



What does the UK Police National Database tell us about the future of police intelligence?

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Introduction

The latter part of the 20th Century saw rapid social change, epitomised by mobility which became faster and less expensive. The advent of the 21st Century saw the speed of change intensify, characterised by developments in technology and digitisation. During this period the physical and virtual environments started to merge (Schwab, 2015), which led to the rise of smart cities, smart devices, and the development of cryptocurrencies. In contemporary society, an individual can organise ~~the majority~~much of their personal and business life via their smart phone, 24 hours a day.

These transformative changes are also exploited by offenders, which has ramifications for law enforcement agencies. Routine Activity Theory (Cohen & Felson, 1979) argues that crime occurs through the national rhythms of everyday life, therefore “crime is the intentional consequence of unintended opportunity” (Tilley, 2005, p.266). Recent developments allow offenders the opportunity to travel further and more quickly, whilst the online environment can be used to maintain anonymity and facilitate crime. Whilst legitimate digital assets, such as ‘meme coins’ or ‘non-fungible tokens’ grow, so do illegitimate actions, especially during the pandemic which has seen online fraud surge (Stripe, 2021). This technology can also be exploited by the police, to identify and target persistent offenders and reduce the vulnerability of repeat victims. However, whilst this course of action is simple in theory, it is more difficult to achieve in practice. Although offenders leave physical or electronic traces concerning their movement and interactions, these are disparate and fragmented, held by different police forces on various intelligence systems. (Egbert, 2019).

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6 These shortcomings were tragically highlighted during 2002 in the UK, following the
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8 murders of 10-year-old Holly Wells and Jessica Chapman. The offender, Ian Huntley, was
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10 known to various UK police forces for burglary, sexual and violent offences. However, due
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12 to the inability of police forces to link or disclose this intelligence, Huntley was able to
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14 acquire the post as their school caretaker and gain their trust. To prevent this re-occurring a
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16 government inquiry, led by Lord Bichard between 2003-6, recommended the urgent
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18 development of “a national information technology system for police intelligence in England
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20 and Wales” (Bichard, 2004:13). From this emerged the Police National Database (PND), a
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22 system which allowed the 43 forces of England and Wales, the Police Service of Northern
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24 Ireland, British Transport Police, Police Scotland and other national law enforcement
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26 agencies (e.g. National Crime Agency, the Child Exploitation and Online Protection Centre)
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28 to share information “to support public protection” (Lambri et al., 2011, p.5). ~~It did so by~~
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30 linking~~The system was independent to the Police National Computer (PNC), which enjoyed~~
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32 mainstream access and usage. However, the PND linked 230+ local crime, custody, domestic
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34 abuse and child abuse records, allowing a more holistic intelligence picture concerning
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36 people (e.g. offenders), objects (e.g. stolen property), locations (e.g. address) and events (e.g.
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38 a crime report). Launched in 2011, it aimed to: safeguard children and vulnerable people;
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40 counter terrorism; and prevent and disrupt serious and organised crime (SOC). Whilst one
41
42 academic study explored its introduction (see Lambri et al., 2011), there has been a lack of
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44 independent published studies to examine its progress and efficacy. Indeed, the success of
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46 such an enormous undertaking was not guaranteed due to the number of reports that show the
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48 introduction of police technology is fraught with challenges (e.g. Lum et al., 2017). This
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50 specific study therefore explores the lessons that can be learnt from the PND, a decade after
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52 its launch.
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Literature Review

In an information rich world, during periods when public resources are finite, it appears obvious that technology can improve police efficiency (Rutgers & van der Meer, 2010). Indeed, information technology, which enables the harvesting and analysing of intelligence, is thought to be central to criminal investigations (Koper et al., 2014; Weisburd et al., 2003; Hollywood & Winkelman, 2015). As offenders often come to the attention of numerous agencies, multi-agency working and data sharing are fundamental to working practice (Home Office, 2014, 2018; National Crime Agency, 2014; Carter et al., 2014). Whilst all information systems are introduced with the “intention of making officers more efficient, fair and productive” (Carr, 2017, p.360), this is “easier to say but harder to do well” (Wilson & Gray, 2015, p. 5). The academic literature confirms the challenges in introducing, embedding, and using new technology (Lambri et al., 2011; Lum et al., 2017). This is because any organisational change, facilitated by IT, needs to go much further than the product itself (Lambri et al., 2011).

Barriers to information sharing

There are various elements that generate these difficulties. At the outset there are considerable technical challenges in designing software that can harvest data from disparate systems and provide a secure and user-friendly interface to analyse the contents (Wilson & Gray, 2015). These issues are exacerbated by the lack of consistent data standards (Evans-Pughe, 2006; Hollywood & Winkelman, 2015), which leads to inaccuracies in the recording of “people, events and even colours” (CGI, 2013, p.1). Difficulties also surround the requirement for a secure system that complies with legal requirements (Lum et al., 2017; O’Neil, 2017, p.531), as well as numerous concerns between partners over proportionality, legal ambiguity, and appropriate guidance (Thomas & Walport, 2008).

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6 The fear of what can and cannot be legally shared can result in practitioners failing to reveal,
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8 or over-sanitise, information rather than risk data protection breaches (Pinkney et al., 2008;
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10 Wilks, 2014). This is exacerbated by concerns that other agencies will fail to manage the data
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12 according to legal and procedural guidelines (Dawes et al., 2009; Wilson et al., 2011). In fact
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14 it is argued there is a “fog of ambiguity and uncertainty surrounding the legal framework”
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16 (Thomas and Walport, 2008, p.40), which leads to risk aversion, poor data sharing, and
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18 ultimately detracts from proactive approaches to tackling crime (Thomas & Walport, 2008;
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20 Van Staden et al., 2011). This is exacerbated when the data is particularly sensitive in nature
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22 (Kirby, 2013).
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29 Police organisational culture is also highlighted as a major obstacle to organisational
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31 improvements, which include technological change. Lambri et al. (2011, p.10), specifically
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33 argued the way PND challenged existing cultural norms, “could in fact impede the
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35 evolutionary development”, and cause officers to block its use. These cultural aspects are
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37 exacerbated in multi-agency work. This is because different agencies are more likely to
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39 generate conflicting cultures (Barnes, 2008; Horwath & Morrison, 2007), competing
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41 priorities (Atkinson et al., 2005; White, 2009), different attitudes to information sharing
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43 (Hollywood & Winkelman, 2015), institutional friction (Gillen, 2011; Pratt, 2012; Stanier,
44
45 2013) and logistical challenges (e.g., funding, space, compatible technology; Atkinson et al.,
46
47 2005; Barnes, 2008; White, 2009). Other issues such as poor leadership, limited resources
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49 (funds and IT), and a lack of engagement with innovation are also said to hinder an
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51 intelligence-led approach (Darroch & Mazzerolle, 2013; Ratcliffe, 2005, 2008; Sanders et al.,
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53 2015). Deloitte (2015) discovered in their survey that over 80% felt employee resistance was
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3 the main cause of technology projects failing; a finding previously reported by others who
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5 have uncovered active resistance from police officers (Ericson & Haggerty, 1997).
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10 Facilitating effective information sharing

