Investigating Police Productivity: A Literature Review

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Abstract

This study provides a review of the literature on productivity in the police sector. Based on a consultation of over 250 works (both on the UK and international), the study is organised in four parts (following van Ark, 2022):

- The police delivery chain – Developing an understanding of how police budgets and inputs are transformed into activities (outputs) which are then turned into societal outcomes
- Measurement of police productivity – An overview of the data that is available for measuring police productivity.
- Drivers of police productivity – An overview of the key factors (organisation, people, and technology) by which an organisation can improve its productivity.
- Practical management of police productivity – How organisations should think about putting insights on productivity improvements into practice.

The study identified some key areas of attention to drive improvements in the productivity performance of the sector:

1. There is a need for clearly mapping of service delivery chains for each function in the police force. A better understanding of budgets, inputs, output and outcomes for each core and ancillary function will help to determine what success looks like and what the needs are to drive productivity.
2. Measurement of police productivity at both the aggregate level (where productivity growth is assumed to be zero as outputs equal deflated inputs) and the organisational level (where measures are sparse, difficult to aggregate and to compare) should be a major priority. However, such measurement efforts either require investment in new data collection or significant imputations.
3. Sustainable productivity growth is obtained through the nurturing of three drivers of productivity growth. The first factor is the "organisational driver"; success in this area will result in an adaptable organisational design. The second factor is the "technological driver"; success will result in digital transformation. The third is the "individual driver"; success in this regard will result in an agile workforce. Organisational learning is a key principle to unlock those key drivers of productivity, as a learning organisation will be able to continually identify and implement productivity improvements.
4. Practical management of productivity requires an integrated approach to change management as is common practice in large scale private-sector organisations. Change management and the prioritisation of new projects through the management constraints approach reduce risk of failure. Evidence-based management, transparent communication, and internal and external collaboration are key drivers to manage productivity on a consistent basis.

Contents

1. Introduction

The productivity performance of the police sector has been an issue of considerable interest for several decades. As the complexity of policing in modern society has risen, the expenditure (in real terms, corrected for inflation) on policing per head of the population and per police officer has gone up substantially over time. However, while public safety remains a key determinant of well-being, real spending on policing in the UK has fallen substantially after the financial crisis and, despite a recovery since 2016, has barely recovered to the levels of two decades ago (Figure 1). The recent developments happened at a time of an increase in demand for police services across a wider range of tasks and increased complexity of cases to be dealt with (Police Foundation, 2022).

Figure 1a: Police Spending in Real Terms (corrected for inflation) per Head of Population and per Police Officer, 2003-2022

Figure 1b: Number of Police Officers and Number of Police Officers per 1000 Population, 2003-2022
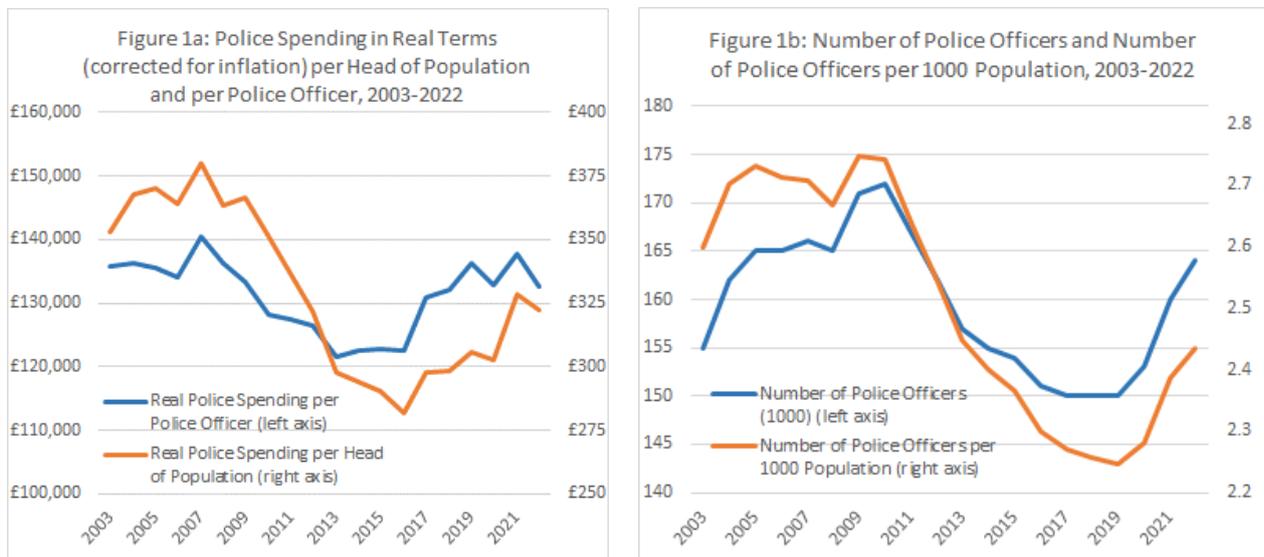
Note: conversion from nominal to real spending is based on the deflator for GDP.
Sources: HMT, Public Expenditure Statistical Analysis; Office for National Statistics; Statistica.

The number of police officers in the UK has also risen over the long-term but it declined by 13 percent between 2010 and 2019, and only recently began to recover, following a substantial recruitment drive as part of the Police Uplift Programme (PUP), even though it is still about 8,000 heads short of the 2010 level (Figure1a). Between 2016 and 2021, real expenditure per police officer recovered by 12 percent (Figure 1b).[1] While still lower than one decade-and-half ago, a legitimate question to ask is what the impact of the increase in expenditure has been on the productivity performance of the sector.

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[1] From https://www.politics.co.uk/reference/police-funding/: 'Figures by the website Knoema have attempted to estimate government spending on public order and safety worldwide as a proportion of a country's GDP. In 2016, they estimated that the associated expenditure in the United Kingdom amounted to 1.83% of GDP in the UK. This was above the 1.7% spent by Australia, 1.63% by France, 1.55% by Germany, and the 1.24% spend by Japan. It was below the law enforcement levels of 2.03% in America and 1.9% in the Netherlands.' Knoema (https://knoema.com/) is a privately-owned data platform which provides data services to governments and private businesses.

Unfortunately, there is a significant lack of evidence on the performance of productivity within the police sector. Official estimates by the Office of National Statistics (ONS) suggest that the trend in productivity of the UK police force has been flat. Figure 2 shows that the police sector sits in the middle range of measured public sector productivity performance, with some sector performing better on productivity (notably education and health care) whereas other sectors perform even more weakly (for example, the remainder of public order and safety sector) (see Figure 2).

Figure 2: Total Factor Productivity (TFP) growth in public sectors, incl. quality adjustment (annual % change, 2010-19)
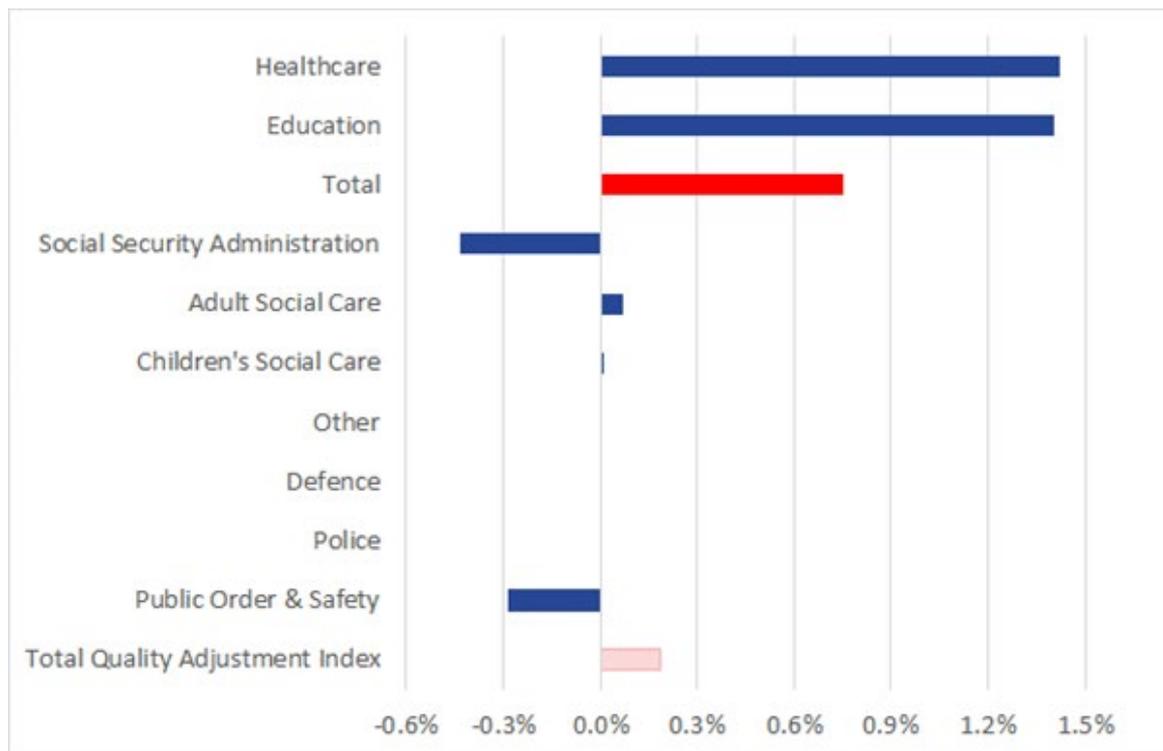
Note: Total factor productivity is a measure of efficiency which measures how much output can be produced from a certain amount of inputs, mainly labour and capital. 'Other' government services (economic affairs, recreation and housing), defence and police sectors are measured by equating output growth with input growth, which means that the measured productivity growth is zero. Source: Office for National Statistics Public Service Productivity: total public service (28/4/2023).

However, the official productivity measure for the police sector is the result of inadequate measurement, as the ONS method assumes that output equals the deflated expenditure on the inputs from labour, goods and services and capital. It thereby imposes a zero-productivity assumption for the sector (ONS, 2022). The reason that the ONS, like most other statistical agencies in the world, relies on the 'output=input' methodology is because productivity in the police is extremely difficult to measure properly. While the police sector shares many of the productivity challenges of other public sector organisations, there are specific elements which make the assessment of the sector's productivity performance even more difficult than that of other public sectors. These specific challenges relate to (1) the 'multi-outputs' and 'multi-outcomes' nature of police activity and (2) the continuously shifting priorities for the police from a policy, strategic and operational perspective.

The measurement deficiencies translate themselves in increased complexity to allocate the public budget for the police to specific activities such that the desired services are delivered in an efficient and effective manner. Indeed, without clearer measurement and understanding of the productivity of the police force, no level of funding can be evaluated or fully justified as creating value for money. Productivity is a critical variable (though not the only one) in the 'value for money' equation.

