Dr Gillian Tully found that: "On a practical level, the quality management systems used in police forces were set up to deal initially with relatively small scopes of activity (DNA recovery and fingerprint enhancement). As the scope of activities requiring quality management increases, the quality management systems employed are reaching their capacity limits." Consequently, many police forces will currently struggle to meet these accreditation standards and deadlines.

And yet the need to meet these standards goes to the heart of legitimacy and policing by consent. It is imperative that quality standards are universally applied and continuously improved so that the science underlying all techniques is demonstrably well-founded, robust, and ultimately justifiable in a court of law.

In her publication "Codes of Practice and Conduct for forensic science providers and practitioners in the Criminal Justice System – Issue 3, February 2016", the Forensic Science Regulator states that: "When the provisions in the Codes are fully implemented by all forensic science providers and practitioners and are understood by all end users, the potential for a forensic science quality failure to cause a miscarriage of justice will be substantially reduced. This is of course why, despite the challenging financial environment, the requirement to comply is so crucially important".

1.6 "Niche" Capabilities

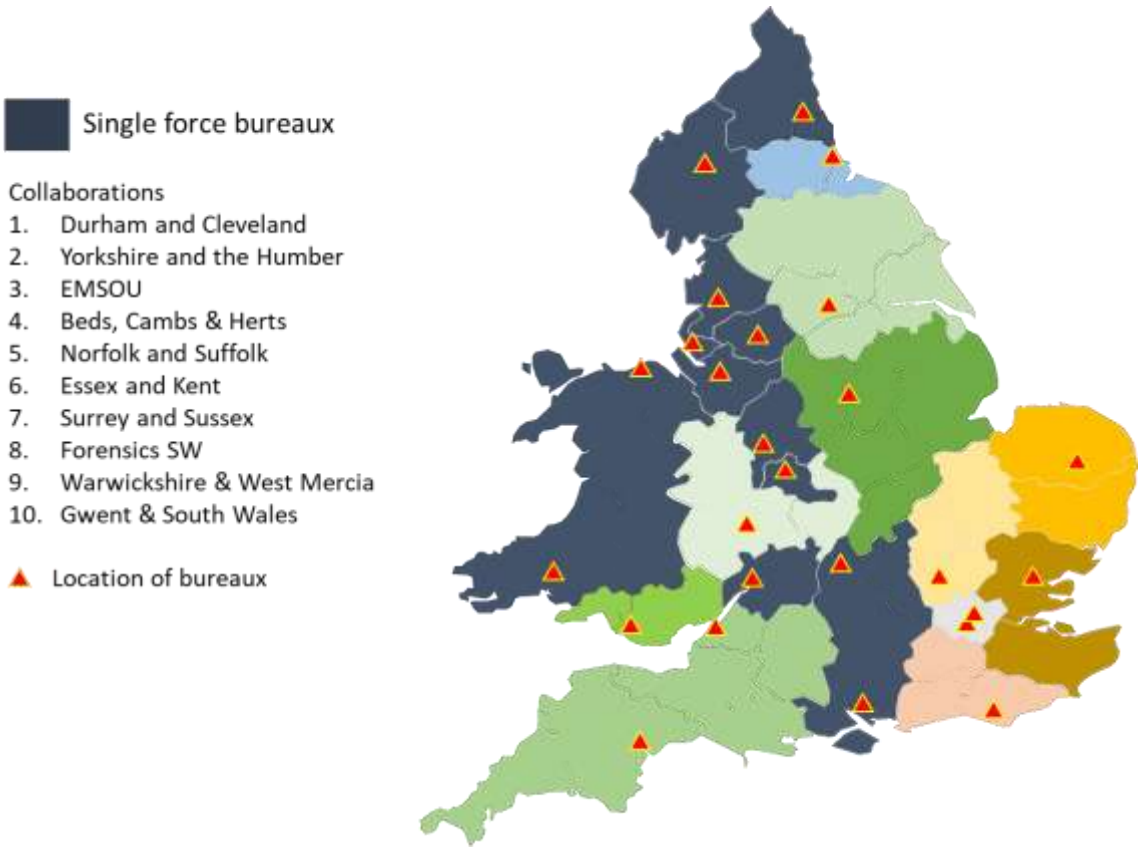
Finally, we also have the challenge of maintaining "niche" or less frequently used capabilities. Forensic science encompasses a broad spectrum of capabilities, ranging from fingerprints and DNA to toxicology, tool marks and fibre analysis.

Home Office analysis suggests that, between 2015-16 and 2019-20, the demand for traditional forensics, as opposed to digital forensics, is expected to reduce by approximately 16%. However, although volumes may be decreasing, the associated complexity is not. Indeed, whilst the overall level of traditional crime has until recently been declining, the number of violent and "high harm" crimes has been increasing. Some of these crimes need significant forensic input, including recourse to less frequently used forensic capabilities. One of policing's aspirations, as agreed at a recent strategy session, is to avoid the unintentional loss of any forensic intelligence. The challenge will be to ensure that these more niche, but still very valuable, forensic capabilities remain viable and are preserved as part of forensic centres of excellence.

1.7 The current landscape

Forensic services for policing are currently provided through a combination of in-house and outsourced arrangements. Fingerprint analysis, footwear analysis and hitherto a significant proportion of digital forensics are primarily provided in-house, either by police forces individually or in small groups of collaborating forces. Within the collaborations there are three larger regional groupings. These are shown on the following map.

Figure 4: Map of current fingerprint bureaux and collaborations



Areas such as DNA analysis, controlled substance analysis, toxicology, trace evidence and questioned documents are primarily provided by external suppliers, procured by different police force groups or consortia, and often using national frameworks such as the, now expired, National Forensics Framework Next Generation. In addition, there are several services / capabilities provided at a national level including the National Ballistics Intelligence Service (NABIS), IDENT1 (Fingerprints), the Immigration and Asylum Biometrics System (IABS) and the National DNA Database (NDNAD).

Police spending on forensic services is significant. In 2015/16, police forces in England, Wales and Northern Ireland, including British Transport Police and the *S23(1)*, spent approximately £363 million on forensic activity[5].

The estimates of overall spending are, however, uncertain. The Programme Business case therefore has focused on the costs of the services under consideration in Phase 1, mostly fingerprints, and sought to refine these. The most useful full and consistent data set is the information published by HMICFRS from the Police Objective Analysis (POA). This has the merit that the force by force data can be adjusted to suit the cohort under review.

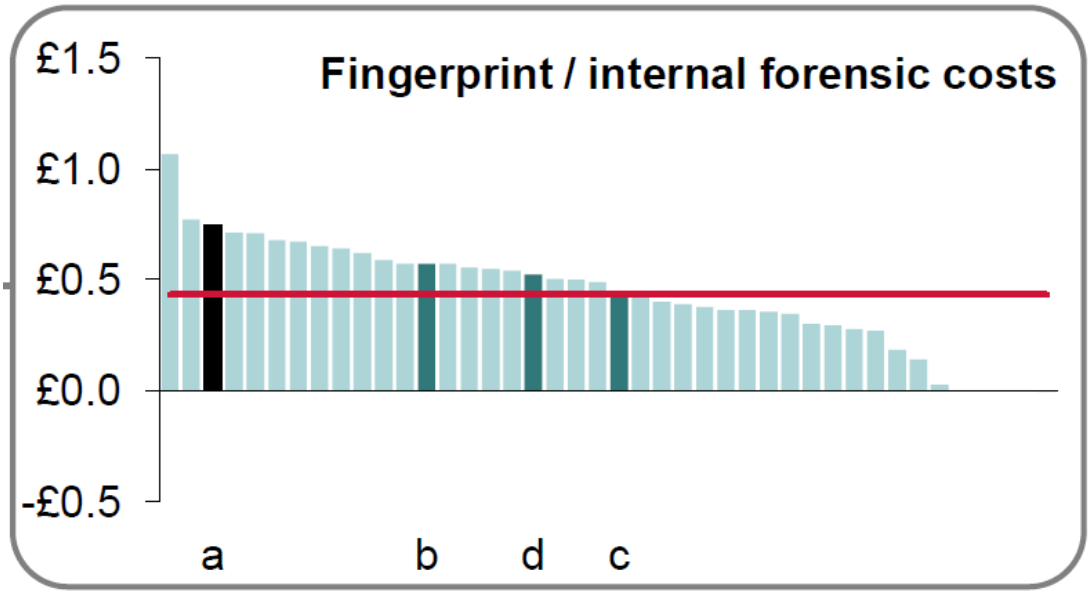
[5] Transforming Forensics Outline Business Case

1.8 HMICFRS data for E&W territorial forces

The HMICFRS collects data from forces to construct value for money (VFM) profiles. The underlying datasets are publicly available. These show that:

- Scientific services are mainly in Investigative Support, but some may be in areas such as Cyber Crime or may be hidden within specialist units such as CT
- There is considerable variation in the spending between forces. The HMICFRS shows expenditure per head of population in the police force area then highlights the force in question and the most similar forces. An example is shown in the figure below.

Figure 5: HMICFRS VFM profile extract



While the per capita comparison is an easy to understand starting point for the VFM profiles the analysis for the BC uses recorded crime. This moves closer to the work volume drivers for forensics and removes the wide variations that exist in recorded crimes per 1000 population.

There are six main components in the HMICFRS analysis, which is based on an "objective analysis" of police force spending (i.e. analysis by the purpose of the expenditure) collected by CIPFA. The FTEs set against these headings are presented in the table below.

Table 1: HMICFRS Investigative Support FTEs 2016

HMICFRS INVESTIGATIVE SUPPORT	E&W exc MPS
Scenes of Crime Officers	1,486
External Forensic Costs	0
Fingerprint / Internal Forensic Costs	572
Photographic Image Recovery	406
Other Forensic Services	1,227
Investigative Support Command Team and Support Overheads	95
Total	**3,786**

The HMICFRS data contains inconsistencies for example when forces collaborate the contributing force may omit the data entirely or double count the cost and the recharge.

The back-office functions of the forces are not recharged to the front-line services, so some costs of delivery are not included. In the case of forensics where the service costs are relatively small compared to the main police functions, it is not unrealistic to regard these as fixed costs – though efficiencies in forensics services will feed through in some way.

The HMICFRS data for CSIs and FP matches well with the data that TF has collected directly from the participating forces. This triangulation with data collected directly from the cohort enables gaps in returns from the cohort to be filled in by inferring the data.

1.9 Developments in police forensics

There are several local forensic science initiatives currently being trialled, which look as if they could offer policing significant benefits. These include:

- the use of digital cameras and appropriate software to capture, auto-encode and transmit fingerprint images for matching against both the IDENT1 national database and, in some cases, locally held watch lists to enable immediate matches or elimination of suspects or victims. Studies in the UK and the Netherlands, and recently fully evaluated trials in the UK, have demonstrated that the introduction of such technology offers significant improvements in quality match rates and speed (results potentially in 20-25 minutes compared to an average of 1 ½ days currently[6]);
- the use of on-scene DNA profiling, either at a crime scene or a custody suite, which, although limited by current technology, could potentially offer results in a timeframe of 60 to 90 minutes, compared to the current average of 3-7 days for laboratory testing;
- the deployment of "digital kiosks", which allow appropriately trained police officers to download evidence captured by members of the public on their smartphones etc. in a matter of minutes, thereby avoiding a situation where the member of the public is unduly inconvenienced by being asked to surrender their device for longer than strictly necessary;

[6] Based upon trials in the Yorkshire and the Humber policing region - 2017

- the development and application, to criminal justice evidence standards, of new mass spectrometry techniques to provide an in-depth analysis of trace substances left in fingerprints at crime scenes;
- the use of CCTV facial recognition capabilities at large events to identify potential criminality by matching attendees with police custody facial image records;
- the introduction of "forensic innovation centres" on university campuses, enabling police professionals, academics and students to work together in an operational police forensic research facility;
- the use of novel micro-computed tomography (CT) techniques to analyse knife or tool marks on tissue and even bone;
- the use of electricity (electrowetting) to detach aged or damaged fingerprints that are stuck to a surface, so that they can be visualised using reagents;
- the use of forensic techniques to detect fingerprints on metal surfaces subjected to extreme conditions such as improvised explosive devices (IEDs).

1.10 Crime trends

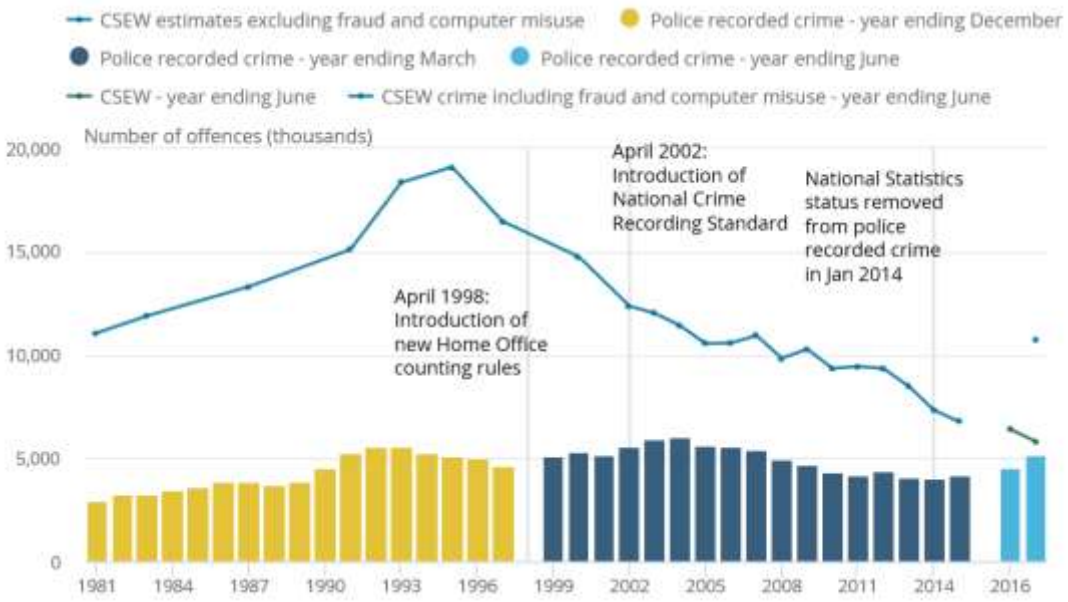
The most authoritative source of information on trends in crime is the Office for National Statistics. They produce regular bulletins on crime statistics using the Crime Survey for England and Wales (CSEW) and the crimes recorded by police forces.

1.10.1 Crime Survey for England and Wales

The ONS say "Official statistics cannot provide a measure of all crime, but the available sources can provide useful insights to long-term and emerging trends in crimes. The Crime Survey for England and Wales (CSEW) provides a good measure of long-term trends for a selected range of crimes experienced by the general public, including those not reported to the police and the latest figures show one in five adults, aged 16 and over, had fallen victim in the previous year.