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12 Understanding the barriers to successful implementation can provide the means to ameliorate
13
14 them. In relation to the technical issues, it assists if practitioners can work closely with
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16 developers to identify appropriate technology requirements (Hollywood & Winkelman, 2015;
17
18 Deloitte, 2015). Lambri et al. (2011), emphasise the importance of understanding how
19
20 practitioners interpret the data from the IT system rather than just focusing on the technology.
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22 Ultimately the importance of collaborating with end users during the initial development
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24 stages has been recognised as “fundamental to the successful delivery of... technology
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26 programmes” (House of Commons, 2021, p.3).
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33 Several commentators have suggested the way to reduce cultural resistance is through
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35 business processes and business change (Lambri et al., 2011). Neyroud and Disley (2008,
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37 p.230) highlight the importance of “management and oversight” when dealing with new
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39 technology, arguing effective governance requires an emphasis on ~~three~~four issues: a)
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41 *integrity* – specifically the security, accuracy and reliability of the system, with clear
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43 governance over how the information is shared with other agencies; b) *outcomes* – which
44
45 understands “the value added...to various aspects of policing” as well as the involvement of
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47 independent research to make this clear; ~~and~~-c) *transparency*, relating to how systems and
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49 databases are governed; and, d) *public confidence* and trust in the new technology.
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56 Thomas and Walport (2008, p.59) also endorse the importance of “strong leadership and clear
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58 lines of accountability” when sharing information, with Koper et al. (2014 p.215) arguing that
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3 “management practices, agency culture, and other contextual factors” play an important role.

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5 This can be assisted by mainstream acceptance ~~for~~of innovative technology, coupled with
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7 training, technical support, and incentives (Lum et al., 2017). In fact, the absence of training
8
9 associated with new technology can often make new systems irrelevant (Martin & Jackson,
10
11 2008). It appears when technology is endorsed by other organisational change it is linked
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13 with enhanced performance (Garicano & Heaton, 2010; Willis et al., 2007).
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19 The current intelligence landscape and developments in the PND

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21 As is illustrated later in the paper, the PND has evolved from its original purpose of
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23 providing a national police intelligence system, that provided a national view of local force
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25 data (holding intelligence on people, objects ~~(i.e. vehicles),~~ locations and events ~~(i.e.~~
26
27 crimes),~~),~~ to also act as a national information source for organised crime and organised
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29 crime groups (OCGs), including county lines, modern slavery and human trafficking. It has
30
31 ~~also~~ undergone technological developments (i.e. improved facial searching), and supported
32
33 multiple pilot programmes (i.e. police vetting, firearms, domestic abuse non-molestation
34
35 orders). However, following the launch of the National Law Enforcement Data Service
36
37 (NLEDS) programme in 2016, there has been “repeated deferral of investment mean[ing] that
38
39 some elements of the PND’s infrastructure have reached the end of their service lives,
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41 affecting both service quality and stability” (National Audit Office [NAO], 2021, p.33).
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43 Subsequently, in December 2020, the Home Office decided to maintain the PND “as a
44
45 standalone system until 2031”, with renewed investment and development in the PND
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47 underway (NAO, 2021, p.6; Say, 2021).
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56 Summary
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3 In summary, although the PND was introduced in response to a failure by UK police forces to
4 share information, this type of intelligence failure occurs across the world (Kirby & Keay,
5 2021). The PND was therefore implemented to make available “the wealth of information
6 held, but not exploited, by police forces for the prevention and detection of crime” (Bichard,
7 2004, p.130). This meant tackling the incongruent technology systems across different police
8 forces which, “led to real difficulty in accessing all relevant information, which has in turn
9 resulted in poorly informed decision making” (ibid, p.129). However, as explained by the
10 National Police Improvement Agency (2009, p.7), the PND project “is not just an IT project;
11 it is helping the Police Service to deliver fundamental business change improvements enabled
12 by IT”. As such, research can assist in adding to the contextual understanding of
13 implementing and adopting police technology (Lum et al., 2017), as “police often adopt new
14 forms of technology before their impacts and effectiveness have been demonstrated” (Koper
15 et al., 2014, p.219). As the wider landscape shows, intelligence has a critical role to play in
16 tackling current strategic policing priorities; for example, the violence against women and
17 girls strategy underlines “the importance of effective information sharing and clear data”
18 (Home Office, 2021a, p.75), with the significance of “data collection and intelligence
19 sharing” noted in the Beating Crime Plan (Home Office, 2021b, p.31). Ensuring the effective
20 use of the PND is therefore essential to support policing in protecting the public and tackling
21 serious crimes.
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Methodology

Access to police systems is often limited due to the legitimate concerns surrounding the confidentiality of police operations. This study has been supported by both the users (UK National Police Chiefs' Council) [NPCC] and developers (CGI) of the system. Care has been taken with this study not to identify any issues that may compromise operational capacity or capability, and the process has included the vetting of research staff, together with the anonymisation of data.

The study uses a mixed methods approach. The quantitative element explores numerical data to establish PND usage across the 56 British police forces and associated agencies (i.e. Home Office, National Crime Agency). Specifically, it ~~explores~~ examines the number of commissioned PND licenses, (‘enabled’ and ‘used’, as of June 2019), as well as the number of searches across various categories (as of June 2019) July 2018 to June 2019. The number of searches were counted in the following categories: POLE (a search relating to a person, object, location or event); facial (a search of images of people held on the PND); bulk facial (a search of multiple images); bulk (a bulk search of other details); scheduled (a search scheduled to automatically occur at a set time: weekly, monthly, quarterly or annually); and triggered (a search scheduled to automatically run on a daily basis). All quantitative data was anonymised and transferred into SPSS to facilitate descriptive ~~analysis~~ and inferential analyses. Shapiro-Wilk tests of normality deemed the data to be skewed ($p < .05$); therefore, non-parametric tests were conducted.

The qualitative aspect of the methodology involved semi-structured interviews and focus groups with individuals perceived to be experts in the system. The 17 participants were contacted with the aid of the ~~National Police Chief Council~~ NPCC PND lead, and further

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3 participants were recruited via a snowball sampling technique. Due to accessibility and
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5 scheduling, a variety of methods were used (during Spring 2019); ten interviews (face-to-face
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7 or via the telephone), two focus groups (one consisting of a group of two and a further
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9 consisting of a group of three), and two written responses. The roles of the participants
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11 included a Chief Police Officer with national responsibility for PND and senior police
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13 officers with managerial responsibility for the development or implementation of PND, as
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15 well as PND users, auditors, and administrators. The interviews were transcribed and
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17 anonymised. NVivo was used to conduct thematic analysis of the data to establish the key
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19 themes, with quotes from the practitioners anonymised using reference numbers (i.e. P1, P2
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21 etc).
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28 Whilst it is acknowledged the sample size was small, ~~the exploratory research was able to~~
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30 ~~include~~ it is not dissimilar to other research examining expert perspectives (i.e. De Paoli et al.,
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32 2021, n=13; Olver & Cockbain, 2021, n=11); the exploratory research offers valuable insight,
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34 including perceptions of those from a range of roles and agencies. Moreover, the practitioner
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36 interviews provide a contextual understanding and complemented the quantitative data on
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38 search usage.
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Results

The results follow the quantitative and qualitative approaches, highlighted above.