Fortunately, to improve our understanding of police productivity we don't have to start from scratch. Over the decades, much has been written about police productivity both in the UK and elsewhere.[2] In fact, a leading theme in this literature review on police productivity is that our knowledge on how to improve productivity is more advanced than the practical implementation of that knowledge. Much is known on how to better structure the complexity of outputs and outcomes in the police sector (Section 3). There are also well-laid out principles on improving the official measures of productivity measurement in the police (Section 4). And we know a lot about the key drivers of police productivity (Section 5). Nevertheless, the evidence on practical policy and strategic instruments to unleash the power of police productivity is more fragmented and incomplete (Section 6).

This literature review points at a range of barriers in implementing productivity enhancing methods in the police. These, in part stem from budget constraints, frequent policy interventions and the need to 'fire-fight' small crises to the detriment of long-term programmes that are conducive to productivity. In part, barriers are also caused by a lack of bandwidth for leaders in the force to follow through with critical initiatives already underway in a clear, consistent and scale-up manner on.

For this literature review we have consulted over 250 works, which are referenced by chapter in the bibliography. For the narrative of this report, and following van Ark (2022), we have organised the literature into four areas of consideration for public sector productivity:

1. The police delivery chain – Developing an understanding of how police budgets and inputs are transformed into activities (outputs) which are then turned into societal outcomes (Section 3)
2. Measurement of police productivity – An overview of the data that is available for measuring police productivity. (Section 4)
3. Drivers of police productivity – An overview of the key factors (organisation, people, and technology) by which an organisation can improve its productivity. (Section 5)
4. Practical management of police productivity – How organisations should think about putting insights on productivity improvements into practice. (Section 6)

Table 1 shows unique references of the literature across those four areas, as well as four other key characteristics:[3]

1. Geography of origin: UK vs overseas literature
2. Type of work: Academic, other research and opinion pieces
3. Time: Pre- and post-2000 literature
4. Methodology: Qualitative, Quantitative

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[2] We have also benefitted from some earlier reviews, including Blank et al. (2010), Tiwana et al. (2015), Ludwig et al. (2017) and The Police Foundation (2022).
[3] Some of the literature is used across different chapters, but Table 1 provides unique references according to the most important match of the area of consideration and the four other characteristics.

Table 1 Overview of consulted literature for this study

		Delivery Chain (Section 3)	Measurement (Section 4)	Drivers (Section 5)	Management (Section 6)
Geography	UK	49	11	43	8
	Foreign	52	15	65	9
Time	Pre-2000	21	2	22	2
	Post-2000	80	24	86	15
Type of work	Academic	73	14	76	12
	Other research	26	12	26	2
	Opinion	2	0	6	3
Methodology	Qualitative	60	7	69	13
	Quantitative	41	19	39	4

Source: Author's assessment. Each reference is allocated to a unique cell. See Appendix A - Bibliography for full references.

Most of the literature that we have consulted is focussed on the delivery chain and the key drivers of productivity in the police sector. The literature on measurement issues relating specifically to police productivity is sparse, and the literature on police management is also lacking.

The literature we reviewed is a well-balanced mix of UK-specific and foreign studies, and most of our literature is up to date, being published over the past two decades. Finally, we found more literature of a largely qualitative nature, whereas the number of quantitative studies was more limited.

Outline and Key Insights

To set the scene, Section 2 focuses on some characteristics of the police sector which are especially relevant from a productivity perspective. These include reflections on why productivity in the police sector matters and why more money will not always solve all problems. It also addresses the difficulty for police managers to manage a complex delivery chain that has to respond to a wide range of stakeholder priorities and perspectives. We discuss how success in this area is crucial for maintaining legitimacy, which is a key capability for the police.

Section 3 zooms in on the delivery chain of different functions in the police sector ranging from budget efficiency to organisational productivity and effectiveness. It breaks down police activities into four core functions (Emergency Response, Crime Investigation, Neighbourhood Policing and Crime prevention) and four ancillary functions (Crowd Control, Missing Person Investigation, Anti-terror, Organised Crime), and then discusses what we know about the determinants of productivity for each of the functions.

Section 4 deals with the measurement of police productivity. As mentioned, the 'zero-productivity' assumption for police productivity in the national accounts is inadequate and needs to be substituted with real output measures of police activities. A critical challenge is the unique measurement of the quality of inputs, outputs and outcomes – otherwise quality improvements will not show up in the productivity statistics, even though they increase performance from the perspective of the public. The literature suggests that while the principles of better measurement of police activities are clear, the implementation of better practices has been hampered by lack of comprehensive and reliable data. We describe the challenges of aggregating activity measures to an overall measure of productivity. In any case, overall performance measures are not always the most

useful metrics to manage productivity within an organisation, and we discuss how managers should think about creating department- and organisation-level metrics in Section 6.

In Section 5 we zoom in on the key drivers of organisational productivity, drawing insights from across the public and private sector. The key organising principle in this chapter is the importance of organisation learning, which is the process by which an organisation creates, shares, and uses knowledge and insights to improve its performance. Following van Ark (2022), we look at what the literature tells about (1) how an adaptive organisational design can help the police to focus more on the long-term while also addressing short-term pressures and priorities; (2) how digital transformation is a critical tool for innovation, what capabilities are needed to avoid the pitfalls associated with IT projects, and how a process of continuous improvement and innovation is key to making technology work; and (3) how an agile workforce intensifies the focus on creating critical skills for the police, such as investigatory and digital skills, but also relational skills which help staff in responding to changing demands without sacrificing the optimal use of skills and guarantees morale and well-being of police officers and staff.

In Section 6 we look at practical approaches to managing productivity improvement for the police. Here we find the literature to be patchy and occasionally lacking scientific standards. We find that a commitment to a change management philosophy is the key to success. We look at three key areas of change management: (1) how a systematic approach to solving key constraints can help long-term change; (2) the key principles for using data to support productivity improvement; and (3) how communication and collaboration are key assets of successful management strategies.

The final section, Section 7, we summarise our most important observations from the literature on police productivity, and describes pathways forward to improve our understanding of police productivity, and implications for strategic development and policy-making in the sector. We find there is a lot to be gained from better sharing of productivity-enhancing practices across organisations.

2. What is unique about police productivity?

What is police productivity?

What is productivity? In the context of a public service like the police, there is no clear monetised measure of output and inputs, and there are no market-determined prices for police output. Hence, the traditional economic concept of productivity (how the inputs of labour, equipment, etc. generate a monetised output) cannot be easily applied to the police. At a minimum, police activities (such as crime investigations) need to be linked to desirable outcomes (such as the reduction in crime). There also needs to be a recognition of the different ways in which the output can be delivered which requires, for example, a measure of the quality of the service as experienced by the public.

It is therefore recommended to adopt a broader concept of productivity for the police, which doesn't simply measure the output and inputs of individual activities, but also captures the impact on the ultimate desired outcomes, which may include public safety and upholding the law. As will be discussed in Section 3, this broader concept is consistent with the concept of 'value for money' as often used in budgeting discussion, but broader than what is currently measured in the framework of official national statistics of police productivity. In principle, it is possible to produce improved national accounts measures of police outputs that measure the output of activities and are adjusted for quality improvement. While this would be an improvement over the current practice of equating outputs to deflated inputs, it still doesn't fully embrace the idea that, in the end, it is the outcomes that matter (see Section 4).

Why does police productivity matter?

Even when taking a definition that focusses on outcomes, it is still important to question the extent to which the police sector really can raise productivity. There is a long-standing debate in the economics literature that services, and especially public services, are subject to 'Baumol's cost disease', which refers to the tendency for labour-intensive services to become more expensive over the long run, even if they haven't changed much in terms of the services they deliver. Baumol and Bowen (1966) describe an archetypal case of this phenomenon for symphony orchestras, which are substantially more expensive to operate today than 100 years ago, despite being functionally identical. The reason for this is that, as the productivity of the aggregate economy has risen, so too has the pay that workers can get from working elsewhere, and so the orchestra has to spend more in order to maintain competitive wages. This issue applies to all organisations, but labour-intensive organisations like the police are particularly vulnerable (Maiello, 2017).

The phenomenon of Baumol's cost disease may have led to a zero-sum approach to the management of public sector services. The view is that service performance can only be improved by making budgetary adjustments – either by increasing spending or instead consolidating operations, reducing quality, or removing 'non-essential' functions like personal training and strategic change planning (Bowen, 1980; Elliott, 2020; van Ark, 2022).

Such policy responses can be seen from past and current debates on funding for the police force.[4] However, the literature suggests that police activities can also be delivered more productively in the way described above. Indeed, there is ample evidence of ways to raise police productivity. In

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[4] Most recently, see, for example, Police: We will investigate every crime, The Times, 28-7-2023.

particular, the application of intangible assets like digital technology, better management skills, and organisational skills can already be seen as contributing to improving the quality and volume of police outputs (Sections 5 and 6).

Nevertheless, it is important to realise that there is at least some evidence for what may be called the 'weak' Baumol hypothesis. Despite the fact that productivity in the police sector can be increased, managers should still expect to have to raise wages to be able to attract the workforce in general, and skilled workers in particular, even when the productive contribution of that additional investment does not immediately change.

Challenges to police productivity

Police as the service of last resort

In recent decades the role of policing has become more complicated not only because of more complex societal challenges, but also because of underfunding and productivity weakness in other public services. The police often have to pick up the slack when other public services are unable to meet the demand placed on them. As will discussed in greater detail, the police delivery chain is dependent on the performance of adjacent sectors (for example, the courts or the prison service) in the criminal justice system. For example, the backlog in court cases has strongly increased since 2020 and has reduced the number of cases which can be successfully closed. The impact of fewer cases going to justice can have a big impact on public confidence and the legitimacy of the police force, which in turn affects police productivity in addition to the direct effects of the backlog (HMICFRS, 2021).

There are also important challenges for the police dealing with societal issues which are not within the immediate purview of the criminal justice system itself. For example, the resources that the police need to allocate to the rising number of mental health incidents, has received a lot of media and political attention. As the mental health care sector is overburdened, when individuals become at risk to society, the police are having to allocate resources to deal with situations that they are not optimally trained or motivated to solve (Police Foundation, 2022, McLean and Marshall, 2010, House, 2023). In addition to increased volume, the complexity of these mental health cases has also increased. Beyond the need for enhanced capacity in the mental health care system itself, increased collaboration between the police, the NHS, local government and private partners in the health sector and the security industry can help bring down the number of hours that police officers have to spend safeguarding individuals with mental health problems - a task which they are not optimally trained or motivated for (see Sections 5 and 6).