The figure below shows crime estimated by the survey has fallen considerably from the peak levels seen in 1995, but crime dealt with by the police has begun to rise in recent years"

Figure 6: Crime in England and Wales, year ending December 1981 to year ending June 2017



Source: Office for National Statistics

Notes:

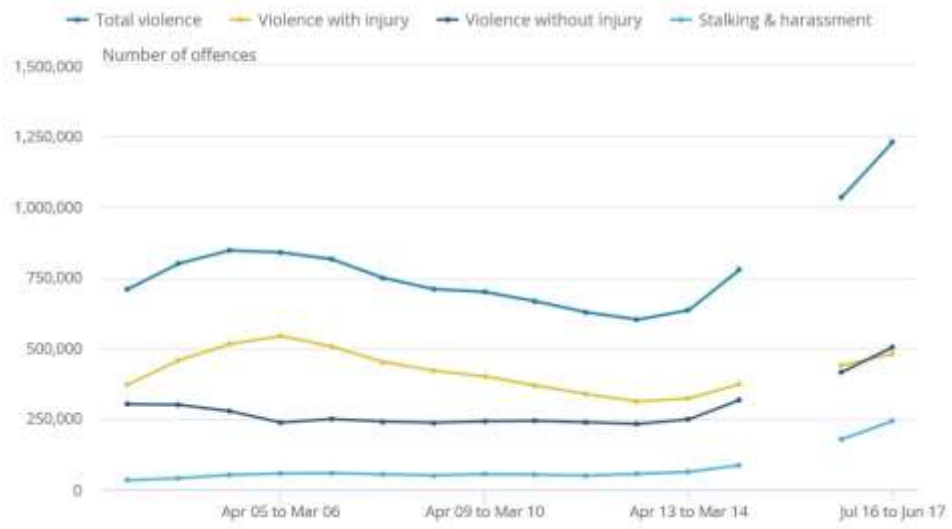
- Police recorded crime data are not designated as National Statistics.
- Crime Survey for England and Wales (CSEW) data on this chart refer to different time periods: a) 1981 to 1999 refer to crimes experienced in the calendar year (January to December) b) from year ending March 2002 onwards the estimates relate to crimes experienced in the 12 months before interview, based on interviews carried out in that financial year (April to March).
- From the year ending March 2012 onwards, police recorded crime data have included offences from additional sources of fraud data.
- CSEW data relate to adults aged 16 and over or to households.
- Some forces have revised their data and police recorded crime totals may not agree with those previously published.
- CSEW data on fraud and computer misuse are published as Experimental Statistics, which are in the testing phase and not yet fully developed. They are published to involve users and stakeholders in their development, and as a means to build in quality at an early stage.
- New victimisation questions on fraud and computer misuse were incorporated into the CSEW from October 2015. The questions are currently asked of half the survey sample to test for detrimental effects on the survey as a whole and help ensure that the historical time series is protected.

"Including new Experimental Statistics on fraud and computer misuse offences, the CSEW estimated 10.8 million incidents of crime in the latest survey year, but first annual comparisons will not be available until January 2018.

The police recorded 5.2 million offences in the latest year; this series can provide a better indication of emerging trends but can also reflect changes in recording practices and police activity rather than genuine changes in crime."

The figure below shows that the volume of violent crime being dealt with by the police has increased over the last few years

Figure 7: Recorded Crime England and Wales, year ending March 2003 to year ending June 2017



Source: Police recorded crime, Home Office

Notes: recorded crime data are not designated as National Statistics.

The ONS comments:

- The 13% increase in police recorded crime from the previous year reflects a range of factors including continuing improvements to crime recording and genuine increases in some crime categories, especially in those that are well-recorded.
- The new presentation of official statistics on violent crime highlights there were 711 deaths or serious injuries caused by illegal driving, a 6% rise from that recorded in the previous year.
- A number of sources showed a rise in bank and credit card fraud in the last year; UK Finance reported a 3% rise in the volume of fraudulent transactions reported on UK-issued cards.

The latest CSEW estimate is 5.8 million incidents of crime in the year ending June 2017, a 9% reduction compared with the previous year. However, these headline estimates do not yet include fraud and computer misuse offences as these have not been included in the survey for the full two years needed to make annual comparisons. Including fraud and computer misuse, there were an estimated 10.8 million incidents of crime in the year ending June 2017.

The main strength of the CSEW is that it provides a good measure of long-term trends for a selected range of crimes, including those not reported to the police. However, it is less able to provide a good indication of changes in low volume crimes or emerging trends. This is in part due to the time lag arising from the 12-month recall period, the fact that CSEW sample sizes for individual crime types are relatively small and the natural variability in estimates arising from any sample survey.

The police recorded crime series covers a wider range of offences than the CSEW but is restricted to those crimes that have been reported to and recorded by the police. From the 1980s until the late 1990s, trends in police recorded crime broadly followed those shown by the CSEW, but changes to recording rules and processes resulted in rises between 1998 and 2004 that did not reflect changes in crime as estimated by the CSEW. The two sources then both showed a downward trend until the early 2010s, when a renewed focus on improving crime recording resulted in further increases in the police series each year. The size of year-on-year increases has grown, with police recorded crime increasing by 5% in the year ending June 2015, by 7% in the year ending June 2016, and by 13% in the latest year.

This increase reflects a range of factors which vary for different individual crime types and which is explained in the other sections of the ONS bulletin. The factors can include continuing improvements to recording processes and practices, more victims reporting crime, or genuine increases in crime.

1.11 Forensic Supply Chain

This section is brought forward from the OBC and can be found at Appendix G: Commercial Case Appendices – Extract from OBC.

1.12 Trends in the digital world

According to the ONS[7], in Quarter 1 of 2017, 89% of adults in the UK had recently used the internet, up 22% from 2007[8], in which 67% of adults had recently used the internet. Within the youngest age groups

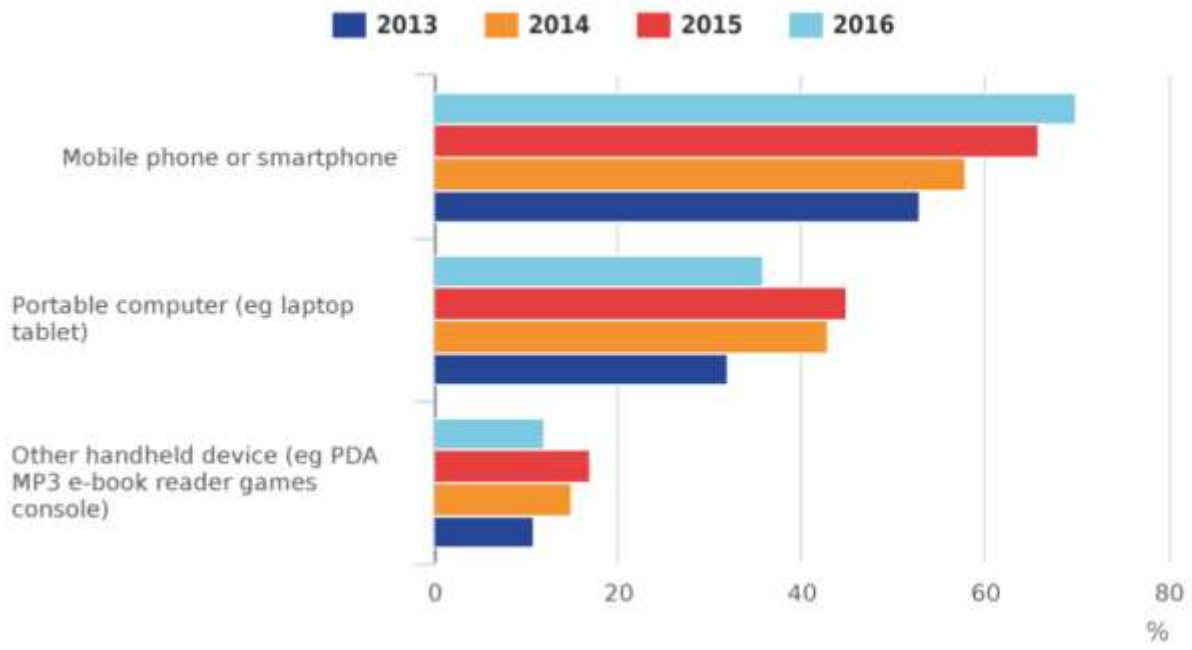
[7] ONS: Internet Usage: 2017 (https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2017)

[8] ONS: Internet Access 2007 (http://webarchive.nationalarchives.gov.uk/20080610225135/http://www.statistics.gov.uk/pdfdir/inta0807.pdf)

(16 to 24 and 25 to 34), that number had gone up from 70% in 2007 to 99% in 2017. In 2017, 90% of households in Great Britain had iwnternet access, an increase from 89% in 2016 and 57% in 2006.

The ONS Internet Usage – Households and Individuals 2017[9] report states that in terms of how users are accessing the internet, 73% of adults accessed "on the go" using a mobile phone or smartphone, more than double the 2011 rate of 36%.

Figure 8: Internet use 'on the go' by device, 2013 to 2016, Great Britain



Source: Office for National Statistics

Notes:

- *Base: Adults aged 16+ in Great Britain*
- *"On the go" refers to accessing the internet away from home or work.*

The ONS has only recently began reporting on the usage of services to store data on the internet (cloud computing), but from 2015 to 2017, the usage overall has increased from 39% to 42%.

According to the Ofcom 2017 Communications report[10], smartphone uptake has increased from 39% in 2013 to 76% in 2017. In addition to smart phones, investment research firm Consumer Intelligence Research Partners (CIRP) has estimated that there are now 8.2 million US homes with Amazon Echo/Alexa devices. Independently, Kantar Worldpanel has found that 2.7m households are currently actively using an Amazon Echo or a Google Home device. Both reports put usage at about 8% of total households. Kantar Worldpanel also found that 22.2% of UK consumers are already using a Virtual Assistant (such as Siri) on

[9] ONS: Internet Usage Households and individuals – 2017 (https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2017)

[10] https://www.ofcom.org.uk/research-and-data/multi-sector-research/cmr/cmr-2017

their smartphones (data from September 2017). Siri was released as part of iOS 5 in 2011 on the iPhone, along with iCloud usage.

The Competition and Markets Authority [11]published a report on cloud storage in May 2016 that estimated cloud storage to be increasing by 20% each year. As part of the review, they estimate that 3 out of 10 adults used cloud based storage in 2016, and of this usage, 80% was free. The report also quotes industry representative techUK27, stating that 2.5 billion GB of data is being created in real time each day across multiple devices including smart watches, mobile phones, tablet, laptops and PCs.

The International Data Corporation[12] have found that number of people connected worldwide grew fivefold between 2005 and 2015. The IDC Data Age 2025 report predicted that by 2025 an average connected person will interact with connected devices nearly 4,800 times per day and that nearly a quarter of data will be real-time in nature. This significant increase will be driven by the increased availability and usage of data enabled appliances, vehicles, wearables, homes, and workplaces

An example of this increase is the wearables market that integrate key technologies into intelligent systems i.e. smartwatches and fitness trackers – a Research and Marketing report[13] stated that shipments of connected wearables reached 72.5 million in 2015, up from 25.3 million devices in the previous year. At this rate, the market is forecasted to reach 228.3 million units in 2020.Another significant contributor to future connection will be the imminent introduction of 5G networks, which will deliver 1,000 to 5,000 times more capacity than 3G and 4G networks today and will be made up of cells that support peak rates of between 10 and 100 Gbps. Research on the Internet of Things[14] estimates that it will connect 30 billion devices.

The Crime Survey for England and Wales conducted a study published by the *S23(1)*[15] that found in 2015 there were 2.46 million cyber incidents and 2.11 million victims of cybercrime in the UK, with the top categories being computer virus related and unauthorised access to personal information.
Due to the changes in reporting and the creation of new agencies to combat cybercrime, the ONS have noted in their 2017 report[16] that it is inherently difficult to compare levels of recorded fraud over the longer-term, but did note a 4% increase in the year ending June 2017.

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[11] CMA: Compliance review of Cloud Storage – 2016

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/526447/cloud-storage-findings-report.pdf

[12] IDC – Data Age 2025

https://www.seagate.com/files/www-content/our-story/trends/files/Seagate-WP-DataAge2025-March-2017.pdf [13]

Research and Marketing – Connected Wearables

https://www.researchandmarkets.com/reports/4392723/connected-wearables-3rd-edition

[14] Internet of Things Cognitive Transformation

https://www.researchgate.net/profile/Markus_Eisenhauer/publication/318348856_3_Internet_of_Things_Cognitive_Transformation_Technology_Research_Trends_and_Applications/links/5964f624458515183cfab2b0/3-Internet-of-Things-Cognitive-Transformation-Technology-Research-Trends-and-Applications.pdf

[15] *S23(1)*– Cyber Crime Assessment

http://www.nationalcrimeagency.gov.uk/publications/709-cyber-crime-assessment-2016/file

[16] ONS – Crime in England and Wales

https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/crimeinenglandandwales/june2017#overview-of-crime

1.13 Ethical issues in forensic science

As noted in the report on Forensic Science Strategy[17] published by the House of Commons Science and Technology Committee, "Quality standards in forensic science are integral to the criminal justice system (CJS): without them, there may be a greater risk that those guilty of crime may escape justice or that innocent people could be convicted."

The Home Office Forensic Science Strategy[18] (2016) also notes quality management as a potential source of ethical debate and set a goal of assuring the public of the legitimacy of the techniques and methodology used. While there have been debates internationally about the use of forensic evidence in court cases, the report commits to further research to validate forensics, utilising the NDNAD Ethics Group (an advisory public body) to promote independent advice. The report also notes the advances already made in genetics and phenotypic profiling in the medical/food sectors and the contribution these could make to forensics. However, this would require "significant ethical scrutiny and a statutory framework to gain public acceptance."

Chris Hughes, Chair of the National Database Ethics Group identified four key themes in his case study[19].

- The first is that forensic efforts to reduce crime include psychological/behavioural models applied as a nudge towards pro-social behaviour, prompting criticisms from proponents of a minimal state.
- The second is the idea of adequately communicating complex forensic evidence to judges/juries to ensure fair and accurate trials.
- The third dimension is that of an individual's right to privacy, which forensic science threatens to violate in the quest to protect society at large by identifying individuals who have committed crimes.
- The fourth ethical discussion centres around the large-scale collection and storage of individual information, such as fingerprint banks and CCTV recordings. As Chris Hughes discusses, all of these ethical debates must be undertaken to assure the legitimacy and acceptability of forensic science.

Mark Littlewood, co-ordinator of the Forensic Science Special Interest Group and Gillian Tully, Forensic Science Regulator also note the importance of discussing ethics within forensic science development[20]. New DNA techniques will allow researchers to determine physical characteristics and also biomarkers of suspects. They also recommend utilising systems for ethical management of data already employed in other areas such as clinical services. They also discuss the responsibility of forensics teams to conduct validation studies with adequate documentation to disclose in the case of challenges during court, as failure to do so could result in cases getting thrown out and also create doubt about the accuracy of forensic science.

There have been efforts to regulate the retention of biometrics in the UK while keeping them proportionate, as discussed by Paul Wiles, Commissioner for the Retention and Use of Biometric Material[21]. The Protection of Freedoms Act in 2012 changed the prior legislation so that biometrics cans now only be kept indefinitely for convicted criminals, but for non-serious offenders and young people there are shorter retention periods. The police can apply to retain biometrics of individuals arrested (but not charged) of serious offences for up to three years.

[17] House of Commons, Science and Technology; Forensic Science Strategy 2016-17; page 20
[18] Home Office; Forensic Science Strategy Report 2016; page 14- 22
[19] Hughes, Chris; Ethics in Forensic Science; page 100
[20] Littlewood, Mark and Tully, Gillian; Accessing Forensic as a New Market; page 191
[21] Wiles, Paul; Annual Report: Commissioner for the Retention and Use of Biometric Material; page 2

Another ethical debate is around bias in forensics, as discussed in the Forensic Science strategy[22]. Dr Tully has noticed "a major risk around unconscious bias" arising from decisions about what evidence is collected at the crime scene and what forensic tests are commissioned. There are mitigating actions in place such as limiting who has access to what information and blind verification. The Strategy also notes that setting standards and accreditation efforts will also help alleviate cognitive bias.