Quantitative

AHAs the system is separate to PNC all agencies who use the PND are required to purchase licenses, which enable its use. The number of required licences is specified by the individual agency, who are guided by personnel numbers and predicted use. The data shows that although many licences/licenses were commissioned, not all were activated; thein June 2019, an average of 228.76 (SD=207.69) licenses were enabled, compared to 137.11 (SD=128.99) licenses that were used. The percentage of activated licenses ranged from 0% (which related to a small agency who had seven available licences but had not activated any of them) to 90% (median=63%). At this basic level, it shows that the actual use of the PND does not match the potential availability. Kendall's Tau correlations between the size of the force¹ and both the number of licenses commissioned and activated were found to have statistically significant relationships, albeit of a moderate strength² ($T=0.578, p<.001$; $T=0.555, p<.001$, respectively); this indicates that, generally, the bigger the agency the more licenses that are commissioned and active.

In relation to individual search usage, again there were disparities between police forces- (see Table 1). Whilst some inconsistency could be expected, as the agencies cover widely different areas, it was shown that the POLE searches ranged from 0 (found within two agencies) to over three quarters of a million in another agency. Similarly, the facial searches

¹ Based on 46 agencies in the sample, with force size figures obtained from Statista (2022)

² The correlation coefficient (T) indicates the strength of the relationship. A value of less than 0.35 is deemed to be weak, 0.36 to 0.67 to be moderate and 0.68 to 1.0 to be strong (Taylor, 1990).

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3 ranged from 0 in ~~one agency~~ three agencies to over 2000 in another. This pattern was
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5 illustrated across all available search categories and ~~did not correlate with the number of PND~~
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7 ~~licences or the number of personnel within the organisation. It~~ indicates that different police
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9 forces chose to use the PND, and its various capabilities, with different levels of frequency.
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14 License use significantly correlated with each of the search types, yet such relationships
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16 varied from a weak to moderate strength: POLE ($T=0.548, p<.001$), facial ($T=0.498, p<.001$),
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18 bulk facial ($T=0.379, p<.001$), bulk ($T=0.585, p<.001$), scheduled ($T=0.363, p<.001$), and
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20 triggered ($T=0.367, p<.001$). In relation to agency size, significant, albeit weak, relationships
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22 were reported with POLE ($T=0.463, p<.001$), facial ($T=0.357, p<.001$), bulk facial ($T=0.325,$
23
24 $p<.01$), bulk ($T=0.248, p<.05$) and triggered ($T=0.278, p<.01$) searches, yet scheduled
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26 searches did not correlate ($p>.05$). However, of note, when the two largest agencies were
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28 removed from the analysis, both bulk and scheduled searches were not significantly related to
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30 agency size ($p>.05$). Whilst such analyses highlight that, generally, the larger the agency and
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32 the more licenses used, the higher the frequency of various search types, the absence of
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34 strong associations between the variables should be considered.
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42 [Insert Table 1 here]
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46 Qualitative

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48 This section provides results in four thematic areas: a) specific examples of PND use; b)
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50 overall impressions perceived strengths; c) areas where improvement can be made perceived
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52 deficiencies; and d) future considerations.
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56 a) *Specific examples*

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3 Participants provided a vast range of positive examples emanating from their use of the
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5 PND-. highlighting its ability to assist in quickly apprehending an offender and finding a
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7 missing person due to facial recognition, initiating investigative leads, and offering a holistic
8
9 view of an individual to inform the assessment of threat, risk and harm. To assist the reader
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11 with a wider understanding of the transformation it has made to intelligence analysis four
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13 scenarios are selected:
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17 Example 1: *“a vulnerable lady with young children, single parent, met someone online,*
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19 *formed a very quick relationship and that person committed sex offences within that family*
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21 *environment. But the only contact, or only evidential trace, was the photograph of the*
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23 *social media profile... that’s run through PND and immediately identifies the person...*
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25 *they were arrested within hours. So that’s the value of PND, not the potential value, the*
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27 *value because it happens all the time” (P4).*
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33 Example 2: *“[force] were dealing with a murder with a vicar in a church and the PND*
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35 *had information on somebody who had made a threat to kill members of the clergy. So,*
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37 *having done that search, the investigators realised it’s probably the person they’re looking*
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39 *for and it led them to an address. They found the person and blood-stained clothing in the*
40
41 *wash, as he was trying to get rid of the evidence” (P7).*
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47 Example 3: *“When we were aware of [facial searches] we put a person’s picture into the*
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49 *system that had been missing for 10 years... we found this person in 20 minutes” (P17).*
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54 Example 4: *“Vetting is better because now you have access to all of that data across the*
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56 *whole area, all forces” (P10).*
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~~b) Overall impressions~~

b) Perceived strengths

Participants recognised the value of the PND, in terms of its innovation and ability to transform the intelligence, and policing, landscape. Benefits of the PND are captured according to three themes: i.) a consistent and reliable approach to intelligence; ii.) transforming police intelligence; and iii.) a holistic view.

i. A consistent and reliable approach to intelligence

As can be seen from the examples provided, participants explained the PND provided a step change to intelligence analysis, arguing that prior to the PND there was “*no intelligence sharing capability*” (P13). Whilst some historic mechanisms, such as national intelligence bulletins, did exist these were “*not really effective at all*” (P4). What previously existed was a haphazard approach, which was both ineffective and inefficient. For the police to establish if an individual was known elsewhere an officer sent requests to other forces in a variety of ways, such as “*general intel mailboxes*” or “*a phishing email to all of the forces to clarify*” (P11). One participant explained they would, “*go to 43 forces and say tell me what you’ve got on [name], unless I know where [name] has come from, it wouldn’t be done*” (P10). Ultimately police forces would respond arbitrarily, often ignoring the intelligence request or providing only limited information.

ii. Transforming police intelligence:

Participants explained the PND had transformed the intelligence process and met its remit in tackling terrorism, serious organised crime and improving safeguarding. The system had also improved over time with P10 stating, “*When it first started... it was very clunky. You had to fill a form out and send it off... Now its developed, you can access that data yourself, so you can go right... click on that force and give me that data. It’s massively different*”. This was

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3 endorsed by P13, *“When you look at where we started, and that we had nothing, it’s been*
4 *100% successful... It works. It solves murders, as well as volume crime, missing persons”*.