Legitimacy as a key social capability

In addition to the inputs (labour, capital and technology) as described in the delivery chain discussion (Section 3), the productivity of policing is also strongly dependent on the creation of core social and institutional capabilities (sometimes also described as the creation of social and institutional capital) (Coyle et al., 2019; HM Government, 2022).

As part of social capabilities, legitimacy is a critical driver underpinning the willingness of the public to co-operate and engage productively with policing efforts (The Police Foundation, 2022). Legitimacy refers to the authority and trust bestowed upon the police by society, which results in the public having the inclination to work productively with the police. When the public recognises the right of the police to hold power and perceives their actions as fair and just, several positive outcomes can be observed:

- Legitimacy ensures public cooperation, as individuals are more willing to engage with the police, provide information, and support their efforts (Jackson et al, 2013; Tyler and Fagan, 2008).
- Legitimacy promotes acceptance of police decisions, ensuring that the public respects and abides by the outcomes of police interventions (Tyler and Huo, 2002).
- Legitimacy rejects the use of violence as a means to bring about societal change, fostering a peaceful and law-abiding society (Jackson et al., 2012a).
- Legitimacy fosters compliance with the law, as individuals are more likely to adhere to legal norms when they perceive the police as legitimate authorities (Sunshine and Tyler, 2003; Tyler, 2006; Jackson et al., 2012c).

There is anecdotal evidence for cases where police units have low legitimacy which has impacted their effectiveness. For example, police may face situations where they 'have to be persuasive just to get basic information such as statements and other evidence' (Robinson and Tilley, 2009). Since the volume of eyewitness accounts and victim statements are also a critical factor in determining the likelihood of clearing a crime (Jansson, 2005), a lower level of co-operation from the public is likely to increase the amount of time that has to be spent on clearing a case and a reduction in the likelihood that the perpetrators will be brought to justice.

Police professionalism and fair treatment is a major determinant of legitimacy. Adherence to procedural justice, which is fostered by effective training of police officers, is critical (Nagin and Telep, 2019). Officers' ability to engage positively with the public appears to be a key determinant of perceptions of the institution. When looking at the determinants of victim satisfaction, Brandl and Horvarth (1991) find that interaction with officers who are regarded as polite, understanding, concerned and competent are more significant than response time and investigative effort.

Legitimacy can also play an important role in the recovery stage of incident management, referring to post-incident relief activities that help bring back the normalcy of the affected community by minimising the long-term effect of the incident. Anecdotal evidence suggests that the police can substantially improve community relations by taking time to complete non-routine tasks, not directly related to their core business, such as providing support to clean up the incident location or provide some social care that can help restore normalcy after an incident (TED, 2015).

3. Mapping the Police Delivery Chain

With the increases in police funding in recent years, focus is now being placed on the ability of the police force to deliver value for money in the best way possible. For this, two questions must be answered: (1) what is the optimal mix of activities being produced to achieve outcomes, and (2) how can these activities be delivered in the most efficient and effective ways possible.

Productivity Effects in the Police Delivery Chain

The delivery chain is one way of framing these two questions. It divides the activities of a public sector body into discrete functions, each of which is composed of the following steps (Figure 3):

1. Obtain public money, which are the financial resources allocated from the public budget or revenue sources for funding programmes, projects, or services.
2. Generate inputs, which are the resources, including human capital, infrastructure, equipment, and supplies, that are required to implement the planned activities.
3. Create outputs to produce the tangible or measurable products, services, or activities, such as public services delivered, or the implementation of policies or regulations.
4. Realise the desired outcomes to obtain the intended results or impacts of the activities for the targeted beneficiaries or the broader public.

Figure 3
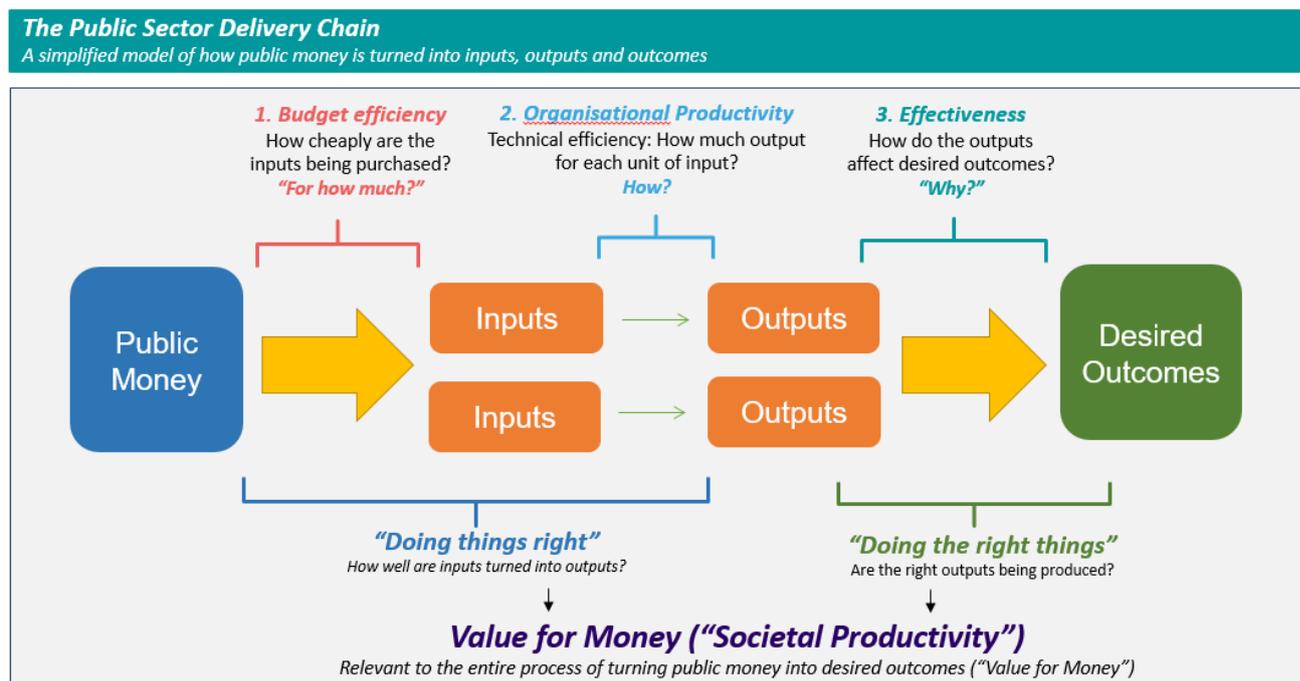
Source: van Ark (2022). Adapted from Aldridge, Hawkins and Xuereb (2016).

The delivery chain concept offers a way to map the processes for all tasks and activities in an organisation, to identify the areas for performance improvement, to understand how it might impact other processes, and to measure the efficiency of the transformations along the chain. Hence the delivery chain concept facilitates the development of targeted strategies, improvement in the allocation of resources correctly, and the identifying of productivity-enhancing opportunities.

The delivery chain contains three critical transformations that help raise productivity (van Ark, 2022):

- **Effectiveness = output to outcomes**

  Starting from the right in Figure 3, the transformation of outputs into outcomes determines the effectiveness of an organisation's activities. Outputs refer to the activities that organisations carry out and the services they produce, whereas outcomes are the beneficial effects for the target recipients. For example, while more officers "on the beat" is a useful measure of an output for neighbourhood policing, the outcome is increased safety and security for the public. Quality is a key factor in the transformation from output to outcomes.

  While outcomes should be the starting point for any design of a delivery chain, they are also difficult to determine, to manage and to measure. They are determined as part of a process of aligning the needs of the civic community with the resources and capabilities made available to the police sector. In democratic societies, such as the UK, this alignment takes place through consultations and decision making by elected officials about the resources being made available, after which implementation and execution is done by the civil service and leadership of the police.

  The relationship between outputs and outcomes in the context of police activities is undeniably complex. This complexity is confounded by the fact that the police have to operate in a constantly shifting crime landscape, meaning that the relationship between outputs and outcomes may change over time, even if the output activities remain the same. For example, recent crime trends challenge the traditional notion that the conviction rate is a strong determinant of the deterrent effect of police arrests. From 2015 to 2022, the proportion of crimes that resulted in a charge or summons fell from 16% to 5.6% (ONS, 2023b), whilst the 'traditional' crime rate (i.e. excluding fraud and computer misuse) fell by 39% over the same period (Home Office, 2022). This highlights the need for the police to have the ability to constantly review and adapt their delivery chain.

  Given the difficulty of managing outcomes, there is a risk of an excessive focus on output targets without considering the desired outcome is that one 'hits the target but misses the point' (Bevan and Hood, 2006).[5] For example, when there more officers on the street during day time but fewer at night (when the perceived safety risks are higher), the output does not achieve the desired outcome, and its delivery or funding model must be reconsidered.

- **Organisational productivity = inputs to outputs**

  While effectiveness is about 'doing the right things', organisational productivity is about 'doing things right' by finding the optimal way to turn inputs into output activities. To stay with the neighbourhood police example, the organisational productivity (also referred to as technical efficiency) refers to how many inputs (staff time, skills, equipment and organisational support) are needed to bring more officers to the street. It is important to note that organisational productivity also depends on back-office processes like office and admin support. Organisational productivity is the main topic of our discussion on drivers of productivity and the management of productivity in Chapters 5 and 6 respectively.

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[5] Gwyn Bevan and Christopher Hood, What's measured is what matters: targets and gaming in the English public healthcare system, Public Administration, Vol. 84, No. 3, 2006.

- **Budget efficiency = public money to inputs**

    The third element of the service delivery chain is about turning available budgets into the inputs required (staff cost, real estate, materials, etc.). Since labour costs make up the bulk of police expenditures, the recruiting of appropriate staff, and the retaining of workers as they grow more experienced should also come into consideration. Not only staffing, but also training, procurement and IT expenses are important determinants of what inputs can be obtained. Public sector managers tend to focus intensively on this aspect of budget efficiency by managing their budgets because the outputs and inputs are often fixed, at least in the short-term. Focusing on budget efficiency can provide short-term efficiency gains, but in the longer term, improving organisational productivity and effectiveness contribute the most to growing productivity.

Core and Ancillary functions

A specific challenge for assessing police productivity are the multiple outputs and multiple outcomes that the delivery chain must reflect. According to The Police Foundation (2022) the core role of the police is 'to promote public safety by maintaining order and upholding the law, which their unique powers enable them to do, and to carry out other activities which enable them to perform this core role legitimately, effectively and with minimum reliance on those powers.' While sound in theory, this principle can be used to justify a vast range of output activities. Bittner (1970) encapsulates this by stating that it is the role of the police to 'respond to all situations where there's something happening that someone thinks ought not to be happening, and about which someone had better do something soon'.