[22]House of Commons, Science and Technology; Forensic Science Strategy 2016-17; page 21

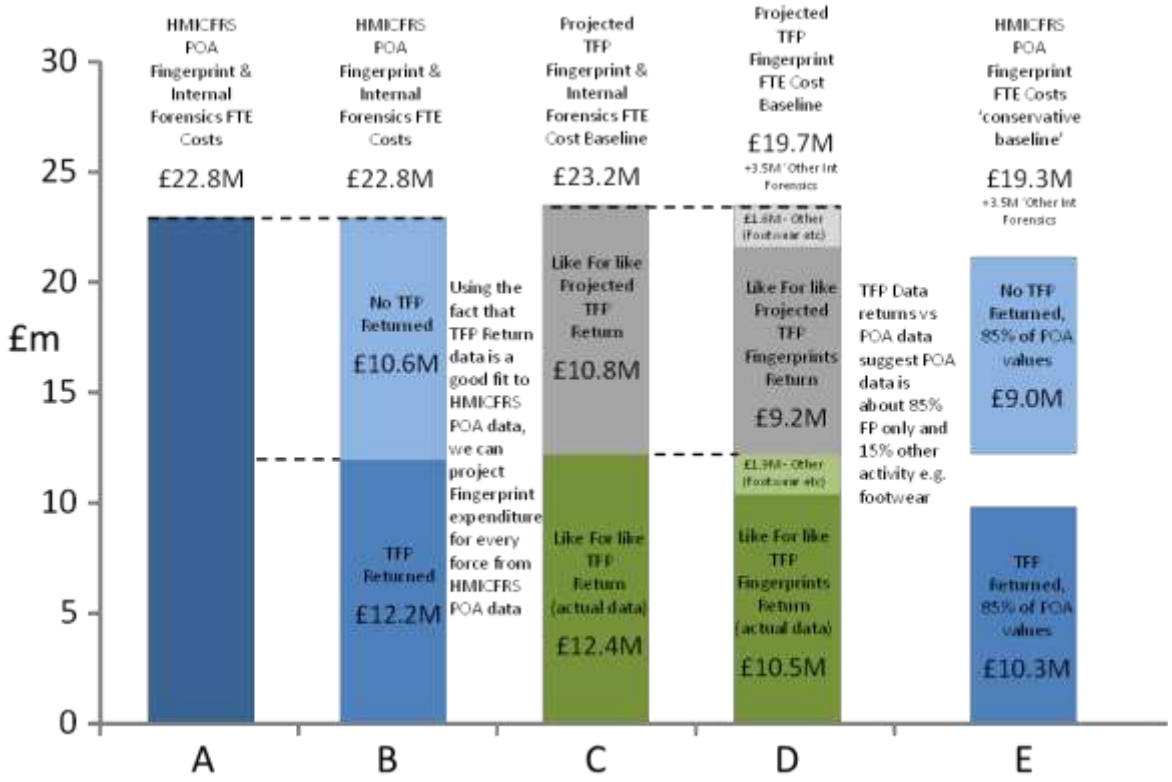
2. Appendix B – Establishing the Baseline

Data for the costs of forensics in forces is at best patchy. Two sources were used in the assessment: the data published by HMICFRS – the Police Objective Analysis prepared by CIPFA; and the data specifically collected by the TF Transition Team. The baseline for the BC uses the HMICFRS POA data as this is a full and consistent data set and matches the recorded crime data. The TF survey data has been used to extrapolate from the HMICFRS data e.g. making the adjustment for non-fingerprint tasks that are included in the HMICFRS information for "fingerprints/internal forensics".

The HMICFRS data is available for all forces, but there are gaps (e.g. the treatment of digital forensics and bought in services) and errors (e.g. inconsistent presentation of the costs of aggregated forces). The locally collected data was more detailed, but not always consistent, and was only available in full for some of the forces. The two sources were therefore combined, which gave some assurance that the numbers were more complete and consistent.

The baseline for the estimates can be explained by the figure below.

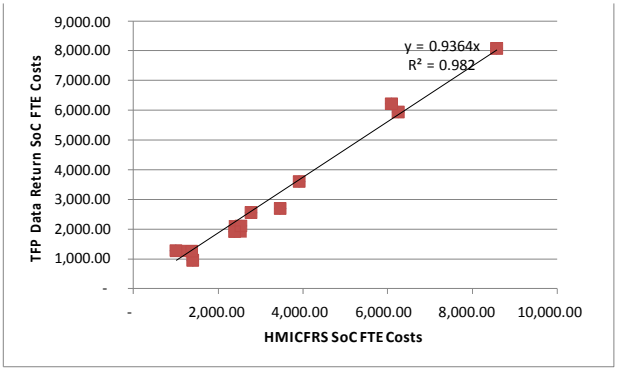
Figure 9: Baselining FP Bureaux Costs

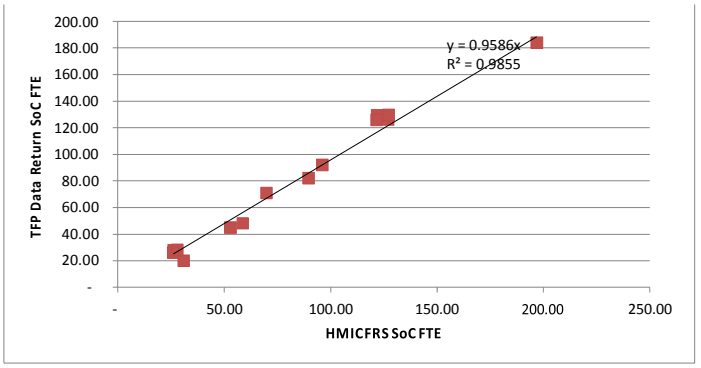


In Figure 48, column A represents the 2016/17 costs of 'Fingerprints and Internal Forensics' FTEs as collected by HMICFRS in the Police Objective Analysis, a cohort total of £22.8m. The forces for which comparable data were available represented £12.2m of the cohort total, see column B. These forces showed equivalent expenditure of £12.4m in the returns collected by the programme, see column C. This may be timing differences or differences in definition. If the cohort forces for which there was no return are scaled up in the same ratio, their value would be £10.8m, see column C. The returns showed that about 15% of the total of 'Fingerprints and Internal Forensics' was on other services, such as footwear, see column D. Making the same adjustment for the forces for which there were returns and for those where there were not, then the baseline cost of FTEs in fingerprint bureaux is about £19.3m a year and there are about £3.5m of other internal forensics costs.

A similar process was undertaken for CSIs (shown as SOCOs in the HMICFRS data). There is a close correlation between the HMICFRS data and the TF collected data in terms of both FTEs and costs as shown in Figure 49.

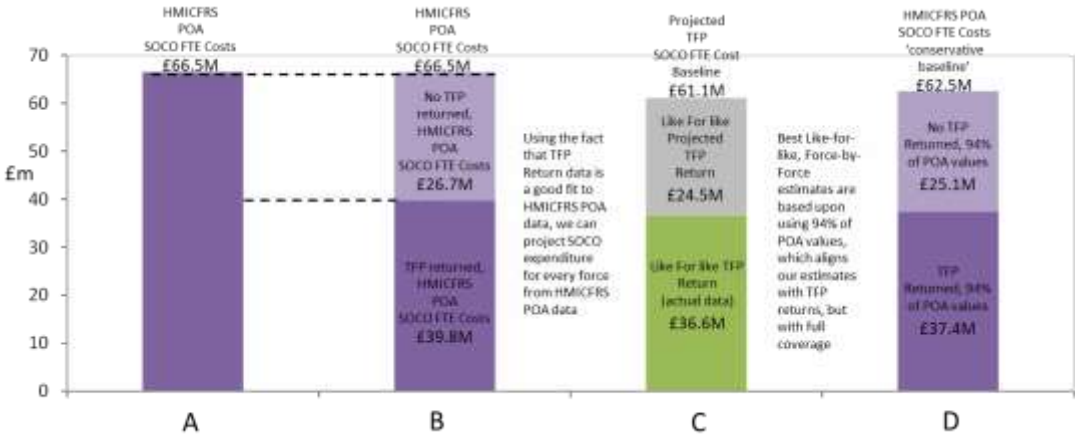
Figure 10: Cohort HMICFRS SOCO costs and TF CSI costs





The equivalent analysis for the baseline for CSI/SOCO is set out in Figure 50 below.

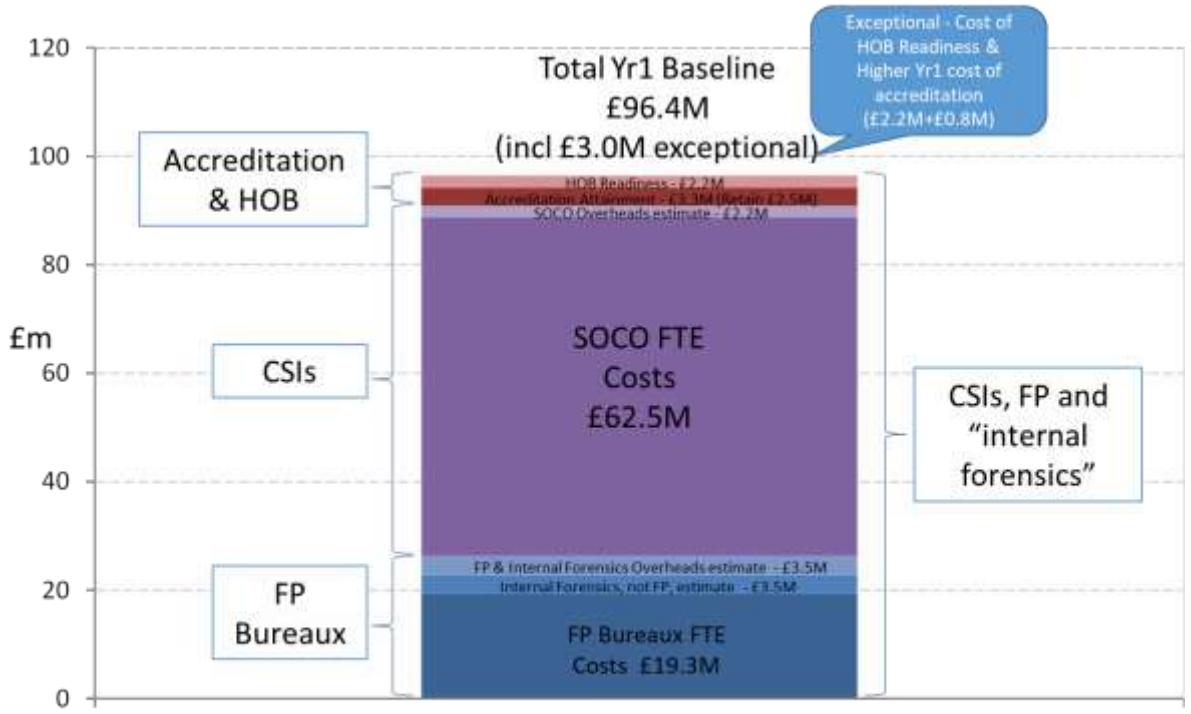
Figure 11: CSI (SOCO) Baseline



Column A shows the HMICFRS baseline for SOCOs in the cohort, £66.5m. Column B shows that cohort returns amounted to £39.8m of that total. The like for like return in column shows a value of £36.6m. Applying this ratio to the 'missing' forces gives a revised cohort baseline of £62.5m.

Putting this information together provided a total baseline for the cohort of about £96m a year, when overheads and estimates of accreditation costs are included. This is summarised in the figure below.

Figure 12: Fingerprints Baseline



The baseline we have used is shown in Table 24 below.

Table 2: TF Phase 1 baseline

	5-Year Total	2018/19	2019/20	2020/21	2021/22	2022/23
Baseline Costs						
Fingerprint bureau FTE Cost Baseline	**101,447**	19,494	19,884	20,281	20,687	21,101
Fingerprint bureau Overheads baseline	**18,214**	3,500	3,570	3,641	3,714	3,789
Other Internal Forensics Baseline	**15,416**	2,962	3,022	3,082	3,144	3,207
CSI FTE Cost Baseline	**349,574**	67,174	68,517	69,887	71,285	72,711
Labs FTE Cost Baseline	**334,452**	64,268	65,553	66,864	68,202	69,566
Total Budget Baseline	**819,104**	**157,398**	**160,546**	**163,757**	**167,032**	**170,372**
Unfunded Risks						
Projected Accreditation Attainment UKAS Fees Unfunded Risk	**578**	578	-	-	-	-
Projected Accreditation Attainment Internal Resource Unfunded Risk	**2,420**	2,420	-	-	-	-
Projected Accreditation Retention UKAS Fees Unfunded Risk	**865**	-	210	214	218	223
Projected Accreditation Retention Internal Resource Unfunded Risk	**5,255**	-	1,275	1,301	1,327	1,353
Projected HOB Readiness Unfunded Risk	-	-	-	-	-	-
Total Unfunded Risks	**9,118**	**2,998**	**1,485**	**1,514**	**1,545**	**1,576**
Total In-scope Costs	**828,221**	**160,396**	**162,030**	**165,271**	**168,576**	**171,948**

There is not yet an agreed boundary between HOB and TF, so this area has been left as no cost at present.

We have added the estimated unfunded risk for standards and accreditation based on the Home Office Impact Assessment, direct data from forces and information from the UKAS website.

3. Appendix C – Strategic Alignment

Section 5.3 of this document provides details of how the Transforming Forensics Programme is aligned to and supports both Policing Vision 2025 and the Government's Forensic Science Strategy. It is organised using the theme headings agreed for Transforming Forensics, as determined in consultation with supporting organisations, namely:

- Creating a shared vision and buy-in from policing;
- Creating a sustainable national capability;
- Developing and inspiring people;
- Long-term sustainability.

Each of the theme headings above, together with the supporting detail, is then referenced back to the main strands of Policing Vision 2025.

This Appendix provides similar information but is grouped in line with the main strands set out within Policing Vision 2025.

The link between communities and the police will continue to be the bedrock of British policing

The Transforming Forensics Programme has been built upon the premise of policing by consent and recognises the need to embed legitimacy, trust and confidence, underpinned by the Code of Ethics, in all it does. The programme therefore places significant emphasis both upon making it easy for members of the public to help the police and delivering outcomes that instil confidence. Examples of how the Programme will achieve this include:

- investing in technology enabling local Crime Scene Investigators (CSIs) and front-line police operatives to be tasked more efficiently, thereby delivering better outcomes to victims of crime;
- improved accreditation and quality management services, ensuring policing can meet the ISO accreditation timetable outlined by the Forensic Science Regulator and providing centralised technical support where this is not possible. In addition, the accreditation process will be put under the spotlight and transformed where necessary, ensuring the process is made simpler and easier for forces to work with, combined with a significant reduction in the overall time to complete.

The British policing model, with its tangible link between citizens and police through local policing, combined with specialist services that operate at regional, national and even international level, is envied all over the world. TF's design will maintain this valuable policing relationship.