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7 Practitioners pointed out it supported the intelligence picture on a daily basis, benefitting
8 OCG management, operational planning, and major investigation. It was also said to be
9
10 useful to a diverse range of departments and teams, including control rooms, intelligence
11
12 teams, child protection, domestic abuse, and vetting. The participants recognised how the
13
14 PND brought a new capability to the intelligence landscape:
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19 *“Historically with intelligence, it’s always been an issue... around the ability to share*
20 *information between border agencies, national agencies and policing. Along comes PND,*
21 *you’ve solved it”* (P4).
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25 *“To think of policing in the 21st century without a PND equivalent is just, you’re back in*
26 *the stone age”* (P5).
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33 iii. A holistic view:
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35 Practitioners lauded its ability to provide a holistic picture. As P6 explained, *“everybody uses*
36 *the PNC [Police National Computer], but the PNC tells you information you already know. I*
37 *know you’ve been arrested... but I didn’t know that he was talking to [name]... that he drove*
38 *that car... had this phone number. Now, that’s gold dust and that’s where we should be*
39 *working”*. Further, the system was acknowledged to be innovative, *“at Europol... they were*
40 *amazed at PND. They were like ‘we don’t have anything like this’. So, we’re in a really*
41 *unique position... we’ve got something that we can really get some value from”* (P12). The
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43 power of the system in providing a holistic understanding was summed up by P13:
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53 *“In [the PND] we have records of 16 million people. So that includes from a safeguarding*
54 *perspective as well. Two million organisations, which can include OCGs. 85 million*
55 *intelligence records, 160 million crimes records, 130 million custody records, six million*
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3 *child abuse records, 17 million domestic abuse records, 1.1 billion association records*
4 *and there's no point having 4.1 billion records if they're not linked to tell the story. So, if*
5 *you can't link the person to the child abuse record it doesn't tell the story. We've got 14*
6 *million searchable images from people who have come into custody, 14.4 million*
7 *telephone numbers, 12,000 OCGs, and that's from 55 agencies and 250 sources".*

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17 *c) Perceived deficiencies*

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19 Whilst the perception of the system was overwhelmingly positive it was agreed that
20 improvements could be made, specifically surrounding three themes: i.) system design; ii.)
21 system integrity; and iii.) system use.
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29 i. System design:

30 Participants commented that the system was sometimes difficult to navigate, which increased
31 the time spent on the system:
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35 *"I find navigating around all the different kind of searches quite clunky, it's not obvious*
36 *where you'd look sometimes for information" (P1).*
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39 *"It's a bit of a beast to use, I'll be honest, it's not massively user friendly, but if you*
40 *consider the vast volume of data that it's dealing with, it's what we've got, and it bridges*
41 *those gaps" (P3).*
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49 Speaking about the design, the need for a close relationship between software developers and
50 practitioners was discussed:
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54 *"decisions are made by people who don't understand the system and they get IT*
55 *developers to do something who don't understand the system, so they'll say yes to*
56 *everything... they do go out and they do speak to you, and then they write down what*
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3 *they think you said, and they'll go and give it to some programmer, but they won't give*
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5 *them the whole picture, they're just doing that one little bit of it" (P5).*
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10 Several specific technical improvements relating to search criteria and analytical tools were
11 suggested to make the PND more user friendly. Indeed, the importance of the practitioner-
12 developer relationship extended into training:
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17 *"[the training questions] aren't built for a user, they're a test, like how bizarre a record*
18 *you can find... that's not really what it's like... All of it is based on the training system*
19 *which doesn't have a volume of records in anyway, so it's not particularly representative*
20 *of a search that you'd do to begin with" (P12).*
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26 *"You'd ask the trainers questions but because they're not users, they're not really able to*
27 *answer your practical questions" (P12).*
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33 ii) System integrity:

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35 As the information is generated from forces all across the country, there was a further theme
36 around national standards and consistency:
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40 *"all the IT systems are different, all the IT systems work differently, you're trying to feed*
41 *them onto one database, which is a horrendous task" (P5).*
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45 *"there's a real need for that to have a stronger national governance around data quality,*
46 *data currency, for things like PND" (P4).*
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51 This even extended to the level of information input onto the system:
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54 *"Some forces will load next to nothing on it, but they're technically loading onto it" (P5).*
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56 *"issues around completeness and consistency of the data, as well as currency of the data"*
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58 (P4).
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6 However, as others explained this was an issue that affected all national systems and not just
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8 the PND:

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10 *“there’ll always be an issue about data quality, but it’s not the PND, it’s the source of data.*
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12 *Some of it you can avoid and some of it you can’t”* (P6).

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17 iii) System use:

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19 There was a consensus that the system was not being used to its potential, leading to *“a lot of*
20 *missed opportunity”* (P11). Two specific explanations were provided to explain this. The
21
22 most obvious reason was access limitation due to cost. As P8 reported, *“the barrier does tend*
23 *to be the initial access and the amount of people who can have it. I’d love to give somebody*
24 *on every single team access to it, but I can’t”*.

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33 Resourcing was therefore an issue, ranging from the availability of terminals to limited time
34 and staff (e.g. *“I’m not given the time or opportunity to do it”* [P9]), to a much broader issue
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36 of funding. Overall funding was seen to connect to everything, including the development of
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38 the system as well as the support for users, *“You don’t want to say to people who want access*
39 *to PND ‘you can’t have access actually because it’s going to cost you X amount’”* (P5).

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45 Further, as searches were often done through specialist officers in central locations, its use
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47 was reliant on officers being aware of the system and how to access it:

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49 *“you think, it’s been out 11 years, why are we going around telling people the advantages*
50 *of PND, surely you must know this and be doing it”* (P5).

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54 *“the frustrating thing, people don’t know what they have or how to make best use of it”*
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56 (P13).