Table 2 specifies the role and core functions of the police which are derived from the Police Foundation (2022). The core functions of the police include emergency response, crime investigation, neighbourhood policing, and crime prevention. There are also additional functions that have varying degrees of importance for different police forces, such as crowd control, missing person investigation, anti-terror and organised crime.

Table 2: Core and Ancillary Functions of the Police

Core Functions	Input	Output	Outcome
Emergency Response	Rapid Response Vehicles, Conflict management skills, Communication technology	Arrests, emergencies responded to.	Lives saved
Crime Investigation	Investigation skills, Information technology	Arrests, evidence	Criminals arrested, crime deterred
Neighbourhood Policing	Relational skills	Visible Patrols	Legitimacy
Crime prevention	Collaboration with property owners, Information and Communication technology	Arrests, safer behaviour from members of the public	Lower crime rate

Ancillary functions	Input	Output	Outcome
Crowd Control	Riot gear, co-ordinated control, horses, Information and Communication technology	Police control barriers	Avoided calamities
Missing Person Investigation	Investigation skills, Information technology	Investigations	Missing individuals found
Anti-terror	Intelligence, anti-personnel equipment, Information technology	Arrests and apprehension of terrorists	Reduced terror rate
Organised Crime	Intelligence, Information technology	Disrupted supply chains, arrests.	Dissuaded recruits, reduced economic viability of operations

Source: Core and ancillary functions from The Police Foundation (2002). Input, output and outcomes from authors, see discussion below.

The nature of the core and ancillary functions is constantly changing, and their prioritisation may depend on policy decisions but also on tactical considerations and daily or even hourly events. For example, the growing rise of fraud can lead to a strategic decision to focus more on crime investigation to the detriment of other strategic priorities such as public safety. The recent increase in mental-health related incidents can lead to the operational decision to focus on emergency response even though the police do not always have the specialist skills needed to deal with the incidents effectively.

Core Function – Emergency Response

One of the most important functions that the police fulfil is their role as first responders to any incident. This role has a number of important implications for the organisation of the police services. Firstly, the geographic and temporal unpredictability of emergency situations necessitates the presence of an agency capable of providing a rapid and wide-ranging response 24/7 across the country. Additionally, the nature of emergency calls often requires immediate on-site assessment, diagnosis, and potential referral to specialists. Generalist first responders play a crucial role in determining the nature of the problem and taking necessary actions to mitigate risks or escalate the response. Finally, the police possess unique powers and authority that enable them to handle dangerous situations effectively, their mere presence often helping to de-escalate potentially volatile incidents. While there are limits to the general emergency response role, such as the role of other specialist emergency response agencies, the generalist response function forms one of the most important functions of the police.

Inputs, outputs, and outcomes of Emergency Response

Core Functions	Input	Output	Outcome
Emergency Response	Rapid Response Vehicles, Conflict management skills, Communication technology	Arrests, emergencies responded to.	Lives saved

The police emergency response function involves inputs like specialist equipment, information, local knowledge, workers, and conflict management skills. These resources are then deployed to create the output activities, wherein officers arrive at the scene of the incident, and assess what steps should be taken next. If necessary, additional output activities may include arrests, the provision of first aid care, or the de-escalation of a confrontation. In responding to an incident where a crime has been committed, the police may find themselves making an arrest which necessitates consideration of the crime control aspect of police response (see below). This creates an overlap with crime investigation, but for the sake of the clarity of the framework, the primary outcome of the emergency response function is lives saved.

Effectiveness of Emerging Response

The primary determinant of the effectiveness of emergency response is the speed by which they arrive at the incident. Vidal and Kirchmaier (2017) find that a 10 percent slower response rate leads to a 4.5 percent decrease in the likelihood that the situation will be cleared.[6] The suggested mechanism for this effect is that a faster response time significantly increases the likelihood that the person causing the incident will be met at the scene, and a higher likelihood that a potential suspect will be named by the victim or a witness.

Huntsman et al. (2021) find that emergency response workers are substantially more effective when they receive empowerment and autonomy training to act decisively in response to novel situations. Such empowerment practices are also found to be associated with increased employee commitment, improved performance, higher likelihood of goal implementation (Kuye and Sulaimon, 2011), and greater personal resilience (Harcourt and Ateke, 2018).

Organisational efficiency of Emergency Response

Research into the efficiency of emergency response consists primarily of case-study based analysis. Many of the relevant studies are based on analysis of the fire and ambulance services, which provide an emergency response function and so have a very similar delivery chain. Key factors to improve organisational efficiency are facility location (Erdemir et al., 2010; Toregas et al., 1971) and the quality of dispatching techniques (Green, 1984; Chaiken and Dormont 1978a, 1978b; Kolesar, 1982) to reach the place of the incident as quickly as possible. For example, Zografos et al. (1998) presents a framework for the analysis of police dispatch technology, comprising three distinct components: a data management module, a vehicle monitoring and communications module, and a modelling module.

There has been limited research into the value of personnel skills and expertise of emergency responders (Balcik et al., 2010; Grant and Grant, 1996). French et al., (2014) find that detailed knowledge of the area has a significant impact on the efficiency of emergency response units.[7] This has implications for the geographical set-up of emergency response units. Recent anecdotal evidence also suggests a role for camera-powered drones to facilitate emergency response forces to scan geographical areas faster.

Core function – Crime Investigation

Crime investigation is another core function of the police. As first responders to incidents involving lawbreaking, the police are in the best position to gather evidence and initiate criminal

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[6] They find that these results are stronger for thefts than violent crimes.

[7] French and Fan (2014) also argue that while past research has primarily focused on urban emergency units, it is essential to recognise the significance of emergency response in rural areas as well.

investigations from the outset. Their immediate involvement allows for the preservation of critical evidence and, if required, the pursuit of matters through the criminal justice system. Second, the police ensure a level of regulatory control over the use of investigatory powers, safeguarding against improper use. Third, crime investigations frequently require the use of police powers at various stages, such as arresting suspects, executing search warrants, or holding individuals in custody. While these powers could potentially be delegated to others, centralising them within the police provides a regulatory framework and oversight to prevent misuse.

However, it is acknowledged that not all police investigations need to be conducted exclusively by warranted officers, and civilian investigators or collaboration with external actors may be utilised (Police Foundation, 2022), particularly in specialised areas or with technical expertise. Additionally, the evolving landscape of cross-border crime calls for a shift toward disruption strategies, intelligence gathering, and targeting the enablers of criminality at global level. Hence, while the police should lead the crime investigation function, the emergence of non-state actors and the need for innovative approaches may contribute to the need for closer collaboration with outside agencies.

The crime investigation function is one of the least examined areas of police studies. Scientific research is relatively rare and is primarily limited to best practice studies and analyses of specific aspects of investigation work (Deslauriers-Varin and Fortin, 2021 – see below). Mitchell and Huey (2019) describe how there is still a challenge in moving police investigation practices beyond evidence-informed practices (leading to received wisdom) and towards a more evidence-based approach.

Inputs, outputs, and outcomes of Crime Investigation

Core Functions	Input	Output	Outcome
Crime Investigation	Investigation skills, Information technology	Arrests, evidence	Criminals arrested, crime deterred

The ultimate outcome of the delivery chain of the crime investigation function involves the deterrence of crime by increasing the expected cost to the offender from future incidents. The output activities of this function are the arrests made and the collection of substantial evidence, both of which are crucial for building strong cases. The inputs include investigatory skills and legitimacy. Investigatory skills encompass the expertise and techniques employed to gather and analyse the evidence of the cases.

Effectiveness of Crime Investigation

It is broadly accepted in the literature that the likelihood of conviction is the primary determinant of the deterrent effect of punishment (Levitt, 1998; Owens, 2013; Chalfin and McCrary, 2017). This indicates that high-quality criminal investigations, that can lead to the just conviction of offenders is key to the delivery of the desired outcome, which is a reduced crime rate.

The 'triage hypothesis' introduced by Eck (1983), categorises crimes based on their solvability and guides the allocation of police resources. Eck identifies three groups: self-solvers, where clear leads make detective work minimal; solvable cases, requiring investigative efforts for resolution and where police actions have the greatest impact; and unsolvable cases. According to the triage hypothesis, focusing police investigative activity on cases with available leads and information yields the highest effectiveness. Empirical support for this approach was found in a study on residential burglaries in a large English city, demonstrating the conceptual and empirical merit of concentrating

police efforts on incidents with the most promising potential for catching offenders in the act (Coupe & Griffiths, 2000). However, such a triage approach may need to be balanced against a strong desire for justice in certain highly complex cases or cases with a large societal impact, such as homicide.

Organisational Efficiency of Crime Investigation

Robinson and Tilley (2009) analyse the factors that affect police performance by comparing the characteristics of high performing investigation units with low performing ones. They find that the higher performing units had a greater proportion of cases with suspects at an early stage.

In 2005 the Home Office commissioned two literature reviews relating to crime investigation. The first relates to the factors that affect the volume of crime investigations (Jansson, 2005), whereas the second is on the use of forensic science in such investigations (Bradbury and Feist, 2005; see above). Jansson's review finds that the first stage of the investigative process, involving first contact between the police and the witnesses and victims, is critical for the success of the investigation since a large proportion of convictions and arrests are made based on information given by the public (Burrows et al., 2005). This highlights the importance of legitimacy, discussed in Section 2, as a key capability for the police.

Eck (1983) and Hewitt (2002) also find that early decisions and actions that police take to gather evidence have the largest beneficial effect on the likelihood of clearing a crime. Jacobson et al., (2003) argue that these stages are critical and must be routinised for efficient investigation performance.

Jansson (2005) also finds that the arrest of a suspect at the scene increases the likelihood of police clearing the crime, which is determined by the time between the committing of the offence, and the arrival of police at the scene of the incident.

Deslauriers-Varin and Fortin (2021) argue that there are three factors that influence the overall productivity of the investigatory function: (1) the ability to understand and prioritise investigations; (2) the use of investigative techniques including spatiotemporal patterns of offenses for suspect prioritisation and identification; and (3) investigative interviewing and new techniques and approaches to improve information and evidence gathering.

In 2022, the College of Policing conducted a literature review of the factors affecting the likelihood of success of an investigation, and found evidence that it is important for officers to have an 'investigative mindset', which entails the ability of investigators to gather and assess material, interpret the facts, and then form and test hypotheses. The report finds that it is important for practitioners to maintain an open mind during an investigation, in order to avoid confirmation bias.

Contributing factors to an 'investigative mindset' include good supervision, experience, and training. Potential threats to the quality of the investigative mindset include judgements whether victims are 'deserving' or 'genuine', high workloads, poor prioritisation procedures and high stress. Contributing factors to stress include poor supervision, role ambiguity, shifting priorities, and poor time management between tasks.