Local policing will be tailored to society's complex and diverse needs

Transforming Forensics will provide a platform for services that centre around victims. This will support the principles of improving safeguarding and reducing victimisation, and will produce an improved victim support service. Similarly, it will design services that facilitate earlier intervention which will enable more effective investigations, prevent crime and protect communities.

Specialist capabilities will be better prepared to respond to existing and emerging crime types. Decisions on how capabilities are positioned, structured and deployed will take into account the need to rapidly protect communities and the vulnerable, as well as provide value for money.

Transforming Forensics is developing a more standardised forensics delivery model to deliver forensic services in a consistent manner, enhancing interoperability, demand management and resilience across policing. We are working with police forces and PCCs to agree how specialist services should be organised and where they should be located. The work is building upon the excellent foundations put in place by several collaborative initiatives across the country and will be designed to ensure that local services e.g. crime scene examination / investigation remain closest to the point of demand whilst more bureau-based services are organised around resilience, availability (24/7 where required), interoperability and efficiency. This approach to specialist and support functions will rationalise the number of locations required to support the provision of an effective police service, allow capabilities common to different policing activities to be deployed flexibly, and ensure availability to all forces. Organisational design is a key part of the TF programme.

A good example of this is the approach we are taking to enhance biometrics capability, networking existing fingerprint bureaux and sharing services and capabilities between forces. This new configuration, which is illustrated in Figure 3 (Chapter 6) not only builds on the experience and successes in regional forensic capabilities; it also enables easier and smoother introduction of new technology, notably the Home Office Biometrics (HOB) system that will deliver new, enhanced fingerprint services. This will help deliver more operational outcomes whilst simultaneously reducing costs and introducing more rapid and digitally-enabled forensics, enabling, for example, victims' biometrics to be eliminated at the scene and for suspected perpetrators to be arrested earlier before they have the opportunity to re-offend.

Similarly, the TF Programme will take a proactive role in driving requirements and running proof of concept trials to inform future policing. An example of this is our DNA stage 3 proposal, whereby Transforming Forensics will run a proof of concept for a next generation DNA database. This will help inform requirements and validate benefits for the Stage 3 DNA database development work due to be delivered by HOB.

The police service will attract and retain a workforce of confident professionals.

Transforming Forensics will develop services that ensure that appropriate skills are available to meet local and national needs. Through its "Quality Management and Accreditation" strand, it will help forces and their new aggregated capabilities to meet the Forensic Services Regulator's accreditation standards. It will also champion appropriate revisions to the accreditation process, which will reduce lead times for innovation and change, thereby driving improvements in both quality and service.

Moreover, the TF Programme is seeking to help policing invest in its people, harnessing their skills, energy and commitment by:

- creating a development programme, aligned to the core values of UK policing, that inspires and nurtures current and future staff;
- establishing an accredited organisational learning, training and competency framework, so that all police forensic personnel are within a Professional Services and Codes of Practice Framework by 2020;

- embedding a culture of continuous improvement;
- creating a "People Forum" to promote regular, frequent, two-way dialogue between the programme and practitioners / frontline operational staff;
- supporting scientific support units and their forensic practitioners in achieving the skills balance required between traditional and digital forensics.

Digital policing will make it easier for the public to make contact with the police, enabling us to make better use of digital intelligence and evidence.

Transforming Forensics is working closely with the Digital Policing programmes to ensure that TF designs and capabilities dovetail with those of these other key national programmes. One of TF's key objectives is to integrate forensic services within the wider Digital Policing portfolio, ensuring forensic services are an integrated component.

Policing will be agile and outward focused. Police forces and their partners will work together in a consistent manner to enable joined up business delivery.

Transforming Forensics is targeting positive impact across the whole criminal justice system, focused on delivery across the entire supply chain, from crime scene to court. Recognising this, we have set up programme governance arrangements which involve key stakeholders across Law Enforcement, British Transport Police, the*S23(1)*, the Crown Prosecution Service, the Forensic Science Regulator, Her Majesty's Revenue and Customs, the Department for Work and Pensions, and HM Courts and Tribunals Service. In addition, TF is seeking contributions from the Home Office and Academia. The Home Office Forensic Steering Group and the Science and Justice Forum are also expected to play a role in programme governance.

TF has also already engaged and initiated dialogue with several private sector forensic service providers. We consider these to be a key group of stakeholders and TF will be working closely with them throughout the programme's life.

Clear accountability arrangements that recognise the roles of different policing bodies, coherence in the oversight of the police reform programme and PCCs continuing to be at the heart of engaging communities.

This area is covered in significant detail in the Management Case. The programme has gained support from 44 forces / organisations and their respective governance bodies. All have opted in to the programme, agreeing to collaborate in the development of the detailed business cases and the subsequent delivery of forensic science service reform.

TF is also closely aligned with several other significant transformation programmes, including the Home Office Biometrics (HOB) Programme, the Emergency Services Mobile Communications Programme (ESMCP), the National Law Enforcement Data Services (NLEDS) Programme, the Digital Policing Programmes and the National Ballistics Intelligence Service (NABIS).

Examples of this, in practice, include the recent alignment between the NABIS & Transforming Forensics programmes to ensure services are aligned and avoid any duplication or divergent programme activities, and the DNA Stage 3 database proof of concept, described in the "Specialist Capabilities" section above, which is an example of programme collaboration, building understanding and cooperation across the portfolio of law enforcement transformation.

4. Appendix D – Assumptions

This appendix includes the more generic assumptions behind the Programme Business Case. Detailed assumptions that are part of the assessment are in Section 7.5.

4.1 Wider assumptions

4.1.1 Political

- There will be no reorganisation of police services in England & Wales, neither functionally (e.g. national forensics service) nor as regional bodies.
- There are no proposals to change the role of PCCs.
- PSNI retains the same constitution
- Police Scotland remains outside the programme and Home Office funding
- Other British police forces e.g. BTP and police forces in Crown dependencies retain the same legal basis
- There is continued support at the national level for increased emergency services collaboration (e.g. JESIP) using existing powers, but no specific legislation requiring collaboration.
- Brexit proceeds but does not create any relevant political change.

4.1.2 Economic

- The 2015 Spending Review protects police funding until 2019-20, as long as each police force maximises precept (the local authority contribution to police funding).
- The downward pressure on public spending will be maintained across the period of the TF Programme.
- The economy continues in line with the forecasts of the OBR.
- The public sector pay cap will be lifted, but forces will still have to keep within the 2015 SR totals
- The relative costs of people and technology do not change materially over the review period
-

4.1.3 Social/demographic

- The demographic trends of an increasing proportion of older people will continue, but all parts of the population are increasingly connected and reliant on digital technology.
- Trends in crime will continue so that areas of traditional crime will tend to remain steady or fall, but there will be more complex issues such as children's safeguarding, cyber-crime and cyber-enabled

crime, and terrorism. The emphasis in policing will continue to shift towards prevention and multi-agency working.

- The culture and traditions of the police force will continue to evolve but the various cultures, real and perceived, will persist.

4.1.4 Technological

- The technology trends continue to develop rapidly to e.g. enable mobile working as the norm, artificial intelligence to support focussed preventative work, and widespread use of sensors generating large quantities of data.
- At the force level, systems implementation and integration will become simpler as more ICT is bought as a service
- On-line learning and development continues to develop and becomes the norm for non-physical and non-social training.
- Genomic science, information technology, machine intelligence, the internet of things and quantum technologies will coalesce to power major advances in analytical power.

4.1.5 Legal

- The admissibility of forensic evidence in UK courts will not change
- The format of evidence (e.g. digital presentation) will not change
- The powers of PCCs will remain as updated by the Policing and Crime Act 2017.
- The distinct legal roles of warranted police officers will be maintained in law.
- Rules on data collection and storage (including genetic records) will not be constrained further. GDPR will not adversely affect the forensics databases
- National initiatives to promote interoperability that rely on data sharing will not be constrained by information governance rules.
- International cooperation will remain unchanged by Brexit.

4.1.6 Environmental

- There are no significant environmental issues that need to be reflected in the appraisal.

4.2 Police and PRTB assumptions

- The roles of CSIs and the balance of civilian and uniformed staff will not change
- HTCUs will remain out of scope but not reduce the demand for digital forensics services
- HOB and IDENT1 are implemented as scheduled
- The Emergency Services Network will be rolled out as scheduled and will increase interoperability as planned.
- Funding remains available until March 2020, at which point the PRTB ceases to exist.
- NABIS is an associated programme rather than a component part of TF.
- The PEQF will be rolled out; forces will be contributing to the apprenticeship levy.

4.3 Programme assumptions

- The history of collaboration between forces (e.g. slow progress) is unlikely to change markedly without intervention or facilitation

- The Transformation Programme will increase the change management resources to support a localised, opt-in implementation.
- Redundancy will apply to about 90% of the saved roles and the pay-out will be about 90% of those employees' pay.
- The pace of change and the gradual convergence of the local forensic services will mean that there will be no significant harmonisation costs and no equal pay claims.
- HR processes will be carried out fairly and considerately so that there are no claims against the employers and staff do not feel disenfranchised.
- There is an effective communication programme so that stakeholders are committed to the successful delivery of the TF programme.
- There will be detailed local plans for each force signed off by the local PCC.
- Individual business cases are developed for material elements of the programme to ensure that these are best value for money.
- Consultation with staff associations and unions is carried out sensitively and at a pace that minimises the risk of disruption.
- The benefits management plan will be 'owned' by the managers and leaders tasked with delivery.
- The case uses 2018/19 prices and applies inflation from 2020/21. The inflation risk for 2019/20 is managed within the project.

5. Appendix E – Transforming Forensics

The table below shows a summary of each of the Board's responsibilities:

Table 3: TF Board Responsibilities

Board	Summary of Responsibilities
Design Authority Board	• Custodian of the User Requirement • Governs the acceptability of key deliverables against the agreed requirement • Maintains overall design integrity of the programme • Validates projects' technical designs against the long-term view • Assures the design of the solutions • Assures the realisation of projected benefits • Manages the underlying architecture / infrastructure design including across concurrent projects • Provides regular progress updates to the TF PMO, including RAG and risks and issues for programme attention.
Commercial Board	• Provides oversight & assurance of all contracted services, reporting to PRB as required • Manages existing contracts • Ensures contracted services are being delivered as per contract; on time and within budget • Ensures continuity of contracted services including tendering activities as necessary • Provides commercial advice & guidance to TF teams and Programme Director • Manages TF programme finances, budgets, spend profiles and funding bids • Provides regular progress updates to the TF PMO, including RAG and risks and issues for programme attention.
Project Board	• Ensures project delivers within its agreed boundaries (e.g. cost, organisational, benefits, etc) • Provides project leadership, guidance and acts as point of escalation to remove blockers to progress • Resolves strategic and directional issues that need the input of stakeholders to ensure the progress of the project • Defines the acceptable risk profile and risk thresholds for the projects • Provides operational stability and effectiveness throughout the project delivery cycle • Provides regular progress updates to the TF PMO, including RAG and risks and issues for programme attention.

Board	Summary of Responsibilities
Stakeholder Board	• Provides oversight, assurance and management of all Communications and Stakeholder activities • Produces Communications materials including Newsletters, Website, bespoke event Communications. • Manages stakeholders & engagement events ensuring that key stakeholders remain up to date and briefed on TF progress. • Maintains FAQs, ensuring relevance and currency • Provides regular progress updates to the TF PMO, including RAG and risks and issues for programme attention.
Transition Board	• Reports on the collection of baseline data which needs to be of sufficiently high volume and quality to inform the business cases of individual projects • Co-ordinates stakeholder mapping and management activities to develop key relationships • Ensures that forces' Scientific Support Managers have a clear understanding of current programme priorities and how they link to force priorities • Provides evidence and data to help PRB & design teams develop options and solutions that are likely to be most acceptable to forces • Supports the delivery of the projects into operational activity within forces • Provides regular progress updates to the TF PMO, including RAG and risks and issues for programme attention.
HOB BDA & Transition	• The terms of reference for this Board with respect to TF are being developed and will be agreed with the Home Office Biometrics team.

6. Appendix F – Transforming Forensics Benefits Strategy

6.1 Introduction

The purpose of the Benefits Management Strategy is to:

- Define and document the scope, guiding principles and methodology of the benefits management approach for the Transforming Forensics (TF) Programme
- Establish a formal governance structure that ensures clear ownership (accountability and responsibility) for the benefits

6.2 Benefits Management Strategy

6.2.1 Scope

This document sets out the TF programme benefits management strategy. It covers:

- Definition and agreement of the benefits management approach including the governing principles;
- Definition, agreement and prioritisation of benefits for the TF programme based on, and linked to, the agreed objectives;
- Types of benefit, particularly cashable and non-cashable and qualitative
- Governance including roles and responsibilities
- Benefits documentation, including maps, profiles, register and tracker
- Benefits assurance including checkpoints through the programme lifecycle

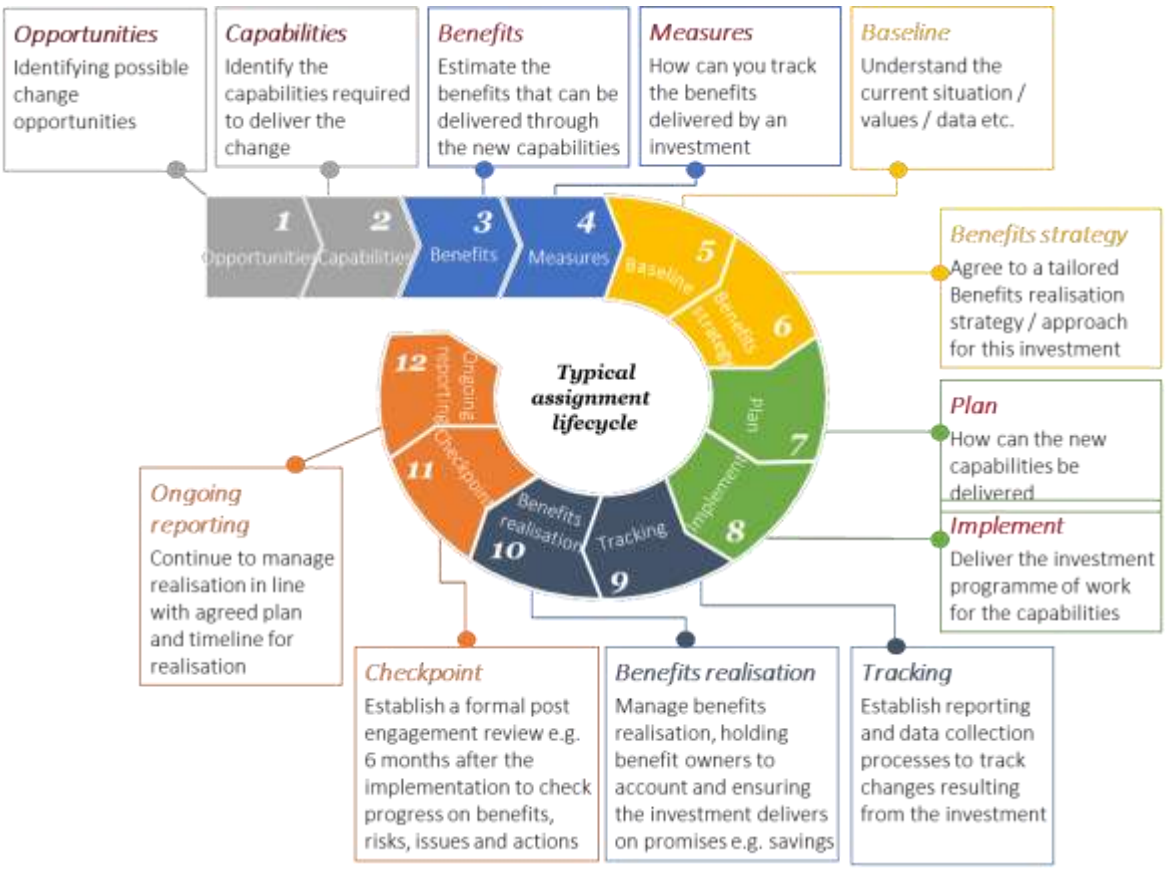
These procedures are designed to ensure that the benefits from TF programmes are managed and delivered.