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3 Participants suggested the lack of a systematic and centralised marketing approach leads to
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5 the differences in awareness across agencies.
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10 The second explanation concerning its lack of use was that practitioners simply chose not to
11
12 use it to its potential. A participant explained why this may be the case:
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14 *“I think the information sharing barriers that we come across are those with nervousness*
15 *around sharing information... people worry... it’s sort of a complex area of information*
16 *compliance isn’t it, and one that people are concerned about... You can start to see a*
17 *culture that is developing around being concerned around sharing information because of*
18 *penalties and fines, and not really counterbalancing that with threat, harm and risk,*
19 *information sharing practicalities in order to safeguard an individual. It is tricky, we’re*
20 *asking our frontline staff to be able to understand and interpret huge swaths of legislation*
21 *and we need to make that easier for them” (P15).*
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35 This situation was frustrating to the interviewees:
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37 *“I will tell you something because I’d rather you be kept safe then end up being killed by*
38 *somebody. And I can live with that. If I get my ass kicked for telling you data that I*
39 *shouldn’t have told you, ok fine. But I believe, we talk about dare to share, we still don’t*
40 *do it” (P10).*
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46 *“What we have sort of forgotten in the background is I can point to serious case review*
47 *after serious case review where actually, the common criticism is not sharing information*
48 *and intelligence that could have made a difference in relation to a safeguarding activity,*
49 *something that would’ve made a difference to that individual” (P15).*
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58 There were also wider cultural issues, such as trust:
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3 *“the dangers of not giving people access far outweigh the risks of them seeing the*
4 *intelligence... it’s part of your role, you’re trusted, you’ve got vetting, it’s a legitimate tool*
5 *in your pack... using those tools with honesty and integrity, quite rightly code of ethics...*
6 *for a policing purpose... as policing UK, we should trust our officers and our staff to*
7 *access appropriately. We give our local systems, so why not the national system” (P3).*
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17 However it was felt risk could be mitigated if the data being transferred into the PND was
18 appropriately recorded by its owner:
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21 *“The more people who have access, yes of course there’s more risk... If the intelligence is*
22 *handled properly by its home force, it will only be uploaded with a certain level of access*
23 *anyway... then if you don’t have the permissions, you don’t have the permissions” (P3).*
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31 *d) The future*

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33 Finally, participants were provided with the opportunity to suggest how the PND should
34 evolve in the future. There was a consensus that the system had much more potential and was
35 currently constrained. One participant summarised the dilemma:
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40 *“What we also have is 20th century thinking, but when we’ve got 21st century technology*
41 *and 21st century problems... how do we manage risk now, never mind in 2023... it should*
42 *be seen as a capability, not as an IT system. It’s about how we transform policing...*
43 *Offending is no longer local, not even across forces, they’re now global... When you take*
44 *into account digitally, mobile world, digital world, we don’t make good use of the*
45 *technology we’ve already got... we have to think of new ways of working and technology*
46 *to overcome all the issues” (P13).*
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59 Another participant suggested how the system could evolve,
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3 *“For me, in an ideal world, everybody would put onto PND. It’s that one place to go to...*
4 *that’s where, for me, if you can pull in partner agencies, it’s an even stronger tool... if*
5 *everybody came onto one system, everybody would have that – if the world was on it, we’d*
6 *have a whole system approach”* (P10).
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15 In this the potential of including other existing databases was also discussed, from Driver and
16 Vehicle Licensing Agency to Missing from Home information. A wider partnership was seen
17 as a significant step forward:
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21 *“we’ve got to start engaging with the private sector and start engaging with international*
22 *law enforcement because they have, their intelligence adds value to us and we have*
23 *information that’s of value to them, so we have to make sure there’s the necessary*
24 *safeguards”* (P13).
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Discussion

This research set out to understand the use of the PND, exploring the lessons that can be learnt from the system, a decade after its launch. The quantitative data highlighted instances of the failure of agencies to use all licenses issued, with great variations in both the use of the different search types and the frequency of use. This indicates the need of agencies to ensure they are utilising the PND to its full potential. The qualitative data offers examples of how the PND has facilitated policing practice, as well as highlighting its perceived strengths and deficiencies, with practitioner suggestions of how the PND could be developed. Echoing earlier literature, these insights are critical at a time when the PND is undergoing investment and development. The implications of such findings will now be discussed.

The study generated four major themes that start with the general and move to the specific. The first point highlights the importance of independently reviewing data management systems. Such systems are significant both in terms of cost and central to police effectiveness and, during the past decade, problems have been reported. One issue relates to overpromising, such as an £80m commission of mobile data units, which failed in their undertaking to save 30 minutes for each officer, per shift (Berry, 2010). However, more problematic is when an information system fails. An example relates to the Athena information system, used by nine UK police forces at a cost of £35m. This faced significant implementation problems and became associated with allegations that it facilitated offenders escaping justice (Waterhouse, 2019). Even more recent was a northern police force who declared a critical incident following a failed upgrade of its £29m information system, which led to officers recording incidents on paper (Williams & Britton, 2020). The lack of independent evaluation is thought to be due to the operational sensitivity surrounding the systems, coupled with the absence of an evaluation culture (Syed 2015; Kirby, 2013).

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3 Nonetheless, understanding the efficacy of an information system is vitally important if
4
5 improvements are to be made. As recognised by the Head of MI6, offenders are constantly
6
7 evolving, and policing agencies need to do the same, therefore they must engage with third
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9 parties to stay fit for purpose (Moore, 2021). Whilst it is accepted that this study has
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11 limitations, both in the level of quantitative analysis and the number of participants, it
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13 provides an independent and objective perspective from which improvements can be made.
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19 The second point is that the study provides a proof of concept in relation to a new approach to
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21 information sharing. Law enforcement information systems, across the world, are often
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23 closely guarded- (i.e. Pinkney et al., 2008; Thomas & Walport, 2008; Wilks, 2014; Wilson et
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25 al., 2011). This means that when partners need to share intelligence systematically, as seen in
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27 US based fusion centres or agencies such as Europol, representatives from the disparate
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29 agencies are brought together to access their individual system independently and disclose
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31 information on request. The PND works differently. It brings together over 230 databases
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33 from approximately 50 multi-jurisdictional agencies and supplies a user-friendly practitioner
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35 interface, which all agencies can interrogate. This is a critical finding as it shows diverse
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37 agencies can, in practice, pool different electronic data sources, held in different formats, to
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39 establish a more holistic picture on a person, object, location or event (POLE). In a world
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41 where offenders are more likely to move quickly and leave traces across diverse jurisdictions,
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43 the benefits of this approach are enormous. If this unique concept was replicated more widely
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45 it could increase the level and quality of police intelligence and reduce cost in both police
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47 time (through individual police searches), as well as limit the need for extra intelligence
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49 structures.
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3 Third, whilst practitioners unanimously endorsed the transformative benefits of PND and its
4 ability to deliver a more holistic intelligence picture, the system could also be improved. As
5 the academic literature has previously shown there are technological and organisational
6 reasons why electronic information systems (less complex than the PND) fail- (i.e.
7 Hollywood & Winkelman, 2015; Pratt, 2012; Sanders et al., 2015; Wilson & Gray, 2015).