The College of Policing review also discovered examples of new technological equipment improving the performance of police investigators, but stressed the risks of over-reliance on technology, procedural uncertainty, and the importance of having the ability to process the new quantities of data.

The approach taken by investigation units can be split into discretionary and procedural ones (Robinson and Tilley, 2005). The discretionary approach involves case-by-case decision-making, considering the specifics of each case and relying on locally informed decision-makers' judgment. It emphasises accountability for the entire investigative process, generalist competence, and on-the-ground knowledge. In contrast, the procedural approach follows pre-specified procedures and established good practices, focusing on efficiency and consistency. It emphasises adherence to prescribed procedures, division of labour, and reliance on hard, physical evidence. Units that took a procedural approach often responded to low performance by adjusting procedures or reducing discretion, while units with a discretionary approach tended to focus on improving individual capacity through supervision, education, or mentoring. Implementation and context play crucial roles in shaping the effectiveness of either approach. The discretionary approach thrives in cooperative communities, while the procedural approach may be more suitable when conditions for discretion are lacking.

There are various advanced technologies which can support the investigative function. For example, the second report commissioned by the Home Office (Bradbury and Feist, 2005), referred to above, finds that forensic science has substantially affected the possibility of certain crimes being cleared. As a result, certain incidents that would have previously been described as unsolvable now become clearable. Essevia et al. (2007) describe how a police unit can use chemical profiling techniques to build up a picture of illicit drug supply chains. The technique collates information on the purity, chemical properties, and nature of the substance. These features can be analysed to identify the 'fingerprints' of certain labs, suppliers, and agents. However, this technique requires the collation and analysis of a large source of data, as well as the ability to disseminate the relevant information to the necessary parties.

Core function – Neighbourhood Policing

Neighbourhood policing is an integral aspect of the British policing model. It involves the active participation of the police in community affairs, in order to create the sense of security amongst community members. Specific activities include visible patrols, the creation of partnerships, and problem solving.[8] Whilst some may question the necessity of police powers for the fulfilment of the neighbourhood policing function, there are two vital reasons for its importance. Firstly, neighbourhood policing provides officers with contextual understanding for the judicious use of their powers. Secondly, it cultivates community consent, fostering trust and legitimacy in policing. As a core function, neighbourhood policing ensures effective power utilisation and community support.

Research into neighbourhood policing is made more challenging by the inconsistent usage of the term. In some cases, neighbourhood policing refers to attempts to increase the accessibility of police officers, in others it refers to activities that address anti-social behaviour. It has even been used to refer to publicity exercises (Weatheritt, 1988). In essence, the term has often been used as a buzzword, and the practice of community policing has drifted from the philosophy that underlies it. Moreover, even though it is recognised as a core function of the police (The Police Foundation, 2022), different police departments can have different interpretations of which activities neighbourhood policing entails.

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[8] Problem solving may be defined as the police addressing specific issues that the members of the community have with the behaviour of other individuals in the community (Ashby & Chainey, 2012).

Core Functions	Input	Output	Outcome
Neighbourhood Policing	Relational skills	Visible Patrols	Legitimacy

The delivery chain of the neighbourhood policing function involves inputs of relational skills and other relevant resources. The process includes conducting visible patrols and actively engaging in problem-solving efforts within the community. The output activities of this process are visible police patrols, the resolution of community issues through collaborative problem-solving and other activities to increase the accessibility of police officers. The ultimate outcome of neighbourhood policing is the promotion of legitimacy which, when achieved, manifests itself as a greater willingness of the public to work co-operatively with the police.

Effectiveness of Neighbourhood Policing

Tuffin et al. (2006) find evidence that suggests that neighbourhood police are particularly effective at improving public legitimacy when they involve problem-solving, targeted foot patrol, reduced victimisation and community engagement. These three initiatives all involve police officers listening to the public's concerns, and then acting on them, suggesting these activities are more important than activities to make officers more accessible and visible. Myhill and Beak (2008) analyse survey data at a national level, and they find that perceptions of their local police department's commitment to civic engagement are strongly associated with confidence in the police. Moreover, Myhill et al. (2010) found that perceptions of ASB and disorder are correlated with low confidence in the police. Taken together, these strands of evidence suggest that the imperative for the neighbourhood policing function is to demonstrably listen to, and then address, the security concerns of the public. This involves addressing the most visible and concerning sources of insecurity for the members of the community. This may not entirely align with the police's perception of the greatest threat to public order, but such a function is essential for building public legitimacy (Myhill and Quinton, 2010).

One of the output activities in the neighbourhood policing delivery chain are police-community partnerships. These may occur at two levels; first an individual may take the initiative in reporting to the police or assisting them. Secondly, neighbourhood groups may act collectively in various programmes. It is unclear what determines the willingness of citizens to participate in community-police partnership effort. Grinc (1994) finds a number of instances where residents have little desire to become partners to co-create. It cites as causes poor pre-existing police-community relations, apathy, poor communication as to the role of the public, and intragroup conflict between community leaders and other residents.

Walker (1992) finds that residents who do not expect to live in an area long-term tend to have weaker ties to their neighbourhood, and so it can be more difficult to get them to engage in community-police co-operation activities. However, whilst long-term, older, high-income, white, and highly educated home-owners who live in well-integrated and orderly neighbourhoods were found to rate police performance more highly, these factors were not significant in determining the responsiveness of individuals to neighbourhood policing initiatives (Reisig and Giacomazzi, 1998) This provides evidence against the common notion that positive perceptions of the police are a necessary precursor to successful neighbourhood policing initiatives. Strikingly, Lavrakas and Herz (1982) even find that individuals from a minority background are more likely to participate in neighbourhood crime prevention efforts.

Organisational Efficiency of Neighbourhood Policing

Previous efforts to adopt neighbourhood policing have suffered from a lack of organisational commitment at either the managerial or operational level (Irving et al., 1989; Fielding, 1995), leading to programmes that do not have longevity. Rosenbaum and Lurigio (1994) find that genuine managerial commitment has a substantial impact on the productivity of neighbourhood policing but they also highlight the difficulty of measuring that commitment. Attempts to implement problem-solving policing have suffered from similarly inadequate commitment from a sufficient range of stakeholders (Read and Tilley, 2000), which is particularly damaging for productivity as these programmes also only begin to have an effect once they have been in place for a long time (Skogan, 2004).

Other studies have found a positive relation between contact and confidence in the police (Myhill and Beak, 2008; Tyler and Fagan, 2008; Bradford et al., 2009; Hough et al., 2010). Myhill and Bradford (2012) find that informal encounters with the police have a greater positive effect on perceptions of the public than formal interactions when they are a witness or victim of a crime. Peyton et al. (2019), who applied a random control trial of the usage of neighbourhood policing tactics, find that personal experiences of positive contact with police officers can substantially improve the willingness to co-operate, and that the greatest positive impact was amongst racial minorities, and those who held highly negative perceptions of the police. However, other evidence seems to indicate substantial heterogeneity in the ways that members of the public interpret their experience with the police (Quinton and Myhill, 2010).[9]

Whilst foot patrols are often seen as a vital part of police work, the findings of research studies are often contradictory, indicating that there is substantial heterogeneity in the impact that the patrols have, based on the characteristics of the communities, the composition of the patrol units, and their activities (Kringen et al., 2020). However, Kringen et al. (2020) find that regular foot patrols increase the officers' knowledge of location, which can be valuable in other activities.

Core function – Crime Prevention

Whilst some argue that crime prevention should primarily be the responsibility of other societal actors, the police have a unique role to play in this area. Their use of power, such as through investigations and arrests, can indirectly prevent crime by removing offenders from the streets and acting as a deterrent. The police can also directly and proactively prevent crime by managing offenders, safeguarding victims, and disrupting criminal activities through intelligence-led interventions. While the precise boundaries of the police's prevention role can be debated, their involvement in minimising the impact of entrenched problems and early intervention is crucial. The police also contribute by collecting data, highlighting social issues, and supporting primary prevention efforts undertaken by other stakeholders.

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[9] The nature of the impact that police contact has on perceptions is also complicated by the lack of high-quality panel data. Most studies so far have used cross-sectional data, which does not indicate the direction of causation – whether people who have confidence in the police will rate their interactions more highly, or if people who have interactions with the police will have greater confidence. Studies that use panel data tend to find an association between pre-existing opinions and how subsequent actions are interpreted (Brandl et al., 1994, Rosenbaum et al., 2005). There is also evidence that whilst positive contact only maintains the existing confidence level, negative contact has a negative impact on confidence (Skogan, 2006).

Inputs, outputs, and outcomes of Crime Prevention

Core Functions	Input	Output	Outcome
Crime prevention	Collaboration with the public, Information and Communication technology	Arrests, safer behaviour from the public	Lower crime rate

The Police Foundation (2022) distinguished between three levels of preventative work. The primary level involves preventing problems from occurring in the first place. The police should not play a primary role in delivering this function, as other organisations are in a better position to address the social conditions that underly crime. However, the police can assist the strategising of these organisations by sharing data. The secondary level of prevention work involves solving problems before they get worse. Examples include early intervention initiatives with individuals and groups that are considered to be at risk (Cameron and Laycock, 2002). The final level of preventative work (tertiary prevention) is concerned with the minimisation of the impact of problems that have been entrenched. It is primarily focussed on those who have already offended or become victims of crime.

Effectiveness of Crime Prevention

The effectiveness of crime prevention output activities relies heavily on the capacity to alter the risks and rewards associated with engaging in criminal behaviour. The Police Foundation (2022) highlight that the police are best suited to work in tertiary preventative work, which involves efforts that aim to deter potential offenders by making the act of committing a crime less appealing and riskier. Partially this is already achieved by the activities in the other core functions – increasing the likelihood of detection, apprehension, and conviction; law enforcement will contribute to a deterrent effect by increasing the perceived risk for criminals. Simultaneously, by co-operating with local property owners, the police can help people to understand how they can reduce their exposure to risks, and hence reduce the reward offered to acts of thievery.

While the aspiration for evidence-based policies is crucial for effective crime prevention, Cherney and Sutton (2007) argue that it needs to be combined with effective stakeholder engagement in order to produce results. They study a number of crime prevention programmes across the UK, Australia and New Zealand that failed to deliver a long-term impact on the crime rate, despite a genuine attempt to select programmes that have a proven track record of working. They argue that the failure was due to the attempt by managers to replicate initiatives that worked elsewhere, without considering the perspectives or preferences of local stakeholders. Similar findings were also observed in Hope (2004), Homel (2005), Crawford (2002), and Bradley (2005). The result of this is an 'unwillingness by grass roots agencies … to satisfy central government expectations result[ing] in the continuous reinvention of strategies'. The cycle of instability and reinvention only further undermines the projects and the relations between stakeholders. In response to this issue, much of the literature recommends an ongoing dialogue and collaborative framework between local practitioners, central government, and community members to help develop strategies that are not only evidence-based, but also contextually relevant, adaptable, and endorsed by those who are most intimately familiar with the local dynamics (Cherney and Sutton, 2007; Cherney, 2003; Hope, 2004; Skogan, 1988; Edwards, 2002; Abbey, 2005).