6.3 Benefits Approach

6.3.1 Overview

The TF Programme will adopt a 12 step, full programme life-cycle, approach to benefits management, this is set out in the figure below

Figure 13 Overview of the TF Benefits Management Approach



This Benefits Management Strategy builds on considerable work done to date to identify, quantify and assess realisation timelines for benefits.

6.3.2 Benefit Definitions

Benefits Management involves identification of the benefits that the project is setting out to deliver, their planning and tracking, the assignment of responsibilities and authorities, and their actual realisation as a result of investing in business change. Benefits management complements and overlaps investment appraisal in the business case; benefits which have a robustly measurable cash value are included in the business case investment appraisal process as an offset against project costs.

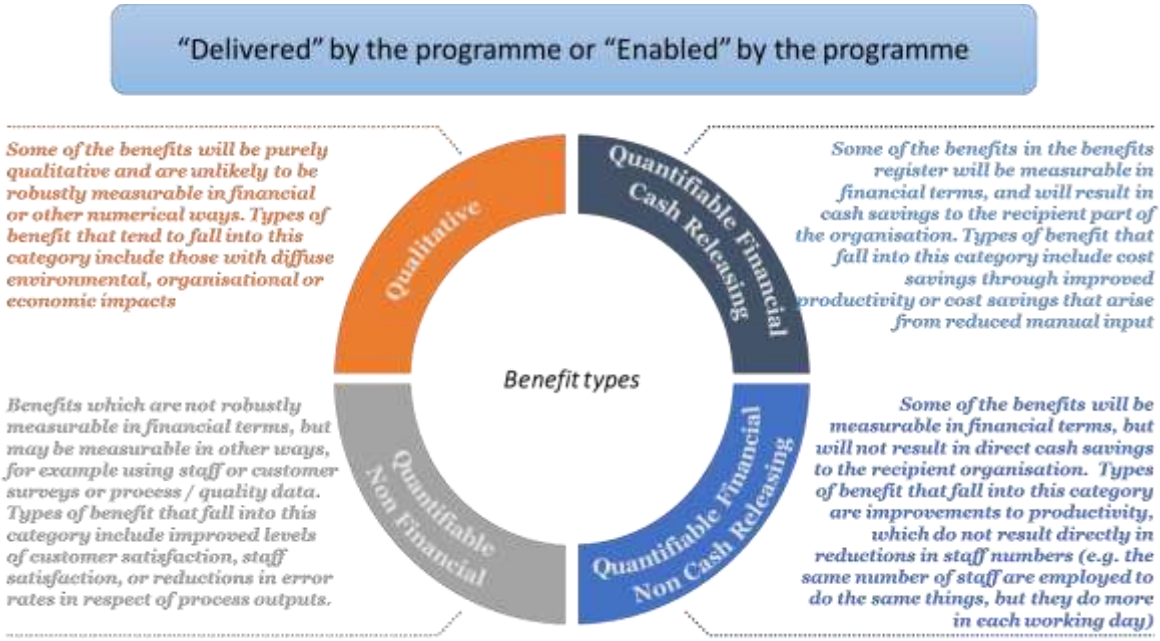
6.3.3 Types of Benefits

The project may realise benefits in various categories. Firstly, the benefits will either be delivered directly by the project or they will be enabled by the project and delivered by another project or business change:

- Delivered benefits: Some of the benefits will be delivered directly by the TF programmes and will be claimed directly by those projects.
- Enabled benefits: Some of the benefits may not be delivered directly by the TF programmes. However, the TF programmes will put in place pre-conditions (functionality, processes, and so on) that will enable the business to achieve benefits through additional projects. These benefits (if any) will be highlighted in the business case for the individual projects, but will not be claimed directly by them.

Secondly, the benefits may be quantifiable or qualitative; those which are quantifiable may or may not be financial; and the financially quantifiable benefits may be cash releasing, or they may not. Figure 53 below summarises the types of benefit which the programme will manage

Figure 14 Types of benefit



There may also be "disbenefits" i.e. additional costs that need to be managed by the project or the business. In some projects not all outcomes will be positive, and these are described as 'disbenefits' (factors which are intrinsically linked to benefits, but which detract from their value to the recipient part of the business). Disbenefits need to be identified and quantified where possible, and any foreseeable financial impacts need to be offset from cost savings or financially quantifiable economic benefits, so as to ensure that the investment appraisal is not understating costs. Where they are identified, management effort will be required to seek to minimise the impact of disbenefits on the business or on other projects. Types of 'disbenefit' include ancillary costs to the business arising from the need to upgrade existing equipment to ensure compatibility with new services and networks.

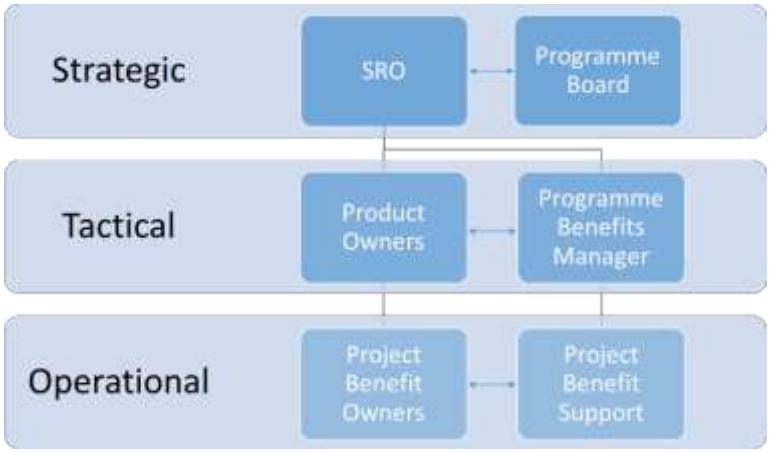
6.4 Governance

6.4.1 Overview

A governance structure has been developed for the realisation of benefits. This structure secures accountability and ownership for each benefit, and provides a mechanism for decision making, and for risks and issues to be resolved. Generally speaking, risks and issues in respect of benefits realisation will flow upwards through the structure until they reach the level where they can be resolved, whilst decisions will flow downwards.

The roles and responsibilities of the stakeholders within this governance structure are described below and are represented in the Benefits Management Governance Structure diagram in Figure 54 below

Figure 15 TF programme Benefits Governance Structure



6.4.2 Roles and Responsibilities

This section aims to provide a clear definition of each role within the above governance structure. All roles may delegate responsibilities as appropriate.

6.4.3 Project Senior Responsible Officer

The project Senior Responsible Officer (SRO) is the individual responsible for ensuring that a project meets its objectives and delivers the projected benefits. The SRO has ultimate accountability for delivering the project objectives, and should also help secure buy-in to the delivery of the benefits across the business by demonstrating top-down commitment to their realisation.

The SRO is responsible for:

- Keeping the TF Management Team, the Project Board, and other stakeholders informed of progress in realising benefits
- Representing the project at review boards or checkpoints

The SRO will receive regular benefit progress report from the Product Owner.

6.4.4 Product Owner

The Product Owner (PO) is responsible for the delivery of the project benefits, and therefore the project deliverables required to facilitate benefits realisation. The PO is accountable to the SRO.

The PO will be required to provide benefits progress updates to the SRO and project boards or other oversight bodies. The PO will receive regular benefits progress report from the Project Benefits Owner (if different).

The PO will:

- Develop initial benefits maps, benefits register and benefits profiles, and the benefits realisation plan
- Work with Project Benefit Owners in progressing all items in the above bullet point to the point of sign off and handover to the Benefit Owners
- Implement the process to measure and monitor benefits appropriately
- Report risks and issues to benefits realisation, and escalate where required
- Manage the realisation of benefit targets set by the project up to the close of the project.

6.4.5 TF Benefits Manager

The TF Benefits Manger role is central to improving and then maintaining benefits management within the team and ensuring meaningful measurable and realisable benefits are put at the heart of project business cases. The TF Benefits Manager's specific responsibilities are to:

- Support the Project Owner in developing project benefit maps, profiles, registers and realisation plans
- Provide assurance of benefits documentation included in project business case
- Take ownership of project benefits realisation plans, where agreed appropriate, at project handover / post implementation
- Manage the realisation plans after project close, liaising with benefit owners in the business
- Contribute benefits realisation information to a post implementation review
- Develop and maintain a central register of common benefit metrics e.g. staff time unit cost
- Collating and reporting on benefits data for the project, targets, realised to date, written off and so on

6.4.6 Project Benefit Owner

The Project Benefit Owner, one will be identified for each benefit, is accountable for specific benefits being realised. The Project Benefit Owner should have the remit to realise the benefit within the responsibilities of their current role and will therefore be likely to sit within the business (rather than the project). The benefit owner will be responsible for ensuring that benefit targets are reasonable and achievable, that action is taken to measure and realise the benefits according to an agreed schedule, and that risks to realisation are identified and managed.

The Project Benefit Owner will be supported by the TF Benefits Manager in order to measure, monitor, and realise each benefit. The activities required to measure and monitor each benefit will be discussed and agreed at the Benefit Profile Sign-Off stage with each Benefit Owner.

6.5 Benefits Documentation

6.5.1 Benefits Map

A Benefits Map is the start point for project benefits management. It is developed to show how each of the benefits relates both to each other and the project's objectives. A benefits map covers the entire set of benefits and is a useful planning document for the project. The Product Owner is responsible for the production of these maps but will be supported by the TF Benefits Manager.

For an example of a benefits map template see Example Benefits Map.

6.5.2 Benefits Profiles

A benefit profile describes a benefit and its value (financial or otherwise), and how it will be measured and realised. All non-qualitative benefits profiled will have one or more measurements. Benefit profiles will be created for project benefits and will be an output from the benefits map. Benefit profiles are the main vehicle for Project Managers to engage with the business and ensure all the information required to complete future documentation (in particular the benefits register), is collected. Profiles will be developed by the Project Manager in close collaboration with individual Benefit Owners. All profiles must be signed off by their owners.

Benefit profiles can be started as soon as the benefits map is complete. A complete set of benefit profiles is a requirement for the FBC. Where these are financial they should be signed off by the benefit owner. Where benefits do not have an owner, an explanation should be provided, setting out the issues

preventing the sign off, the next steps to secure it and the impact of benefits realisation for the project if sign off is not achieved.

6.5.3 Benefits Register and Realisation Tracker

This document has two main components, firstly, the Benefits Register which lists benefits in table format. It is intended to be:

- a record of benefits while more detailed documentation is prepared
- a quick reference guide to the current position of benefits realisation
- A management summary.

It is stored as an MS Excel document, is maintained by the Project Manager, and includes various fields of information. See Benefits register for an example.

The second component is the realisation tracker, the purpose of which is to enable the project team to monitor benefits realisation and identify off-track benefits or risks to benefit realisation. It facilitates the reporting of benefits by the Project Manager and Benefit Owners.

The Benefits Realisation register and tracker is the main tool for managing benefits within the project. These are as follows:

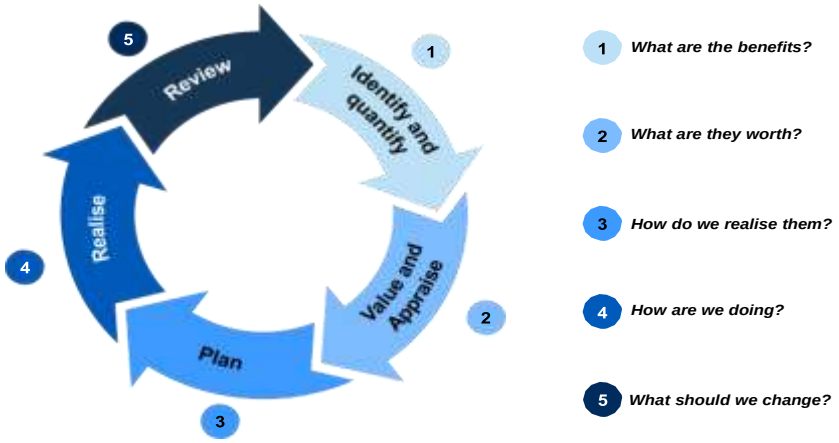
- Confirm ownership and commitment to benefits from business stakeholders
- Summarise benefit measures, data collection mechanisms and frequency
- Set out the benefit delivery schedule
- Define benefit responsibilities

It will provide a full analysis of benefits that are aligned to the project and a plan for benefits delivery.