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14 This study supports previous research and explains further the barriers and facilitators
15 surrounding the implementation and use of information systems. Specifically, both the
16 quantitative and qualitative data illustrate the PND was not being used to its potential and
17 was inconsistent across police forces, both in terms of use and the level of information they
18 shared on the system. ~~The difference is disproportionate and cannot be explained by the size~~
19 ~~of the organisation. Whilst associations between the size of the organisation, the number of~~
20 ~~licenses enabled and used, and the frequency of searches conducted is expected, the~~
21 ~~correlations were of a weak to moderate strength, which were somewhat influenced by~~
22 ~~outliers (i.e. when the two largest forces were removed from the analysis, the relationship~~
23 ~~between agency size and bulk search frequency was no longer significant). What's more, the~~
24 ~~correlational analyses, varying in the levels of strength and significance, alongside the~~
25 ~~descriptive statistics, highlight inconsistencies in use (i.e. a number of agencies conducted~~
26 ~~zero searches in relation to a number of search types). The difference between forces is~~
27 ~~disproportionate and cannot solely be explained by the size of the organisation.~~ Practitioners
28 explain the difference through several reasons which encompass the value they place in the
29 approach, their resourcing of it, how risk averse they are (specifically over legislation),
30 publicity of the system and training provided to their personnel. These issues relating to
31 discretion, emanating from police organisational culture, has been widely discussed as
32 blocking organisational change within policing, including the use of technology. This
33 research endorses other studies that argue any technological based change must be supported
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3 by other organisational change. This includes leadership, infrastructure and supporting
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5 processes.
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10 Finally, this study has also shown the tensions inherent in a national system which is born
11 from local jurisdictions that enjoy individual autonomy and operational discretion. The
12 database has highlighted significant inconsistencies, from practitioner commitment to data
13 integrity- [\(i.e. Evans-Pughe, 2006; Hollywood & Winkelman, 2015\)](#). This finding suggests a
14
15 more fundamental change may be needed, should UK policing highlight the centrality of
16
17 information sharing to the effectiveness and efficiency of their core business. This may affect
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19 work at street level, in understanding the electronic footprint of individuals who come to the
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21 attention of the police, including social media. This radical change would also be needed at a
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23 strategic level to improve compliance around data integrity and use of the system
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33 In conclusion, due to increased digitisation and the rise of technology it is very difficult for
34 offenders not to leave electronic traces of their actions as they travel across time and space
35 (either physically or online). The policing challenge is to collect all the traces an offender
36
37 leaves and identify the pattern that emerge, which presents actionable intelligence to protect
38
39 victims, or target offenders. The PND has shown that this concept can be achieved. However,
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41 if it is to evolve further it must be accepted that local data has national significance, therefore
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43 it would be helpful to have national standards for data quality and PND use.
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References

- Atkinson, M., Doherty, P. and Kinder, K. (2005). 'Multi-Agency Working.' Journal of Early Childhood Research, 3(1): 7.
- Barnes, P. (2008). 'Multi-Agency Working: What are the Perspectives of SENCOs and Parents Regarding its Development and Implementation?' British Journal of Special Education, 35: 230–240.
- Berry, J. (2010). Reducing Bureaucracy in Policing: Final Report. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/117162/reduce-bureaucracy-police.pdf
- Bichard, M. (2004). The Bichard Inquiry: Report. Available at: <https://dera.ioe.ac.uk/6394/1/report.pdf>
- Carr, J.B. (2017). 'Estimating the effects of police technology using quasi-experimental methods.' Journal of Benefit-Cost Analysis, 8(3): 360-368.
- Carter, J.G., Phillips, S.W. and Gayadeen, S.M. (2014). 'Implementing intelligence-led policing: an application of loose-coupling theory.' Journal of Criminal Justice, 42: 433–442. DOI: 10.1016/j.jcrimjus.2014.08.002
- CGI (2013). Police National Database. Available at: https://www.cgi-group.co.uk/sites/default/files/files_uk/casestudies/Case_Study_-_PND.pdf
- Cohen, L.E. and Felson, M. (1979). 'Social Change and Crime Rate Trends: A Routine Activity Approach.' American Sociological Review, 44(4): 588-608. DOI: [10.2307/2094589](https://doi.org/10.2307/2094589).
- Darroch, S. and Mazerolle, L. (2013). 'Intelligence-led Policing: A Comparative Analysis of Organizational Factors Influencing Innovation Uptake.' Police Quarterly, 16(1): 3–37. DOI: 10.1177/1098611112467411

1
2
3 Dawes, S.S., Cresswell, A.M. and Pardo, T.A. (2009). 'From 'Need to Know' to 'Need to
4
5 Share': Tangled Problems, Information Boundaries, and the Building of Public Sector
6
7 Knowledge Networks.' Public Administration Review, 69(3): 392–402.

8
9
10 Deloitte (2015). The Digital Policing Journey: From Concept to Reality – Realising the
11
12 Benefits of Transformative Technology. Available at:
13
14 [https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/public-sector/deloitte-uk-
17
18 ps-digital-police-force.pdf](https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/public-sector/deloitte-uk-
15
16 ps-digital-police-force.pdf)

19
20 De Paoli, S., Johnstone, J., Coull, N., Ferguson, I., Sinclair, G., Tomkins, P., Brown, M. and
21
22 Martin, R. (2021). 'A Qualitative Exploratory Study of the Knowledge, Forensic, and
23
24 Legal Challenges from the Perspective of Police Cybercrime Specialists.' Policing: A
25
26 Journal of Policy and Practice, 15(2): 1429–1445. DOI: 10.1093/police/paaa027

27
28 Egbert, S. (2019). 'Predictive Policing and the Platformisation of Police Work.' Surveillance
29
30 and Society, 17(1/2): 83-88.

31
32
33 Ericson, R. V. and Haggerty, K. D. (1997). Policing the Risk Society. Toronto, Canada:
34
35 University of Toronto Press.

36
37
38 Evans-Pughe, C. (2006). Share and Share Alike. Available at:
39
40 https://crypto.stanford.edu/portia/media/ET_Nov06.pdf

41
42
43 Garicano, L. and Heaton, P. (2010). 'Information Technology, Organization, and Productivity
44
45 in the Public Sector: Evidence from Police Departments.' Journal of Labour Economics,
46
47 28(1): 167–201.

48
49 Gillen, A. (2011). Multi-Agency Working with Children and Families: A Focus on
50
51 Facilitators and Using Activity Theory Principles to Explore This Topic Area. Available
52
53 at: <https://core.ac.uk/download/pdf/40013293.pdf>
54
55
56
57
58
59
60

1
2
3 Hollywood, J. S. and Winkelman, Z. (2015). Improving Information Sharing Across Law
4
5 Enforcement: Why Can't We Know? Available at:

6
7 http://www.rand.org/pubs/research_reports/RR645.html

8
9
10 Home Office (2014). Serious and Organised Crime Local Profiles: A Guide. Available at:

11
12 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_d](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/371602/Serious_and_Organised_Crime_local_profiles.pdf)
13
14 [ata/file/371602/Serious_and_Organised_Crime_local_profiles.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/371602/Serious_and_Organised_Crime_local_profiles.pdf)

15
16
17 Home Office (2018). Serious and Organised Crime Strategy. Available at:

18
19 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_d](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752850/SOC-2018-web.pdf)
20
21 [ata/file/752850/SOC-2018-web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752850/SOC-2018-web.pdf)

22
23
24 Home Office (2021a). Tackling Violence Against Women and Girls. Available at:

25
26 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_d](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033934/Tackling_Violence_Against_Women_and_Girls_Strategy_-_July_2021.pdf)
27
28 [ata/file/1033934/Tackling_Violence_Against_Women_and_Girls_Strategy -](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033934/Tackling_Violence_Against_Women_and_Girls_Strategy_-_July_2021.pdf)
29
30 [_July_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033934/Tackling_Violence_Against_Women_and_Girls_Strategy_-_July_2021.pdf)

31
32
33 Home Office (2021b). Beating Crime Plan. Available at:

34
35 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_d](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015382/Crime-plan-v10.pdf)
36
37 [ata/file/1015382/Crime-plan-v10.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015382/Crime-plan-v10.pdf)

38
39
40 Horwath, J. and Morrison, T. (2007). 'Collaboration, Integration and Change in Children's
41
42 Services: Critical Issues and Key Ingredients.' Child Abuse and Neglect, 31: 55–69.