The above case highlights why it is crucial to understand that insights drawn from the literature must always be interpreted within their specific context. The danger of extracting findings without due consideration for the underlying context poses a significant threat to the potential enhancements in productivity that these insights promise.

Organisational Efficiency of Crime Prevention

The literature on crime prevention primarily consists of case study analysis of specific programmes and projects to reduce crime in a specific community (see, for example, College of Policing, 2023a). The organisational efficiency of crime prevention will depend on the ability of police forces to navigate and leverage this diverse range of programmes on offer. As such, the police's ability to navigate the potential crime prevention arrangements will depend on four key factors that promote adaptability and effectiveness in their strategies:

- Firstly, a willingness to experiment with new programmes and approaches allows the police to explore innovative solutions and identify what works best for their specific community.
- Secondly, the capability to conduct rigorous evaluations and analysis will enable the selection of evidence-based crime prevention programmes that have proven successful.
- Thirdly, fostering a culture of continuous learning and collaboration, where the police can draw insights from other jurisdictions and crime prevention experts, provides a broader perspective and promotes the adoption of best practices.
- Finally, the capacity to develop and tailor new programmes to address emerging challenges and community needs ensures the police remain proactive and adaptable in their crime prevention efforts.

Ancillary function – Crowd control

Crowd dynamics and management is a developing field of research (Challenger et al, 2009), that regularly produces new insights on tactics and best practice. An in-depth overview of this research is beyond the scope of this review, but readers are referred to Challenger et al (2009), and College of Policing (2023b).

Reducing the aggression of individuals in a crowd can be an effective way of increasing crowd control productivity. Alcohol is known to increase aggressive behaviour, and the productivity of crowd control may benefit from removing or limiting the consumption of alcohol. There is also room for innovation, by altering programming, crowd flow on entry and exit and seating and standing arrangements.

Ancillary function – Missing Person Investigation

Whilst the majority of missing person cases are resolved positively, a small number end in serious and fatal outcomes. Therefore, the operational efficiency of missing person investigations is primarily determined by how well the police are able to determine the risk, and then allocate the appropriate amount of resources to the investigation (Phoenix and Francis, 2022). However, the risk assessment process can be hampered by officers being unfamiliar with standardised procedures (Smith and Shalev-Green, 2015), risk aversion (Heaton, 2011), and inadequate communication with the social and healthcare sector (Eales, 2017).

Phoenix and Francis (2017) analysed a dataset of missing person cases and found that certain victim characteristics – such as physical or mental illness, alcohol dependency, and past involvement in violent incidents – were not associated with the case being allocated a higher risk assessment but were associated with a higher probability of a negative outcome. Fyfe et al (2015) reports that some officers believe policy and guidance are not as valuable as experience and instinct in making a risk assessment. The effect of experience on the accuracy of risk assessments has not yet been analysed to the author's knowledge. Nonetheless, the evidence would indicate that officers can have certain blind spots that hinder the operational efficiency of the missing person investigation function.

Once an investigation has been started, the success of the investigation is largely dependent on the quality of the information provided (Hedges and Shalev-Green, 2016). Gabbert et al., (2020) and Juncu et al., (2020) demonstrate the value of leveraging psychological research to design interview processes that give officers more useful information.

Once the intelligence has been collected, the effectiveness of the investigation will then be affected by the ability of police departments to analyse the information. Reilly et al. (2021) develop a Bayesian model for predicting the whereabouts of missing persons. They report that higher degree of efficacy than the manual process that is currently being used by British police forces.

Ancillary function – Anti-terror

The police have two roles to play in managing terror threat. Firstly, they are in a good position to monitor and investigate local terrorist threats (Clarke and Newman, 2007). Intelligence-led policing, through analysing patterns in criminal and non-criminal behaviour, can help reduce the terror rate by identifying preparatory activities, such as the purchase of materials that often precede acts of terror. The effectiveness of intelligence-led policing depends on the effective sharing of information between departments and individuals, which requires intelligence staff in all departments that work on integrated technology and a common curriculum (General Accounting Office, 2003). It also requires a collaborative culture, where officers are inclined to proactively share intelligence, and not attempt to keep the investigation under their control, to maximise the prestige that will be gained from resolving it alone (Brown and Clarke, 2004; Brown et al., 2004).

The police also contribute to the monitoring and investigative role in virtue of their connection to the local community. Officers who operate 'on the beat' can form a connection to local residents and pay close attention to what is bothering them. Officers can then be trained to pick up on evidence that relates to planned acts of terror (Clarke and Newman, 2007). The productivity of this community-based intelligence gathering will also be influenced by the willingness of the public to co-operate with the police. Murphy et al. (2019) finds evidence that procedural justice is associated with heightened willingness of citizens to report terror threats, particularly amongst subjects who felt a lower level of social inclusion.

The second role for the police is to protect vulnerable targets in their jurisdiction (Clarke and Newman, 2007). Individuals seeking to commit an act of terror will generally look for targets that offer the greatest impact for the lowest risk of failure, where impact is defined as economic impact, political impact, or publicity for their cause. Freilich et al (2019) give a substantial review of the literature on how the police can alter this balance in their favour.

Ancillary function – Organised Crime Control

Organised crime is a difficult concept to define. Whilst some describe it as a rationally designed and deliberately structured operation, others describe it as a set of loose and informally structured relationships (Leong, 2007). In truth, organised crime does not appear to have a fixed form, and each model may be appropriate in one context, but inappropriate in another. As such, the most effective organised crime control strategies will also vary by context. Moreover, organised crime operations have displayed substantial adaptive capacity to counter police strategies (Leong, 2007).

An overview of the tactics available for countering organised crime is beyond the scope of this paper (see, for example, College of Policing, 2016). However, the chief determinants of success are as follows:

1. Effective co-operation and intelligence sharing between organisations is essential. Organised crime operations exist across borders, and so communication between law enforcement agencies can help build up a picture of the operation and provide intelligence that is useful for making arrests (Leong, 2007). Moreover, the interception of financial and money laundering operations will require the analysis of information that is under the remit of governmental organisations like the FSA and the DBT, and so communication with these organisations is also useful.
2. Technological capacity is increasingly important for understanding and countering organised crime operations. This new frontier offers opportunities for more effective money laundering, but also offers opportunities for the police in the form of data mining and forensic technology (Leong, 2007).
3. Legislative quality can also act as a help or a hindrance to police productivity. For example, the American RICO act is credited with giving police the ability to shut down entire organised crime operations, where previously they were only able to address particular criminal acts (JUSTIA, 2022).

Asset-focused interventions are a variety of measures that target the assets and financial resources that are gained by organised crime. In theory, it is expected to reduce organised crime by depleting their accumulated capital, disincentivising crime by reducing the expected gains, and by allowing the confiscated money to be reallocated to social programmes, which can reduce the economic deprivation that leads to criminal behaviour. There is currently an absence of evidence on the effectiveness of these strategies (Atkinson, Mackenzie, and Hamilton-Smith, 2017).

4. Measurement of Police Productivity

The productivity of police services can be measured and analysed on three levels: firstly, the productivity performance of the aggregate police sectors or specific police activities; secondly, the performance of specialised units or regional police forces; and thirdly that of individual entities, like offices or stations. At all levels, in the literature there are points of departure on the principles by which a measurement should be designed. Moreover, there are major practical challenges in correctly measuring quantities and qualities of police activities' output and inputs in the right way, so that they can be joined to show how they impact on improving the effectiveness of police activities for the desired outcomes.

Some of the challenges for measuring the productivity of the police are common to the public sector as a whole (Atkinson, 2005; New Zealand Productivity Commission, 2018, Foxton et al, 2019; van Ark, 2022; ONS, 2023). For example, public sector output is typically not provided at a market price, making it difficult to properly distinguish between quantities, prices and quality of the services. Many public sector provisions, including the police, are a common good where everyone benefits from their outputs, regardless of who is using them in the first place. As such, there is limited to no scope for incentives and quasi-market mechanisms. It also makes it difficult to distinguish between the benefits for individuals versus society as a whole. And, as mentioned in Section 2, because of the Baumol-effect there is no relationship to be found between wages (or the cost of any other input) and productivity of services such as provided by the public sector.

Recognising the wide range of tasks undertaken by the police, it is especially challenging to produce solid productivity metrics which relate to the overall effectiveness of the police. To evaluate and manage the performance of the police, more disaggregated measures are required for individual activities, specialised units as well as regional or local forces.

This section begins with a review of historical and current practices for the measurement of police outputs, inputs and productivity. Following Atkinson's principles for better measurement of government output, we review the literature on the delivery of some of those key principles with regard to the measurement of police productivity. Principles around coverage of activities, the measurement of quality, and confidence in the measures developed feature prominently.

Even the more detailed measures for productivity at the level of activities level appear to be of limited value as practical measures for helping managers to improve productivity. Indeed, the literature suggests that not much is known about how to improve productivity and performance at the organisational level in the police force. Differences in context, activity mix or even perceptions of what constitutes good performance matter. For example, different viewpoints on whether crime investigations are more productive than crime prevention to create a safe environment for the public can influence the choice of performance metrics. We will discuss this at greater length in Section 6.

Somewhat related to the above, we briefly discuss the important issue of the impact of police productivity on society's welfare at the end of this section.

Historical and Current Measurement Practices of Police Productivity

Aggregate National Accounts Measures of Police Productivity

At the aggregate level one can obtain time series of output and inputs from the National Accounts for various parts of the public sector, including health care, education and government services. In the UK, productivity measures are published as part of the ONS quarterly publication programme on Public Services Productivity (ONS, 2022). The National Accounts measures of public sector productivity can be helpful in providing an indication of the sector's contribution to the national output, input and productivity growth. The aggregate measure of police productivity can also serve as a metric of the sector's overall performance as a public service.

However, measuring the joint output and input performance of the police is a complex endeavour with multiple dimensions (Atkinson, 2005; Coleman, 2012; Leckie, 2012; Kiedrowski et al, 2013). Ideally adequate aggregate productivity measures of public sector productivity must be based on appropriate measures of quantities and quality of individual activities. Three decades ago, the System of National Accounts (1993) already recommended that countries should measure the output of public services directly, and countries including the UK have undertaken various experiments to do so (Pritchard, 2003).