6.6 Benefits assurance

The TF programme will adopt elements of good practice benefits assurance as set out in "Assurance of Benefits Realisation in Major Projects", authored by the Infrastructure and Projects Authority[23] . This guidance recommends key assurance activities at five points in the project lifecycle:

Figure 16 Benefits assurance checkpoints



[23] https://www.gov.uk/government/publications/assurance-of-benefits-realisation-in-major-projects

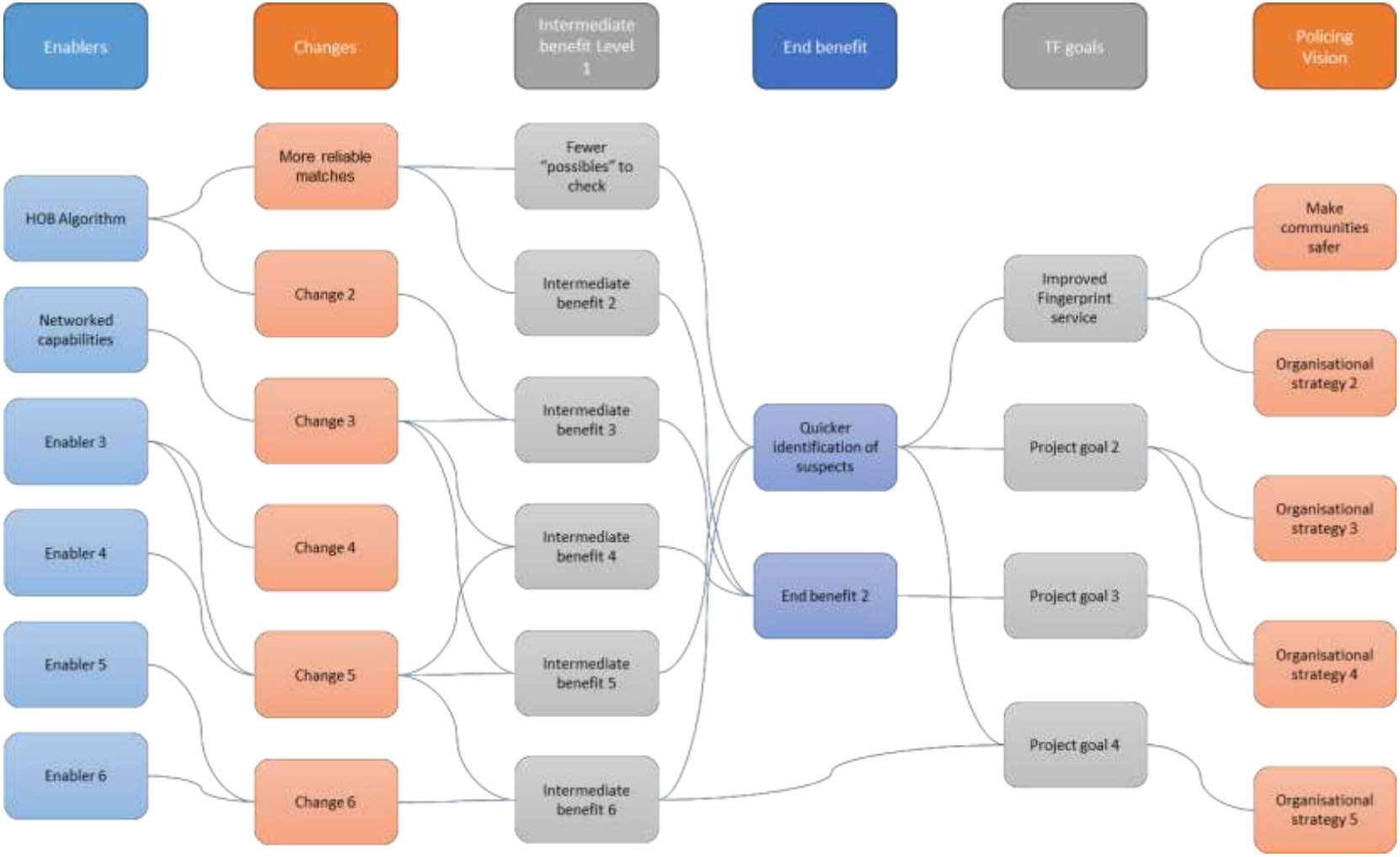
The description of each checkpoint is set out in the table below:

Table 4 Checkpoint purpose and description

Checkpoint	Checkpoint purpose	Checkpoint description
Checkpoint 1	"Identify benefits"	A "long list" of benefits should have been identified, linked to the strategic objective of the project.
Checkpoint 2	"Value and appraise"	A selection of the most important benefits identified will need to be valued, to ensure the project is justified on economic grounds.
Checkpoint 3	"Plan to realise"	A plan for realisation needs to be in place. This should include selecting which benefits the project team will concentrate on realising; allocating responsibility for delivering each benefit; and determining the best mechanisms / metrics for tracking progress. These metrics may be the same as the economic estimates as part of the appraisal, but very commonly might be different.
Checkpoint 4	"Work to realise"	As the project transitions into "business-as-usual", concrete plans need to be in place to ensure the benefits from the project are delivered. What changes in operations need to be undertaken to ensure the benefits are realised as fully as possible? Who is responsible? How do we transition responsibility from the project team to BAU?
Checkpoint 5	"Review performance"	By this stage the project needs to know how they have performed relative to the original and updated business cases. The further key things to ensure are that benefits are well embedded within common business processes and lessons learnt have been captured.

These benefit assurance checkpoints will be programmed into the lifecycle of the programme and constituent projects at the appropriate times.

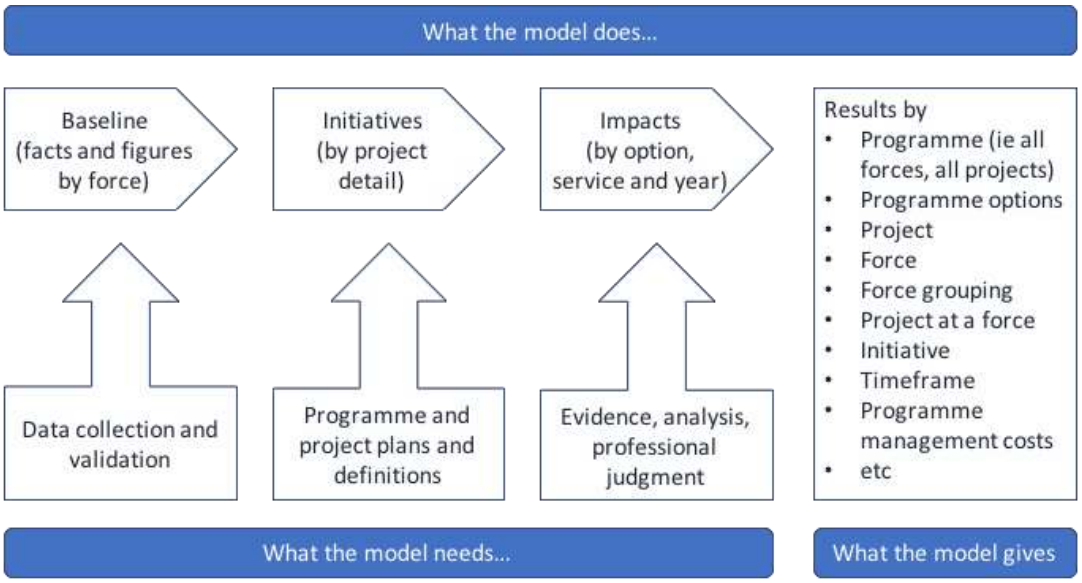
6.7 Example Benefits Map



7. Appendix G – Financial Model

A financial model has been built specifically for this programme. The model works by creating a baseline for each force for the relevant forensic disciplines. This is based on data from HMICFRS and data collected directly by the TF Transition Team. The way in which the projects are being implemented is defined, suing the programme and project plans. The estimated impact of the enablers that are delivered by the specific project is calculated, taking care not to double count the savings (the savings are calculated in sequence). Reports can be generated for any individual force, force grouping, project or programme scenario. This is summarised in the figure below.

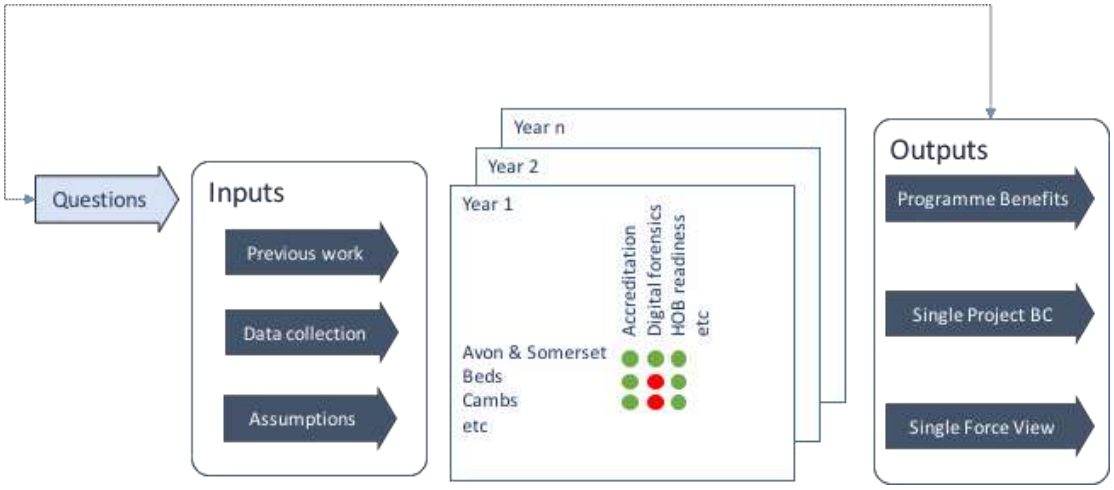
Figure 17: Overview of the financial model



The model was designed in conjunction with the Programme team to ensure that it would meet not only the immediate needs of the business cases but also the longer term needs of the programme. It will therefore be able to show actuals as well as forecasts, so will support the evaluation of the programme. Combined with the Capability Maturity Model and other operational data that the FCN proposals to collect, the financial model will create the foundations for performance measurement and management.

The design approach started by asking what output was required from the model – as shown in the figure below.

Figure 18: Design Approach



As the diagram above shows, the design took account of the OBC (though in the end took a force-by-force and project-by-project approach rather than the national options in the OBC). A master data and assumptions list has been set up for the model.

7.1 Modelling standards

All models created for TFP apply the 'Twenty Principles of Good Spreadsheet Practice"[24]. More complex models are built in line with Spreadsheet Modelling Best Practice (SMBP). The benefits of SMBP are that the model is:

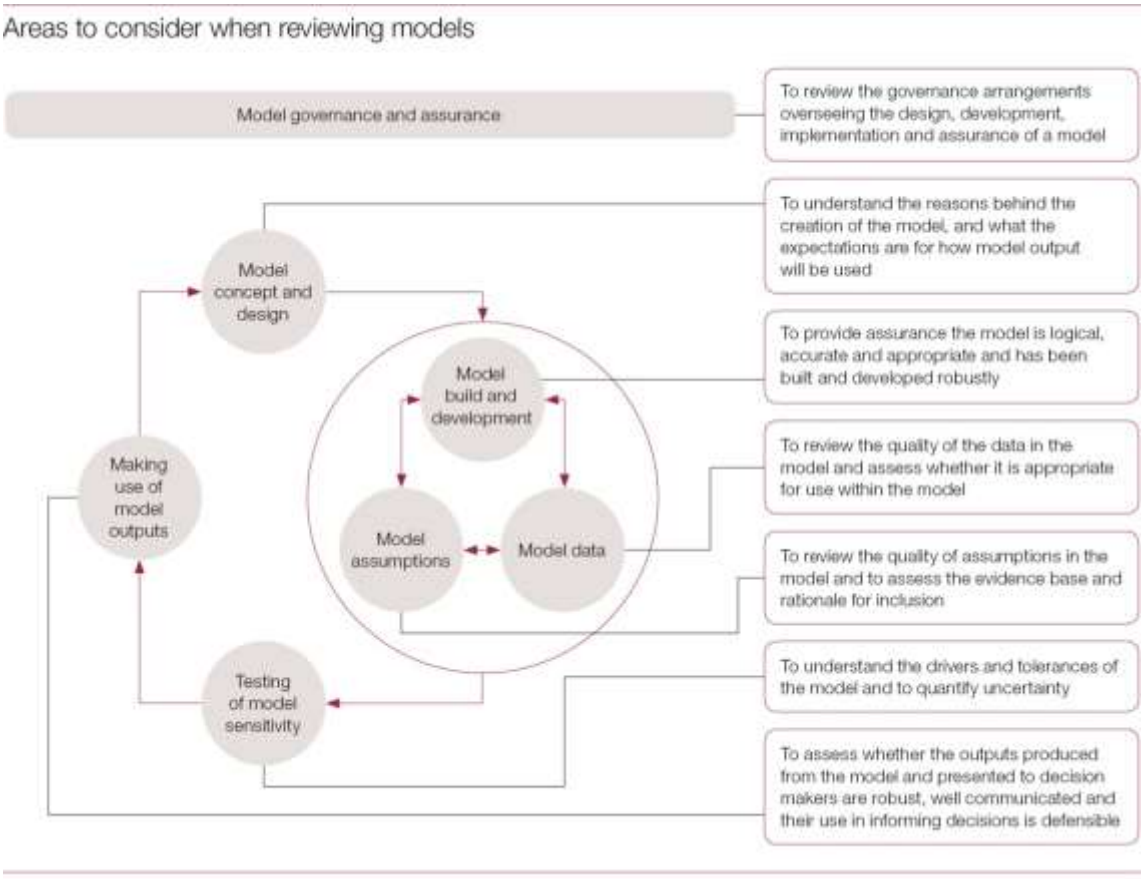
- Easy to use. Using good design makes the model easy to operate, while a clear specification will explain how the model works.
- Focused on the important issues. Spending time on the model scope will make sure that the model answers the right questions.
- Easy to understand. Good design and build techniques will make the model easier to understand. This aids transfer of the model ownership and ensures the continuing value of the model.
- Reliable. If we specify clearly how the model works and then test it thoroughly and independently, we are much less likely to introduce errors.
- Auditable. By constructing the model following accepted best practice rules, the model will be easy to audit by external agencies and all required documentation will be available as a matter of course.
- Adaptable. The attention to detail and design in best practice allows for models to be more easily adapted to reflect changing logic and assumptions and new output requirements. This quality will be of particular value for the TF programme.

These have the effect of meeting the requirements of HM Treasury's Aqua Book.

The Programme has also considered the elements of the NAO framework for reviewing models, see Figure 58.

[24] Institute of Chartered Accountants in England and Wales, Twenty Principles of Good Spreadsheet Practice. ICAEW, June 2014

Figure 19: NAO Framework for reviewing models



As a summary of the modelling quality assurance, we have used a checklist based on the recommendations of the Macpherson report on the quality assurance of analytical models used in government.

Table 5: Checklist for Macpherson report

QA element	Response	Evidence
Structure of the model	Built to Spreadsheet Modelling Best Practice by an experienced modeller; subject to internal review in Prederi. Subject to TF Programme independent review and sign off.	Model specification;
Assumptions – are they robust and sensible	All assumptions are set out in the assumptions log and have been tested with the TF Programme as the project had progressed. Assumptions reviewed by multi-disciplinary Prederi team	MDAL RAID Annex (assumptions) in this BC
Inputs/methodology and output	Basic concept of analysis developed by Prederi team and reviewed and signed off by TF Programme during the project.	Specification for model. See next section.
Is the data fit for purpose	Not entirely (see Baseline for fingerprints and CSIs.in Section 7.5.1), but it is the latest available data used by HMICFRS and the product of a specific data collection exercise to establish the baseline.	Assessment in report

QA element	Response	Evidence
Data sources – uncertainties/margin of error	Considered by Prederi team; discussed with TF Programme. Highlighted in the BCs.	Model includes references for inputs. BCs provide detail.
Checking formulae/mechanics	Built to Spreadsheet Modelling Best Practice by an experienced modeller; subject to internal review in Prederi. Subject to TFP independent review.	Model, specification and SMBP
Identified risks of the modelling process	Built to Spreadsheet Modelling Best Practice by an experienced modeller; subject to internal review in Prederi. Discussed and reviewed with TFP. Subject to TF Programme independent review.	Proposal. Model specification; summary in BC.
How the model is to be interpreted	Discussed and reviewed with TF Programme, PRTB and ERB.	BCs and presentation
How the results are to be presented	Presentation of material as project progressed. Report to TF Programme, PRTB and ERB.	BCs and presentation

8. Appendix H – Commercial Case Appendices – Extract from OBC

This appendix brings forward the work of the OBC that was set out in the OBC Appendix D. It is used in support of the assessment of procurement savings and in the Commercial Case in this Business Case.

The work was carried out the Home Office Biometrics Programme in late 2016 and early 2017.

The key findings were:

8.1.1 Traditional Forensics

- High concentration amongst 3 suppliers, reinforced by recent awards.
- Little evidence of appetite from new suppliers to enter this market
- Evolving from National Framework legacy to several new models which have yet to fully bed in. No comparative data available to evaluate relative performance to date.