43
44
45 House of Commons (2021). 'The National Law Enforcement Data Programme: Twenty-
46
47 Ninth Report of Session 2021-22.' Available at:

48
49 <https://committees.parliament.uk/publications/8125/documents/83326/default/>

50
51
52 Kirby, S. (2013). Effective Policing? Implementation in Theory and Practice. Hampshire:
53
54 Palgrave Macmillan.

55
56
57 Kirby, S. and Keay, S. (2021). Improving Intelligence Analysis in Policing. London:
58
59 Routledge.

- 1
2
3 Koper, C. S., Lum, C. and Willis, J. J. (2014). Optimising the Use of Technology in Policing:
4
5 Results and Implications from a Multi-Site Study of the Social, Organizational, and
6
7 Behavioural Aspects of Implementing Police Technologies. Policing: A Journal of Policy
8
9 and Practice, 8: 212-221.
10
11
12 Lambri, T., Jackson, T. and Cooke, L. (2011). ‘The Challenges and Complexities of
13
14 Implementing and Evaluating the Benefits of an IT System: The UK Police National
15
16 Database.’ In: Dawson, R.J., Ross, M. and Staples, G. (eds). Proceedings of Software
17
18 Quality Management XIX: Global Quality Issues, 18th-19th April 2011, Loughborough,
19
20 UK, 373-390. Available at:
21
22 <https://pdfs.semanticscholar.org/2011/35c9a9fe9ba7aabc5ecafe4e8212d69ae54b.pdf>
23
24
25 Lum, C., Koper, C. S. and Willis, J. (2017). ‘Understanding the Limits of Technology’s
26
27 Impact on Police Effectiveness.’ Police Quarterly, 20: 135–163.
28
29
30 Martin, M. and Jackson, T. (2008). Personnel in Practice. Fourth Edition: CIPD UK
31
32
33 Moore, R. (2021). Speech by SIS Chief Richard Moore: Human Intelligence in the Digital
34
35 Age. Available at: <https://www.sis.gov.uk/richard-moore-first-public-speech.html>
36
37
38 National Audit Office (2021). The National Law Enforcement Data Programme. Available at:
39
40 [https://www.nao.org.uk/wp-content/uploads/2021/09/The-National-Law-Enforcement-](https://www.nao.org.uk/wp-content/uploads/2021/09/The-National-Law-Enforcement-Data-Programme.pdf)
41
42 [Data-Programme.pdf](https://www.nao.org.uk/wp-content/uploads/2021/09/The-National-Law-Enforcement-Data-Programme.pdf)
43
44
45 National Crime Agency. (2014). National Strategic Assessment of Serious and Organised
46
47 Crime. Warrington: National Crime Agency.
48
49
50 NPIA (2009). IMPACT Programme: Police National Database – Privacy Impact Assessment.
51
52 Available at: [http://library.college.police.uk/docs/npia/PND-Privacy-Impact-Assessment-](http://library.college.police.uk/docs/npia/PND-Privacy-Impact-Assessment-V1.pdf)
53
54 [V1.pdf](http://library.college.police.uk/docs/npia/PND-Privacy-Impact-Assessment-V1.pdf)
55
56
57 Neyroud, P. and Disley, E. (2008). ‘Technology and Policing: Implications for Fairness and
58
59 Legitimacy.’ Policing: A Journal of Policy and Practice, 2(2): 226-232.
60

- 1
2
3 O'Neil, A. (2017). 'Australia and the 'Five Eyes' Intelligence Network: The Perils of an
4 Asymmetric Alliance.' Australian Journal of International Affairs, 71(5): 529-543. DOI:
5
6 10.1080/10357718.2017.1342763
7
8
9
10 Olver, K. and Cockbain, E. (2021). 'Professionals' Views on Responding to County Lines-
11 Related Criminal Exploitation in the West Midlands, UK.' Child Abuse Review, 30(4):
12 347-362. DOI: 10.1002/car.2704
13
14
15
16
17 Pinkney, L., Penhale, B., Manthorpe, J., Perkins, N., Reid, D. and Hussein, S. (2008). 'Voices
18 from the Frontline: Social Work Practitioners' Perceptions of Multi-Agency Working in
19 Adult Protection in England and Wales.' Journal of Adult Protection, 10(4): 12-24.
20
21
22
23
24 Pratt, M. (2012). Evaluation of Interdisciplinary Collaboration in Design Research.
25 Unpublished MA Thesis, San Jose State University. Available at:
26 http://www.sjsu.edu/anthropology/docs/projectfolder/Pratt_Mark_project.pdf
27
28
29
30
31 Ratcliffe, J. H. (2005). 'The Effectiveness of Police Intelligence Management: A New
32 Zealand Case Study.' Police Practice and Research, 6(5): 435-451.
33
34
35
36 Ratcliffe, J. (2008). Intelligence-Led Policing. Cullompton, Devon, England: Willan
37 Publishing
38
39
40 Rutgers, M. R. and van der Meer, H. (2010). 'The Origins and Restriction of Efficiency in
41 Public Administration: Regaining Efficiency as the Core Value of Public Administration.'
42 Administration and Society, 42: 755-779.
43
44
45
46
47 Sanders, C. B., Weston, C. and Schott, N. (2015). 'Police Innovations, 'Secret Squirrels' and
48 Accountability: Empirically Studying Intelligence-Led Policing in Canada.' British
49 Journal of Criminology, 55(4), 711-729.
50
51
52
53
54 Say, M. (2021). Home Office Retains CGI for Police National Database. Available at:
55 [https://www.ukauthority.com/articles/home-office-retains-cgi-for-police-national-](https://www.ukauthority.com/articles/home-office-retains-cgi-for-police-national-database/)
56 [database/](https://www.ukauthority.com/articles/home-office-retains-cgi-for-police-national-database/)
57
58
59
60

1
2
3 Schwab, K. (2015). The Fourth Industrial Revolution: What it Means and How to Respond.