In 2005, the Atkinson report recommended a significant overhaul of public sector output measurement in the UK, especially by recommending a much greater focus on quality-adjustment of public sector activities, so that outputs could be more directly linked to outcomes. Indeed, the principle of quality-adjusted output measures has become part of the 2008 System of National Accounts. But in practice implementation of such principles has been hampered by difficulties in defining quality for different services, as well as a lack of objective data that is consistently measured across time and can be used to adjust activities for quality. Indeed the 2010 European System of National Accounts has explicitly rejected quality-adjusted output measures in favour of cost-weighted activity indices of public sector output.

In the UK, 38 percent of public sector productivity statistics are currently quality adjusted, primarily for health care, education and children's social care (Powell and Zella, 2022; van Ark, 2022). However, for public order and safety, activity measures are currently used for the national accounts measures of productivity for courts and prisons, but such measures are deemed inadequate as a measure of output or productivity for the police. Most aggregate productivity estimates for the police across countries rely on equating the increase in real output to the deflated value of inputs (labour, capital and purchasing goods and services), thereby imposing a zero-productivity assumption on the sector. This measure does not allow for observing any growth or change in the productivity of the police as a result of better work practices, technological improvement, or better organisation of resources.

Activity Measures of Police Output and Productivity

There is scope for improving the aggregate productivity measures for the UK police sector by incorporating the use of detailed statistics on crime and other relevant data. A critical improvement would be the usage of investigation and incident management data. For many years, various statistics on crime and other activities have been published for the UK. They provide the basic inputs for measuring police activity in crime investigation when coupled to cost-related measures of crimes investigated and closed. The crime data include survey data by the ONS (Crime Survey for England and Wales), police-recorded crime data from the Home Office, and data on fraud by the National Fraud Intelligence Bureau (ONS 2023). The quarterly ONS publication on Crime in England and Wales

is the most comprehensive and up-to-date source including survey and police recorded data on various crime offences, including fraud, theft, violent crime, computer misuse, vehicle offences, burglary, robbery, knife incidents and homicide (ONS, 2023).

When aggregating different activities to develop a performance measure for the police, they should be weighted to reflect the police resources used to deal with those activities. However, such cost-weighted activity indices have sometimes caused rather perverse results. For example, between 1995 and 2001 the total number of recorded crimes declined, but weighted output of investigations actually increased. This was due to a sharp increase in violent crime (which is the costliest type of crime to investigate) and a reduction in several types of crime that are less expensive (such as thefts from vehicles and burglaries) (Pritchard, 2003). Similar trends could be observed for the police sector in the Netherlands, which saw a fall in cost-weighted activity between 1995 and 2015 (Blank and Van Heezik, 2017).

Indeed, according to Atkinson (2015) the cost of clearing up a crime is not necessarily related to its social value: 'Some crimes from which the public most wishes to be protected are not necessarily the ones that require the greatest resources to solve. A measure that weights outputs by social value rather than resource cost gives a useful alternative perspective on the way resources have been used.' (Atkinson, para 10-58).

Crime metrics often show large differences in measured units for seemingly similar activities over time as well as between regions or police forces. This may be genuine and related to rapidly changing dynamics in the nature of crimes, and the changing difficulty of solving them. But such differences can also result from imperfect measurement of those activities.

In 2014, His Majesty's Inspectorate of Constabulary and Fire & Rescue Services (HMICFRS) introduced a detailed inspection programme to assess Police Effectiveness, Efficiency and Legitimacy (PEEL) in England and Wales. PEEL assessments (IPA) typically incorporated force management statements (FMSs) and monitoring of forces to provide a judgment of how forces were performing. Most of the PEEL evidence is qualitative, but some metrics were systematically used across various forces, including:

- The proportion of victim-based crimes recorded with an outcome of charged or summons.
- The proportion of victim-based crimes recorded with an outcome of investigation complete – no suspect identified.
- The number of domestic Violence Protection Orders and Domestic Violence Protection Notices issued.
- The number of anti-social Behaviour Orders issued.

In addition, PEEL makes use of a qualitative survey of the police workforce focussing on workloads, redeployment, and suitability of assigned tasks.

Aggregate measures of cost-weighted activities can also differ between police forces because of a different distribution of those activities, affecting the weights used in aggregating the activities. However, the major flaw of cost-weighted activities is the failure to adequately assess quality improvements. The introduction of the Crime Severity Score (ONS, 2016) has helped to adjust counts of crime for severity reflecting the relative harm of an offence to society and the likely demands on police resources.

Key Principles of Police Productivity Measurement

1. Comprehensive coverage of activities and territory

The main critique of detailed activity measures is insufficient coverage, which relates to the breadth of activities covered as well as difficulties in gaining sufficient geographical coverage. Ideally, the measurement of productivity should be identical across all regions of the country. This would allow the statistical measures of the different departments to be compared with each other and know that any discrepancy is accounted for by a difference in output performance, and not a difference in measurement methodology. However, different regions may have different delivery chains due to a substantial difference in the nature of the activities being performed. For example, in the case of organised crime control, the nature of the drug market may be very different in urban places versus rural places. In that case, it would not be useful to use the same output activity measures for both cases.

2. Output measures should be adjusted for quality

Standard measures of the volume of output activities in the police will be insufficient for capturing the full picture on police performance. In the case of crime investigation, the impact of the activity is dependent on the ability of investigators to find enough evidence to bring offenders to justice. Without this element of measuring quality, a police force would be able to increase their operational productivity by reducing the amount of time spent at each investigation.

One common approach, which does not require direct measurement of quality, is to categorise between levels of complexity of an activity and weight them accordingly to resources required as well as severity of the offence. In the case of crime investigation, this might involve splitting the output activity into investigations that did and did not include a forensic examination. This is only appropriate if the categories are sufficiently homogeneous in which case a change in quality will show up as a shift in the proportions of the services (Eurostat, 2001). As the case of crime investigation illustrates, the qualitative attributes cannot always be split into simple categories.

The quality adjustments should also reflect how the complexity of cases is affected by environmental conditions. For example, legitimacy can explain variation in level of performance for identical services across different areas. In areas where the police have a high level of legitimacy, the public have a much higher propensity to co-operate (Jackson et al., 2013). This ensures that fewer resources have to be put into performing an investigation in order to find evidence and leads and so reduces the cost of delivering the activity.

According to ONS (2023a), there are three approaches to the measurement of quality in the public sector:

1) **Direct measurement of the quality of the output itself**. For example, cleared crime cases or the number of cases which are successfully delivered to the court for prosecution can be useful measures of quality, but these are often seen as difficult to collect in a standardized and objective fashion (Sparrow, 2015). For example, a reduction in crime could stem from raising the amount of police time to solve cases or from prevention of crime to occur in the first place. Surveys can be another useful source for quality measurement. They can be of different nature (Maslov, 2016):
   - General surveys which typically ask about how the public views the police and can resemble customer satisfaction surveys.

- Contact surveys which are targeted at an individual who had some interaction with the police, either as a victim or a suspect.
- Employee surveys are targeted at those employed in the police.

Despite its subjectivity, survey data can be useful as policing is by consent of the public. However, there are considerable difficulties in implementing survey results as quality measures. For example, the subjectivity of the information that is obtained may not be consistent over time or between units – different people can have different interpretations of the question or the response options. Survey designers have to be extremely careful in how they design their surveys in order to ensure consistency (Maslov, 2016). Furthermore, there is a risk that the subjective evaluation does not distinguish between the quality of the delivery process, the quality of the output, and the actual outcome. Overall, the public attitude to the police is a complex topic, and there is not currently a consensus as to how it should be broken down and quantified (Clarke, 2002; Castle, 2008; Ganjavi, 2000; Gallagher, et al., 2001; Gomes, 2007; Marx, 1976; Moore and Braga, 2003; Maslov, 2016).

2) **Measuring the quality of the inputs**. As many metrics of police activity depend heavily on the inputs (rather than the outputs or outcomes), it might be equally important to look at the quality of, for example, the workforce. An assumption is then made that the quality change of the inputs leads automatically to a quality change of the output. However, this assumption cannot be verified without actually measuring the quality of the output. For example, compensation of employees could be estimated as a measure of quality change, even though it is well known that such measures are not perfectly correlated with quality (New Zealand Productivity Commission, 2018).

3) **Using outcomes**. Quality adjustments are only worth considering if the changes in quality have an effect on outcomes. However, other external factors can also cause changes in outcome separately from changes in the quality and volume of outputs. For example, a reduction in the crime rate could stem from a multitude of other sources, such as reduced inequalities, higher life satisfaction, better mental health services, or the implementation of social activities and programmes within the local community (ONS, 2019). As such, the key questions in using outcomes directly for the assessment of quality improvements are: What benefits does someone receive from being provided a public service? How much of that benefit is directly because of the service? (ONS, 2019)

3. Quality measurement of inputs can be a good proxy for quality of output and outcomes

While output cannot be equated to inputs, correct measurement of inputs (labour, capital and intermediate goods and services) is still useful for several reasons. Firstly, they are often used as the basis for output measurement in the absence of effective output and outcome measures. Secondly, even if output is successfully measured independent of inputs, input measures can provide insight as to why output measures have changed. Thirdly, accurate accounts for the inputs are important for estimating productivity as such.

Inputs also need to be adjusted properly to account for inflation and sector-specific price fluctuations. However, prices can also influence the mix of inputs that managers choose to acquire.

4. Room for experimentation and open governance of new data.

There is a difficult balance to be struck regarding how many indicators should be included in the output measures. More indicators will increase the statistical power of the productivity measurement regime but will also add cost of data collection and complexity in interpretation of the data. As described by Atkinson (2005), the conditions for introducing a new output indicator should be that (1) it covers adequately the full range of services for that public sector function, (2) it makes appropriate allowance for quality change, (3) the effects of the introduction have been tested by the service, (4) the context in which it will be published has been fully assessed, and (5) there should be provision for regular statistical review.

Triangulation of different data sets to assess the evidence from specific metrics against others is useful, not only to the producers of the data to guarantee good quality, but also for users at the organisational level to assess aggregate or activity data against their own organisational metrics, for example against those collected for the PEEL programme.

The usability of performance statistics is determined not only by the quality of the underlying data but also by the quality of the statistical processes involved (Akritidis, 2002). Sampling error can be one source of error in statistical analysis, and can arise when the members of the group surveyed are not representative of the population as a whole. On the other hand, non-sampling errors, can stem from various factors such as incomplete coverage, data collection failures, reporting errors, processing errors, and inaccuracies in data adjustments. While certain elements of the data may be more reliable than others, determining their respective contributions to the resulting aggregate margin of error can be a complex task.

An explicit discussion of margin of error will inform decision making in how the statistics are used. In the case where a user is interested in the contribution of a particular activity to the local economy, then the acceptable appetite for error will be low. Alternatively, a user may be interested in how a statistic has changed across time, in which case the acceptable margin for error will be much greater.