8.1.2 Digital Forensics

- Market for external services is less mature
- Services often delivered through Hi Tech crime units, not necessarily forensics
- Traditional suppliers still featuring prominently in early spend analysis of Digital Forensics buying behaviour.
- Two significant collaborative contracts require further consideration
- Metropolitan Police (Open to all Forces)
- South West Forensics Hi Tech Crime Unit (Open to 19 Forces plus PSNI)
- Two TF demonstrators in Rapid DNA / Mobile Forensics technology may drive national requirements

8.1.3 Significant Forensic Service Buying Collaborations

Four collaborative contracts are leading the market, with around 70% of spend

- Metropolitan Police Service
- EMSOU
- North East
- West and South Coast Consortium

8.1.4 Analysis: Key Data

Police Forensic spending data are set out in the table below.

- Total Investigative Support expenditure is falling and remains under pressure

- 3rd party spend on Traditional Forensic Services is falling because of recent competitive procurement activity, increased demand management, and new operating models
- The in-house Police Forensics market is continuing to grow
- External spending on Digital Forensic services is being captured for the first time. Expectations are that this will continue to grow given crime trends, global market trends, advances in technology and pressures on internal Police forensic teams

Table 6: Police forensic spending key data trends

Data Point	£m (All ex VAT)	Period	Trend	Source
Total Investigative Support Expenditure (43 Forces)	£405m	2013/14		CIPFA Police Objective Analysis (POA) annual data may be distorted by overhead treatment, underlying costs in £320M - £350M
External Spend on Traditional Forensic Services	£60m-£90m	2013-16		NAO Report, "December 2014, confirmed via CIPFA (POA) Data and 2015/16 FSMG spend data
Size of In-house Police Forensics market	£113m- £122m	2013/14 2014/15		CIPFA (POS) data against a limited range of services.
Spending on Digital Forensic Services	£9.6m (3rd Party, plus £6.5m Capex) £39.6m (staff costs)	2015/16		CLEP Programme Digital Forensic Initial Briefing Paper v.3.1 (January 2017)

These data points provide a consistent historic spend picture to support broad framing of the Transforming Forensics case. The NAO report identifies that the Home Office collects a range of data, primarily using Force / CIPFA returns. All available data has been consolidated via the Home Office Economic / Finance case lead and used to underpin the financial baseline used in the development of the TF OBC.

Data limitations have been well documented in various papers published between the HO, NAO, and House of Commons Science and Technology Committee.

8.1.5 Forensic Supply Chain

The Home Office Forensic Science Strategy sets the scene around the external supply chain for both Traditional and Digital Forensic products and services.

A mixed landscape of forensic delivery models exists, ranging from those based at an individual force level, models based on well-developed collaborative/regional structures, to some more recent operating models linked to wider partnership approaches. The Forensic Science Strategy sets an ambition for police forces to have a national approach to forensic science delivery that will provide a more strategic relationship with the forensic supply chain.

A Forensic Marketplace Strategy Group has been established under the NPCC to provide strategic oversight of the relationship with the market, and to mitigate risk of market failure / disruption as Police Forces seek to transform their services. The Terms of Reference for this group include the following objectives:

- Maintaining continuity and quality of forensic science supplies to forces,
- Ensuring and retaining public confidence in the contribution forensic science makes to the CJS,
- Ensuring value for money for the tax payer,
- Enabling & supporting a sustainable and effective competitive market for Forensic Laboratory services.

8.1.6 Overall State of the Market

The OBC reported that despite documented concerns in Parliament[25] over recent years, since the closure of the Forensic Science Service, the Forensic Marketplace Strategy Group has advised of no significant exit or closure of any of the established UK forensic service providers. This picture changed when Forensic Telecommunications Services Ltd (FTS) ceasing to trade in April 201; there are believed to be other suppliers with challenging circumstances.

However, the Forensic Marketplace Strategy Group considered the sustainability of the market to be a high priority. Concerns remained, and several common themes emerged from discussions with stakeholders on both client and supply side of the relationship. The issues highlighted through these stakeholder interactions include the following "non-attributed" observations:

- Sustainability of price reductions / higher SLAs / ever higher standards of accreditation. UK generally considered to have low cost / high service specification and rapid response model relative to other comparable developed countries.
- Lack of consistency in accreditation across internal / external supply channels, need to reinforce commitment of all to meeting formal standards and supporting guidance. This may ultimately contribute to sub optimal criminal justice outcomes.
- Cost of compliance / investment required to achieve accreditation considered high.
- Shortage of available accreditation bodies / resources available to meet the accreditation deadlines set by the Regulator.
- Lack of statutory powers available to the Regulator have left the Regulator asserting a weaker position than before the Home Office Forensic Science Strategy existed, compounded by delays in addressing this through Parliament. Proxy controls through contract T&C have been used to support Regulator provisions.
- Lack of cost transparency and allocation of overhead treatment may be creating a bias toward in-house provision.
- Inability of forces to breakdown costs such as buildings and IT to evidence full cost of in – house forensics provision.
- Perceived public subsidy to Police in house labs.
- Framework bureaucracy and service delivery fragmentation / inefficiency associated with the expired National Framework model, but not a view shared to the same degree by all.
- Risk of long term "partnerships" with certain suppliers effectively constraining the underlying market, freezing out innovators into a Tier 2 sub contract role at best, or no role at all.

[25] House of Commons Science & Technology Committee, September 2016
http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technologycommittee/news-parliament-2015/forensic-science-report-published-16-17/

- Limited competition in Traditional Forensics, over 90% of the Police market serviced by three suppliers and LGC in a dominant position.
- Lack of direct access opportunities for SMEs / new entrants to showcase innovative new solutions, particularly in Digital Forensics, with senior policing and police commercial decision makers.
- Digital Forensic innovators potentially seeing non law enforcement channels as more attractive business, potentially creating a resource / skills retention challenge / innovation gap for Forces in the future.
- Economics of delivery mean that collaboration between Forces (not just in procurement but in pooling forensic and administrative resources) is essential in a 43 Force model, as exemplified in some of the new models.

However, there are also significant opportunities from which to build a platform for transformation. Firstly, the fact that key suppliers are already embracing and investing in new ways of working under the latest collaboration model contracts is significant. Secondly, the shift in demand toward Digital Forensics represents an opportunity to re-establish a strong and sustainable competitive marketplace to support UK law enforcement.

8.1.7 Traditional Forensics

Since the closure of the Forensic Science Service, most external expenditure has been routed via the National Forensic Framework Next Generation (NFFNG), and its predecessor the National Forensic Framework Agreement (NFFA).

The NFFNG was set up in 2012 and supported delivery of 13 service Lots via 7 main suppliers. The NFFNG expired in mid-2016 but there is still a significant "ragged end" of existing business working through the framework pending the introduction of various replacement solutions implemented by groups of Forces.

The NFFNG was not a mandated national framework. However, apart from the North-East region, the Forensic Science Strategy asserts that all forces use or have used the framework. This view is strongly supported by the findings of the Transforming Forensics data collection template. The majority of forensic services purchased under the NFFNG have been acquired as part of collaborative regional competitions with standardised specifications and regional aggregated volumes. However, the forensic landscape has evolved considerably since the introduction of these national frameworks. Police Forces are delivering more services in-house and new types of commercial partnerships have emerged in some police regions.

The Outline Business Case development has not had direct visibility of the business case details underpinning any of the more substantial recent contract awards / proposed awards so the evidence base and supporting the Transforming Forensics Economic Case assumptions cannot yet be informed by such material. The Home Office Commercial team, working with the Forensic Marketplace Strategy Group, has delivered a report (embedded below) intended to compare the respective contract models recently established by EMSOU and West South Coast Consortium (19 Forces), with a view to providing guidance to other Forces as to the relative merits of different approaches.

Major NFFNG replacement contracts awarded by MPS, EMSOU, WCC, and North East effectively tie up the traditional market until 2020 - 2024 with LGC, Cellmark and Key Forensics continuing to dominate. Figure 2 below highlights the market concentration. With the most recent contract awards, LGC have further cemented their position as market leader by market share. These models go live in 2017/18 so comparative operational data is not yet available.

Figure 20: Traditional Forensics 3rd party spend by supplier

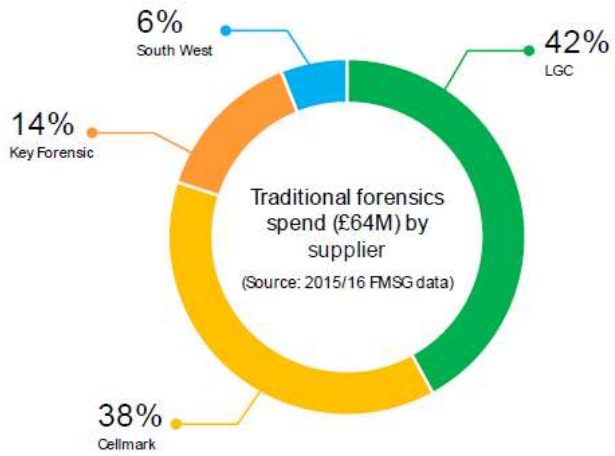
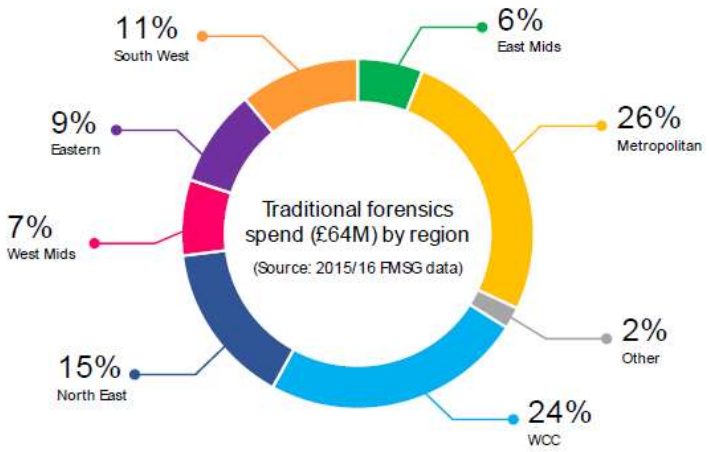


Figure 21: Traditional Forensics 3rd party spend by region



In terms of market structure, there is a high concentration ratio amongst a few established suppliers to the Police and law enforcement sector in England and Wales, predominantly LGC, Key Forensics, and Cellmark in the world of Traditional Forensic services. 72% of spend is accounted for under four collaborations supplied by these companies. The most significant new collaborative contract awards in 2017 commit business through to various dates in the 2020 – 2024 period, potentially longer with extension options.

These three major suppliers, along with the Defence Science and Technology Laboratories, and in-house Police forensic services in Eire, Northern Ireland and Scotland, have formed the Association of Forensic Service Providers (AFSP)[26]. This organisation appears limited in membership / scope but provides an industry interface to the Regulator.

[26] Association of Forensic Service Providers, http://afsp.org.uk/

LGC has a long association with the UK Government Sector and has hosted the function of the "Laboratory of the Government Chemist[27]" for over 100 years. The Government Chemist function today sits within the Department for Business, Energy and Industrial Strategy. The name LGC was adopted on privatisation in 1996 and the firm has since grown approximately 10-fold in manpower terms, as well as acquiring many other smaller companies. LGC enjoys the dominant share (43%) of the England and Wales Police Traditional Forensic services business, with Cellmark (37%) and Key Forensics (14%). The remaining suppliers from the NFFNG; ESG, Arrogan, Randox, pick up a very small (6%) of the remaining business.

It is notable that when the nearest event to a retender of the NFFNG came to market, via the WSCC open OJEU competition in Q4 2016, no new suppliers elected to bid, indicating the market is relatively closed / unattractive for new entrants, even more so given that larger companies such as LGC and Key have diversified their portfolio of services to create broader appeal, potentially to the exclusion of more niche providers. Given the length of contracts entered in recent months, covering >70% of the total England and Wales Police market for the next 3 - 7 years, potentially longer, this situation is unlikely to change.

Table 1 below summarises the broad scale and scope of the most significant recent contract awards representing over 70% of the Traditional Forensics marketplace spend.

Table 7: Summary Table of Recent Contracts.

(Capturing over 70% of total Forces spend) Major Existing Forensic Contract Awards

Collaboration/ Organisation	**Collaboration Scope**	**Contract Term**	**Key features**
The **Metropolitan Police (Digital Forensics)**	Open to all Forces in England, Wales, Scotland and PSNI. Plus others such as: British Transport Police, Civil Nuclear Constabulary, and UK Border Agency.	Awarded in Feb 2017. Seven years plus three-year option	Contract won by MASS as "Managed Service Provider". Tiers of service: Levels 1 and 2 - Frontline Self-Service Hubs, Level 3 – Technical Services including Case work development, Research and Development/Consultancy and lab based forensic analysis of digital devices. Estimated value £15m to £230m
The **Metropolitan Police (Traditional Forensics)**	Available beyond The Met only to London Fire and Emergency Planning Authority, Greater London Authority and Transport for London	Awarded in Feb 2017. Seven years plus three-year option	Contract won by LGC as "Managed Service Provider". Caters for innovation such as Rapid DNA in Custody Suits within 1 year and Rapid DNA at crime scene within 3 to 5 years. Estimated value £75m to £111m

[27] LGC website http://www.lgcgroup.com/our-science/government-chemist/#.WLcUU4XXLg8

Collaboration/ Organisation	Collaboration Scope	Contract Term	Key features
East Midlands SOU – FS (Traditional Forensics)	Open to Derbyshire, Nottinghamshire, Lincolnshire Leicestershire and Northamptonshire Police Forces	Awarded January 2017, with Go-Live on 1st April 2017. Contract term: Seven years plus three-year option.	Partnering arrangement awarded to Cellmark. Approx. 94% to be delivered by Cellmark with the balance by sub-contractors. Primarily Traditional Forensics but with limited Digital (training and consultancy, provided by Intaforensics). Est Value: £35 over ten years. 10% cashable savings in Year 1and 9.6% savings predicted for Year 2. Significant back office savings e.g. 240 invoices pa to 12 pa.
West and South Coast Consortium (W&SCC) (Traditional Forensics)	Nineteen Forces (A&S, BTP, Cheshire, Cumbria, D&C, Dorset, Dyfed, Glous, GMP, Gwent, Hants, Mersey, N Wales, S Wales, Surrey, Sussex, TVP, Wilts) Also available to PSNI although not part of the Consortium.	Contract terms; 3 years from 1 April 2017 with optional 2-year extension	Contractual model of category 8 Lots and 2-5 suppliers per Lot. Suppliers either allocated a specific Force or a percentage of Force business. Main suppliers: Key Forensics, LGC and Cellmark. Standard specifications across all Forces. Accreditation as advised by Regulator, UKAS and Home Office. Pricing based on Service codes and consistent across all Forces. Spend estimated at £23m pa based on 2015/16 data. Savings in year 1 estimated at 25% (PACE sample price reduction from £17-£22 to £12.80 as example)

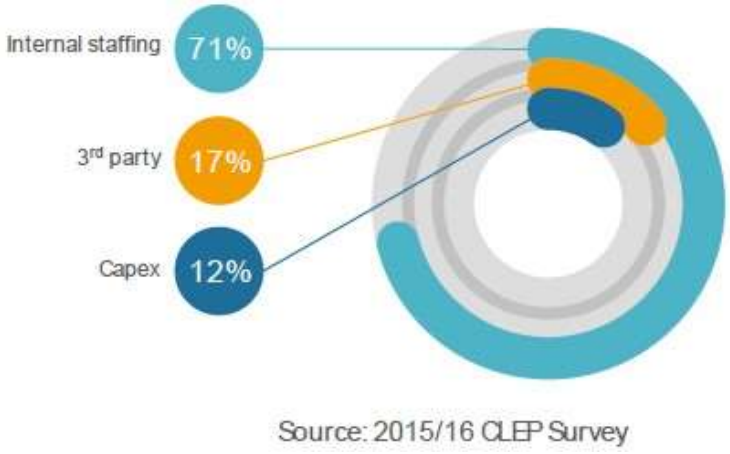
Collaboration/ Organisation	Collaboration Scope	Contract Term	Key features
North East Consortium (Traditional Forensics)	Seven Forces (West Yorkshire, North Yorkshire, South Yorkshire, Humberside, Cleveland, Northumbria, Durham)	Five years plus 2 optional extension. Awarded Sept 2013	The Forces have been collaborating since the closure of the FSS. Contractual model of five Lots (PACE, Volume crime including DNA, Drugs, Toxicology, Case Work). LGC sole supplier, apart from niche services such as Fire or archaeology. Lots 1 to 4 paid for on a case by case basis, Lot 5 (Casework) paid as lump sum (£500k pm). Spend estimated at £10pa with discount structure applying at spend over £10m. Seven individual contracts but pricing consistent across all seven. Pricing fixed for five years, adjustments agreed in light of experience e.g. new drug driving legislation. No single contract manager – monthly meetings with individual Forces, West Yorks manage on behalf of other Yorkshire Forces and Humberside.