4
5 Available at [https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-](https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-revolution)
6
7 [revolution](https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-revolution)
8

9
10 Stanier, I. P. (2013). Contemporary Organizational Pathologies in Police Information

11
12 Sharing: New Contributions to Sheptycki's Lexicon of Intelligence in Policing.

13
14 Unpublished PhD Thesis, London Metropolitan University. Available at:

15
16 <https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.590116>
17
18

19 Statista (2022). Number of Police Officers in The United Kingdom in 2021, By Police Force.

20
21 Available at: [https://www.statista.com/statistics/877540/leading-police-forces-by-officer-](https://www.statista.com/statistics/877540/leading-police-forces-by-officer-numbers-in-the-uk/)
22
23 [numbers-in-the-uk/](https://www.statista.com/statistics/877540/leading-police-forces-by-officer-numbers-in-the-uk/)
24
25

26 Stripe, N. (2021). Understanding the Impact of the Pandemic on Levels of Crime in England

27
28 and Wales. Available at: [https://blog.ons.gov.uk/2021/11/04/understanding-the-impact-of-](https://blog.ons.gov.uk/2021/11/04/understanding-the-impact-of-the-pandemic-on-levels-of-crime-in-england-and-wales/)
29
30 [the-pandemic-on-levels-of-crime-in-england-and-wales/](https://blog.ons.gov.uk/2021/11/04/understanding-the-impact-of-the-pandemic-on-levels-of-crime-in-england-and-wales/)
31
32

33 Syed, M. (2015). Black Box Thinking: The Surprising Truth About Success (and Why Some

34
35 People Never Learn From Their Mistakes). London: John Murray Publishers.
36

37 Taylor, R. (1990). 'Interpretation of the Correlation Coefficient: A Basic Review.' Journal of

38
39 Diagnostic Medical Sonography, 1: 35-39.
40
41

42 Thomas, R. and Walport, T. (2008). Data Sharing Review Report. Available at:

43
44 [http://webarchive.nationalarchives.gov.uk/http://www.justice.gov.uk/docs/data-sharing-](http://webarchive.nationalarchives.gov.uk/http://www.justice.gov.uk/docs/data-sharing-review.pdf)
45
46 [review.pdf](http://webarchive.nationalarchives.gov.uk/http://www.justice.gov.uk/docs/data-sharing-review.pdf).
47
48

49 Tilley, N. (2005). Handbook of Crime Prevention and Community Safety. London: Willan.

50
51 Van Staden, L., Leahy-Harland, S. and Gottschalk, E. (2011). Tackling Organised Crime

52
53 Through a Partnership Approach at the Local Level: A Process Evaluation. Home Office

54
55 Research Report 46. London: Home Office. Available at:
56
57
58
59
60

1
2
3 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_d](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/116532/horr56-report.pdf)
4 [ata/file/116532/horr56-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/116532/horr56-report.pdf)
5
6

7
8 Waterhouse, J. (2019). 'Criminal Escaping Justice' due to IT System. Available at:

9
10 <https://www.bbc.co.uk/news/uk-46964659>
11

12 Weisburd, D., Mastrofski, S. D., Greenspan, R., McNally, A.-M. and Willis, J. J. (2003).

13
14 'Reforming to Preserve: COMPSTAT and Strategic Problem-Solving in American
15 Policing.' Criminology and Public Policy, 2: 421-456.
16
17

18
19 White, M. (2009). Health, Social Care and Housing Partnership Working Briefing Notes for
20 Practitioners and Managers. Edinburgh: Joint Improvement Team.
21
22

23
24 Wilks, L. (2014). Break on Through: Overcoming Barriers to Integration. London: New

25
26 Local Government Network (NLGN). Available at: [https://www.newlocal.org.uk/wp-](https://www.newlocal.org.uk/wp-content/uploads/BREAK-ON-THROUGH2.pdf)
27 [content/uploads/BREAK-ON-THROUGH2.pdf](https://www.newlocal.org.uk/wp-content/uploads/BREAK-ON-THROUGH2.pdf)
28
29

30
31 Williams, J. and Britton, P. (2020). GMP have Declared a 'Critical Incident' After a Failed
32 Upgrade of Their Troubled iOPS IT System Left Officers Recording Incidents on Paper.

33
34 Available at: [https://www.manchestereveningnews.co.uk/news/greater-manchester-](https://www.manchestereveningnews.co.uk/news/greater-manchester-news/gmp-iops-computer-system-error-17691657)
35 [news/gmp-iops-computer-system-error-17691657](https://www.manchestereveningnews.co.uk/news/greater-manchester-news/gmp-iops-computer-system-error-17691657)
36
37

38
39
40 Willis, J., Mastrofski, S. and Weisburd, D. (2007). 'Making Sense of COMPSTAT: A

41
42 Theory-Based Analysis of Organizational Change in Three Police Departments.' Law and
43 Society Review, 41(1): 147–187. DOI: [10.1111/j.1540-5893.2007.00294.x](https://doi.org/10.1111/j.1540-5893.2007.00294.x)
44
45

46
47 Wilson, R. and Gray, A. (2015). Information Sharing: Easy to Say Harder to Do Well.

48
49 Leicestershire, UK: Centre of Excellence for Information sharing. Available at:
50 www.informationsharing.org.uk/download/455.
51
52

53
54 Wilson, R., Martin, M., Walsh, S. and Richter, P. (2011). 'Re-Mixing Digital Economies in
55 the Voluntary Community Sector? Governing Identity Information and Information
56
57
58
59
60

Sharing in the Mixed Economy of Care for Children and Young People.' Social Policy and Society, 10(3): 379–391. DOI: 10.1017/S1474746411000108

Table 1. Descriptive statistics: Search type (July 2018 to June 2019)

	<u>Search type</u>					
	<u>POLE</u>	<u>Facial</u>	<u>Bulk</u>	<u>Bulk</u>	<u>Scheduled</u>	<u>Triggered</u>
			<u>Facial</u>			
<u>Mean</u>	<u>105,917.07</u>	<u>294.30</u>	<u>10.39</u>	<u>26,602.73</u>	<u>3,634.32</u>	<u>9,826.89</u>
<u>(SD)</u>	<u>(113,753.14)</u>	<u>(426.31)</u>	<u>(27.08)</u>	<u>(37,974.77)</u>	<u>(12,926.99)</u>	<u>(44,224.73)</u>
<u>Median</u>	<u>76,853</u>	<u>126</u>	<u>0</u>	<u>15,474</u>	<u>58</u>	<u>461</u>
<u>Range</u>	<u>0 - 765,328</u>	<u>0 - 2,056</u>	<u>0 - 156</u>	<u>0 - 165,337</u>	<u>0 - 82,339</u>	<u>0 - 325,240</u>
<u>Total</u>	<u>5,931,356</u>	<u>16,481</u>	<u>582</u>	<u>1,489,753</u>	<u>203,522</u>	<u>550,306</u>