8.1.8 Digital Forensics

For Digital Forensics, the approach to acquiring / delivering service is less mature and represents a significant opportunity to cultivate a much more competitive marketplace strategy. There is a varied approach to the way services are procured and delivered today. In some forces, digital forensics are delivered through forensic departments; in others, it is part of a high-tech crime unit or intelligence bureaux. Most forces have invested in providing Digital Forensics in-house, but the growth in demand means they often use external suppliers when internal resource cannot meet demand or to clear a backlog. This leads to external digital services being procured in an ad hoc manner, which may not represent good value for money over the longer term. There is also an argument that the pace of technological change may make it increasingly difficult for in house capabilities to keep up.

The Collaborative Law Enforcement Programme (CLEP) has undertaken a survey pulling together, for the first time, the national landscape of Digital Forensics spending and procurement activity across policing, drawing data from 41 Forces plus several other law enforcement organisations. The findings are captured in a comprehensive paper entitled Digital Forensics Initial Briefing Paper assist the TF project by identifying priority areas for follow up. Figure 4 below shows the reported 2015 / 16 distribution across 3rd party spend (£9.6M), capex (£6.5M) and (£39.6M) internal staff costs.

Figure 22: Police spending on Digital Forensics



Source: 2015/16 CLEP Survey

The Commercial Case adopts this work as a foundation layer product to support ongoing development of category management [28] strategy for forensic products and services. The NPCC sponsored CLEP Programme is fundamentally driven by the principles of standardisation, aggregation, and collaboration. As such the continued development of this research provides a sound base from which to develop future category management strategy for all the Options under consideration.

The NPCC research identifies that the market for Digital Forensics is a potentially more competitive landscape than traditional forensics, this is supported by wider market data. However, in the case of larger service providers the line is becoming somewhat blurred between traditional and digital service provision, with some companies handling both, consequently sweeping up a significant share of the overall police market available today. The remaining players may be more constrained to specialist equipment and / or services. The breakdown of recorded spend in 2015/16 by supplier, further confirms the current role of LGC and Key Forensics as potentially dominant suppliers in the digital space too, although 73 suppliers in total are identified. Cellebrite and MSAB take a combined 60% share on mobile device kiosk technology. The data points and estimates created through this initial research into Digital Forensics spending patterns should be treated with caution given this is the first attempt to capture such data. This work will need to be reassessed and repeated as part of a focused MI sub category strategy over a sustained period.

The research goes on to identify 39 contracts for procuring relevant equipment and services of which only 7 are open to collaborating Forces, with 1 national agreement. In additional, there are a limited range of digital forensic service capabilities and equipment / licencing options available through the Crown Commercial Service Frameworks and Digital Marketplace. These contracts cover a variety of operating model scenarios and the natural next step would be to consolidate evidence / data points to support future procurement intelligence, VFM and performance benchmarking and pipeline development. This material can then be packaged into customer / user facing decision support collateral championed by the Forensic Marketplace Strategy Group.

Forensic Marketplace Strategy Group research in 2015 [29] indicated little appetite from Forces to become suppliers to other Forces using their respective in sourced capabilities.

There is no consolidated view currently available with respect to the future market spend / demand profile for either traditional or digital forensic services. However, the various TF pilot / demonstrator projects may provide some helpful volumetrics in this regard since some of the new contracts and fee structures

[28] Category Management overview based on one of many available approaches available in the marketplace http://www.futurepurchasing.com/category_management/5_step_process

[29] Forensic Marketplace Commercial Strategy & Tactical Planning Workshop 18 February 2015

are predicated on a view of volumes of case referrals. The Forensic Marketplace Strategy Group is developing a view to inform future work, including 2017/18 spend plans, but this has not yet been made available to support the OBC.

The Metropolitan Police Service (MPS) has potentially broken new ground in its recent (January 2017) contract award to MASS [30] (Cohort plc). The contract is structured around three service lots. The contract has a seven-year term (plus potential for three-year extension). OJEU value range is £15M - £230M as the contract is open to all Forces. There are no guaranteed volumes. The three service lots are:

- Frontline Self-Service Equipment
- Frontline Supported Service
- Lab & Development Services

The MPS contract supports a Transforming Forensics kiosk "Proof of Concept" collaboration project with Bedfordshire, Hertfordshire, Cambridgeshire, Kent and Essex Police Forces. The Forensic Marketplace team has intelligence supporting the view that many other Forces may see benefit in adopting this solution.

The South West Forensics Hi Tech Crime Unit hosts a further multi Force contract for Digital Forensic services, open to 19 Forces plus PSNI.

West Yorkshire Police is working with LGC in delivering a Rapid DNA "Proof of Concept site over the period

April 2017 – December 2017. The "Proof of Concept" uses technology supplied under distribution rights owned by Key Forensics. The technology is similar to that to be deployed via the Metropolitan Police Service and may ultimately lend itself to a national buy to optimise lifecycle costs and availability of future features and functionality.

Given underlying crime trends, it is reasonable to assume the trajectory of growth in Digital Forensics is likely to outstrip the decline in demand for / spend on Traditional Forensic services. These factors, coupled with any further level of outsourcing and the costs of accreditation, are likely to sustain or increase the overall level of spending on external forensic services for the foreseeable future.

8.1.9 Global Digital Forensics Market

Rising cases of cybercrime and terrorist activities across the globe are the key factors driving the growth of this market, evidenced in various free to view market commentaries[31]. High rate of internet penetration and increasing dependency on it for communication has gained the attention of criminals and hackers. Thus, there has been a surge in internet-related crimes and misuse of government and corporate IT assets costing huge losses. This is turn generates a specific need for Digital Forensic tools for gathering and examining digital data, and for presenting it as evidence in a court of law. The digital forensics market is expected to grow significantly over the coming years.

The global Digital Forensics market is typically segmented by five major domains:

- computer forensics,
- network forensics,
- cloud forensics,
- mobile device forensics
- database forensics and others.

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[30] MASS news release http://mass.co.uk/about-us.asp#sec5

[31] Various market commentaries referred to …..
http://www.marketsandmarkets.com/Market-Reports/digital-forensics-market-230663168.html
http://www.transparencymarketresearch.com/digital-forensics-market.html
http://www.insightpharmareports.com/Affiliated-Reports/IndustryArc/Digital-Forensics-Market/

The global Digital Forensics market by end user industry is represented by seven segments: law enforcement, healthcare, education, banking, financial services and insurance, information technology, transportation and logistics, defence and aerospace. The law enforcement segment contributes the largest market share. Moreover, terrorism and security threats are prevented based on digital traces, thus digital forensics is becoming a vital tool for defence and law enforcement.

Market Forecasts indicate this is a c. USD $2bn market potentially growing to over USD $3bn by 2020, with a Compound Annual Growth Rate (CAGR) of 11% -12% year on year, dominated by the North America region contributing around 50% of the total market.

The most notable solution developers in the global Digital Forensics market, consistently identified in published reports are Access Data, Guidance Software, Oxygen Forensics, FireEye, Paraben, Nuix, MSAB, Cellebrite, Digital Detective Group, LogRhythm, Binary Intelligence, Asr Data, Lancope. Most of these are none UK centric but some do have a global / regional presence in the UK and Europe.

In the UK there appears to be a growing competitive market of organisations providing Digital Forensic services amongst a suite of offerings focused on Information Assurance more generally. The Forensic and Policing Services Association (FAPSA)[32] has many of these organisations, a mixture of SME's and more established / broader based companies, amongst its membership. However, many of these companies may currently lack accreditation credentials or sufficient conviction in plans to obtain them.

The Forensics Expo 2017[33] to be held in London Olympia places a significant emphasis on Digital Forensics, albeit much of it product rather than service focused. The breadth of companies exhibiting indicates a wide range of technology / innovation which may need to be given a platform / route to market other than by simply working behind the established forensic suppliers to Police Forces or waiting for successor procurements.

The Government Digital Marketplace[34] may provide another Force neutral route to facilitate wider market creation in Digital Forensic services in the future. Proactive use of this channel, driven via the Forensic Marketplace Strategy Group may provide ready access to additional services, specified to agreed standards/accreditation levels. This marketplace would operate alongside and / or within existing non-exclusive Force contracts, thereby keeping open access to innovation, through regular refresh of the Marketplace itself, and sustaining a level of competition as the demand for digital forensic services develops in both volume and capability terms.

In Digital Forensics, law enforcement is competing in a much wider industry pool for talent, demand, resources and innovation etc. than the traditional Forensics marketplace. There are competing demands arising from the limited pool of qualified resources and pace of technological change. These factors need to be considered by the Forensics Marketplace Strategy Group when framing the future relationship with the market, and in assessing the ability of internal Police resources to keep pace with both demand and innovation.

[32] FAPSA website link http://www.fapsa.org.uk/

[33] https://www.forensicseuropeexpo.com/

[34] https://www.digitalmarketplace.service.gov.uk/g-cloud/search?q=Digital+Forensics

8.1.10 Forensic Science Regulator

The Forensic Science Regulator was established in 2007 to advise Government and the CJS on quality standards in the provision of forensic science. The Regulator ensures that forensic science services across the CJS in England and Wales are provided within an appropriate regime of quality standards. Scotland and Northern Ireland have their own CJSs but follow the Forensic Science Regulator's standards. The Forensic Science Regulator published her first Annual Report in December 2015.

The 2016 Annual Report[35] , published in January 2017, raises a red flag around funding of science and

Force application of standards, reinforcing the following key concern …

> *"In this, my second annual report, I have updated my assessment of risks to quality in the CJS, reported on progress against last year's priority areas and defined priorities going forwards.*
>
> *A year on, it is clear that the single biggest challenge to achieving my aim is financial: the costs associated with complying with and being assessed against the standards.*
>
> *To be clear, the standards are not some unachievable 'gold-plated' ideal; they are the minimum standards expected of any reliable forensic science organisation, drawing from general good scientific practice and also learning from errors and omissions of the past and of other industries."*

The Forensic Science Strategy reinforces the importance of a robust quality regime.

> "*Operating within a robust quality framework provides the CJS with an assurance of the legitimacy of the evidence being submitted. Complying with international standards, such as ISO1702511, provides a framework that assesses competence, quality and effectiveness in meeting customer requirements. Accreditation to these standards by an independent body demonstrates that the processes within which evidence has been obtained and analysed have been independently assessed to ensure appropriate validation of the methods used and competency of the staff who conduct the analysis."*

Key relevant standards

a. ISO 17025 (General requirements for the competence of testing and calibration laboratories)

b. ISO 17020 (Scene of crime)

Consistent quality across an organisation enables more cost-efficient operations. The absence or failure of quality management systems could lead to massive costs from investigating and correcting miscarriages of justice.

The Forensic Science Regulator has published the Codes of Practice and Conduct which provide additional guidance, context and interpretation of the standards for the UK. Accreditation of forensic science is carried out by the UK Accreditation Service (UKAS). This process of independent assessment provides an accountable and transparent process that strengthens public trust.

ISO17025 is the international standard used to confirm the competence of a laboratory. It specifies the general requirements for testing and allows laboratories to develop management systems for quality, administrative and technical operations.

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[35] Forensic Science Regulator Annual Report 2016
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/581653/FSR_Annual_Report_v1.0.pdf

Under previous commercial arrangements, all commercial FSPs delivering services under the NFFNG are required to be accredited to ISO17025 standards for each of the services they provide. However, this requirement for accreditation does not apply to services purchased outside of the framework, such as digital forensics or services purchased by the defence.

Police forces which carry out in-house forensic provision have agreed a timetable with the Forensic Science Regulator within which they will obtain accreditation to the same standards as those required by external providers.

Digital forensics is a growing and dynamic area, but it is still possible to apply the same standards as for other forensic science disciplines to achieve accreditation. The rapid pace of technological change and the introduction of new devices mean that new methods are required in order to extract information. However, the use of an overarching quality management system is still essential to ensure the validity of the methods and the competence of the staff.

8.1.11 Other Spend Categories

Other potential spend categories to be considered but not dealt with in this paper include:

- Forensic Archiving
- Back office systems, e.g. Case Management, which may be outside direct scope of TF
- R&D
- Training and specialist resourcing / recruitment

9. Appendix I – Checklist of the Programme BC and the MSP requirements

Programme BC elements from OGC Gate 0 review	Reference in this Business Case
a Programme Business Case: this document will be developed over the life of the programme. It should provide progressively more detailed information about:	
objectives: a description of the purposes, outcomes sought, key deliverables and timescales, plus the main success criteria against which the programme will be measure	5 The Transformation Programme Proposals
background: outline of the key drivers for the programme, showing how it will contribute to policy outcomes or the business strategy	6.2The case for change Appendix A: Forensics Background Brief
a model of the intended outcome(s) as a vision of the future and how the vision will be delivered through the organisation(s) involved, delivery agents, new services, etc	5 The Transformation Programme Proposals
scope: the boundaries of the programme	3 Introduction 5 The Transformation Programme Proposals
the required benefits from the programme: these will be elaborated in a benefit profile for each defined benefit, covering a description of the benefit, when it will be realised, and the measures and performance indicators that will be used to assess achievement levels and their costs	5 The Transformation Programme Proposals 6 Strategic Case 7 Economic Case
the main assumptions and constraints on which the programme will be founded and dependencies with other programmes or strategies	6 Strategic Case Appendix D: Assumptions

Programme BC elements from OGC Gate 0 review	Reference in this Business Case
stakeholders: a list of the key stakeholders and their role in the programme, with a strategy and plan for communicating and engaging with them	10 Management Case
finance: the financial provision made for the programme and its components	2.3 Economic Case 2.5 Financial Case
organisation: the way in which the programme is to be organised, led and linked into other related programmes	10 Management Case
risks: the main risks so far identified, a strategy for managing them and need for any contingency arrangements	6 Strategic Case 10 Management Case
issues: a strategy for capturing and resolving issues	10 Management Case
outcomes: a strategy for measuring results and achieving outcomes	10 Management Case
components: a list of the projects in the programme's portfolio and interdependencies that have to be delivered successfully if the programme is to achieve its objectives and their current status	5 The Transformation Programme Proposals 10 Management Case