Inappropriately designed performance measures can lead to undesirable side-effects, such as manipulation of statistics or resources by police officers in an effort to meet performance expectations (See Section 6). A philosophy of open governance should therefore be pursued, making many contextual indicators widely available to promote transparency, comparison, accountability and communication, alongside a relatively small set of core performance indicators (Tiwana et al., 2015).

Atkinson (2005) highlights the importance of having effective channels of communication between those who generate the data, and those who end up using it. In absence of these, the collectors will be unaware of how the data will be used, and users will find it difficult to obtain explanations for apparent anomalies. Overall, the data would be regarded as less reliable, and is therefore less likely to be a valuable source of insights for practitioners.

Police productivity, social value and welfare

A key issue for any measurement of public sector output and productivity is the distinction between it being a "common good" as well as providing individual benefits. 'Common goods' are products or services that are non-excludable and non-rivalrous in consumption. Non-excludability means that once the services is provided anyone can use it regardless of whether one has contributed to its

provision, financially or non-financially. Non-rivalry means that one person's consumption of the good does not reduce the amount available for others.

Regarding police services, some activities such as crime investigation will serve individuals (in this case, the victim of a crime) while crime prevention or neighbourhood policing will serve the entire community. To better reflect the benefit enjoyed by the community as a whole, there are methods to estimate the cost that crime imposes upon society and the impact that the police have in mitigating this cost. Heaton (2010) provides an overview of the literature on the social cost of crime.

Social scientists distinguish between monetary (tangible) and non-monetary (intangible) costs of crime (Heaton, 2010). Monetary costs refer to direct financial impacts on individuals, businesses, and governments, such as property loss, medical expenses, lost productivity, crime-prevention expenses, and government expenditures on adjudication and incarceration. These costs are theoretically measurable using expenditure data.

Non-monetary costs of crime encompass the subjective impact on quality of life, including fear and psychological effects. Measuring these costs is challenging due to their intangible nature, yet they hold significance as they can contribute significantly to the overall cost of a crime. For instance, while the monetary expenses of medical treatment for sexual assault victims may be relatively minor, the psychological and mental health consequences are substantial. Ignoring non-monetary costs would result in an underestimation of the true costs of such crimes.

There are three methods that have been used to estimate the social cost of crime:
- The **accounting approach** involves identifying and assigning a monetary value to individual costs associated with criminal activities. Monetary costs include prevention expenditures, property loss, medical treatment, pain and suffering of victims, and expenses related to investigating, adjudicating, and incarcerating offenders. Non-monetary costs use data from wage premiums for jobs with higher occupational risk (Miller, Cohen, and Wiersema, 1996). The primary drawback of the accounting approach is that it only takes account of victim costs and may not fully incorporate other costs incurred on society as a whole, such as general fear, investment in security apparatus, or incarceration expenses.
- **Contingent valuation** estimates the value of nonmarket goods and services such as, for example, crime reduction. It asks individuals if they would be willing to support a hypothetical programme that provides specific benefits in exchange for tax increases. The tax increases are supposed to reflect the perceived costs of crime, or the value placed on crime reduction. This approach allows for the capture of both tangible and intangible costs associated with crime. Unlike accounting methods, contingent valuation is better able to capture difficult-to-quantify intangible costs, such as fear of crime or the loss of community spaces due to crime. Contingent-valuation studies also enable researchers to identify differences in willingness to pay across different subpopulations by collecting demographic data alongside survey responses. Studies using this approach in the United States and the United Kingdom have yielded higher cost estimates of crime compared to accounting methods, indicating that it better captures the intangible costs. Limitations of the contingent-valuation approach include poorly defined preferences and hypothetical bias, where individuals may overstate their willingness to pay for a programme or good in a hypothetical scenario.
- The **hedonic valuation approach** estimates the value of neighbourhood amenities, including crime incidence and safety, by examining the relationship between local characteristics and the price of housing. In a competitive housing market, prices will adjust to reflect lower demand for neighbourhoods that have less desirable features like a higher crime rate. This

approach captures both monetary and non-monetary benefits of amenities and is based on actual market transactions, reducing the influence of bias in the contingent valuation approach. However, hedonic value is limited in that it cannot provide estimates for specific types of crime since areas with high levels of one type, such as theft, tend to be associated with high levels of other crimes, such as murder. It is also difficult to separate the effects of crime rates from other neighbourhood factors that tend to co-occur with high crime rates, such as poverty and poor school performance. Finally, this method cannot provide estimates for the cost of crimes that people can't adjust their exposure to by moving neighbourhood. Online fraud, identity theft, domestic abuse, and travel-crimes cannot be reflected in the estimates.

In recent years, the measurement of welfare beyond the gross domestic product (GDP) has received increased attention. While the Atkinson report explicitly focused on the need to measure the 'monetised consumer utility' from public service activity in the System of National Accounts, in practice this required the more explicit measurement of quality changes as described above (Atkinson, 2005). Beyond this, however, improvements in welfare and wellbeing can stem from other factors than the direct outcomes of public service activity. For example, improved diets, smoking prevalence, and other lifestyle decisions will determine the impact on wellbeing. Foxton et al. (2019) argue that measures of outcomes from public services should be consistent with those used for measuring the welfare of society as a whole and they should sit alongside measures of GDP. The improvements in social well-being (such as safety or security) beyond that created by police services would form a residual attributable to non-policing drivers in a welfare account.

5. Drivers of Police Productivity

There are many drivers to improve productivity in the public sector. Van Ark (2022) summarises the key drivers of public sector productivity into three categories covering organisations, technology and people:

- Organisation: Adaptive organisation design
- Technology: Continuous improvement and innovation and digital transformation
- People: An agile workforce

All three drivers strongly apply to the police sector. Adaptive organisational design is especially important for the police, where priorities change continuously from a policy, strategic and operational perspective. Continuous improvement and innovation and digital transformation in the police have often been hampered by underfunding, policy churn, and a lack of collaboration between forces and adjacent public sector organisations. Workforce issues have also been affected by inadequate training on a broad range of skills, worker engagement and well-being.

The three drivers are also closely linked to what the public is expecting from the police 'to provide the best protection possible, and at a reasonable price, by being', as defined by Sparrow (2015):

- Nimble, flexible enough to organize themselves quickly and appropriately around each emerging crime pattern rather than being locked into routines and processes designed for traditional issues.
- Skilful, masters of the entire intervention toolkit, experienced (as craftsmen) in picking the best tools for each task, and adept at inventing new approaches when existing methods turn out to be irrelevant or insufficient to suppress an emerging threat.
- Vigilant, so they can spot emerging threats early, pick up on precursors and warning signs, use their imaginations to work out what could happen, use their intelligence systems to discover what others are planning, and do all this before much harm is done.

In this section, we discuss the three drivers from the perspective of the literature on the police. As the three drivers are connected through the concept of organisational learning, we start our review with the broader literature on that concept.[10]

Organisational Learning

A learning organisation is one that is constantly looking for, and able to exploit, opportunities to sustain and increase productivity (Wang and Ahmed, 2003; Garvin, 1993). A learning organisation should not be confused with individual learning – although in the literature it often is (Senge, 2006; Elliot, 2020). Personal skill development will be discussed in greater detail later in this section.

For a learning organisation it is important to make a distinction between structural and cultural learning. Structural learning involves the creation of formalised procedures, such as audits and reviews, to facilitate continuous learning and improvement within the organisation. Structural learning requires a top-down change approach, with senior leaders driving and overseeing the implementation of these learning mechanisms.

Cultural learning refers to the development of a learning-oriented organisational culture. It is a product of the habits, values, and attitudes of individuals within the organisation, who collectively

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[10] In principle, the characteristics of a learning organisation should apply equally to business and governmental organisations. Hence much of the literature discussed here is derived from private sector-focused research.

promote a proactive, curious, and scientific approach to problem-solving (Farkas et al., 2020). A culture of learning is self-reinforcing, since employees observe and emulate the behaviour of their peers, leading to the entrenchment and growth of a learning mindset throughout the organisation (O'Reilly and Chatman, 1996). For this reason, effective teamwork skills are vital for the establishment of a learning culture (Torbert, 1991). An important issue for future research is what the effect of remote working will have on the formation of an organisational culture (Raghuram, 2021). While cultural learning involves the entire organisation, it also depends on the strong commitment and trust from senior management (Drew and Smith, 1995; Wang and Ahmed, 2003).

Cultural learning is particularly prevalent in startup culture, where an environment is fostered to encourage all individuals to actively engage in problem-solving (Midler and Silberzahn, 2008). Employees at every level are encouraged to think critically about the challenges the organisation faces, and they are empowered to propose solutions as they have easy access to senior management for support to implement the solutions. These conditions help to foster a sense of ownership and responsibility.

The degree of opportunity in the public sector for leveraging cultural learning is not known. Whilst it may be challenging for larger, highly hierarchical and formalised organisations like the police to fully emulate the agile and entrepreneurial aspects of a startup culture, their example highlights the immense productivity opportunities that arise from nurturing and empowering self-motivated individuals (Elliott, 2020).

Management is key to determining whether an organisation is blame-oriented or solution-oriented. In the context of the police, a blame-oriented culture focuses on finding individuals to hold accountable when things go wrong, leading to excessive risk aversion and a reluctance to accept responsibility for tasks that have inherent uncertainty. Conversely, a solution-oriented culture emphasises understanding the root causes of challenges, learning from mistakes, and collaboratively finding constructive solutions. This culture fosters transparency, accountability, and a proactive approach to problem-solving, promoting trust, open communication, and continuous improvement within the police force. A solution-oriented culture is crucial for enhancing effectiveness, maintaining public safety, and building a sense of teamwork and trust among officers.

Organisational learning can be divided into single- and double-loop learning (Argyris and Schön, 1978; Bapuji and Crossan, 2004; Tosey et al, 2012). For single-loop learning, the primary objective is to fix the immediate deviations from the desired outcomes: a problem is identified, a solution is implemented, and the organisation examines to see how effective the solution is. Double-loop learning is a more sophisticated and proactive approach to problem solving: the organisation reflects on why certain approaches were taken, how they shape decision-making, and whether they align with the organisation's long-term goals and values (Argyris and Schön, 1978). It involves a more careful examination of the values, assumptions, and theories that underlie the organisation's activities.

Effective single-loop learning is essential for incremental improvements in productivity. In the context of the delivery chain, it refers to the examination of whether the chain has the appropriate inputs, and what constraints are currently acting on productivity. Double-loop learning is a necessary ingredient to an agile organisational design as it refers to the examination of the chain itself, to see if it is well conceived and appropriately reflects the desires of the public. Such a fundamental change in thinking on the delivery change can be spurred by changes in demand placed on the chain (either from the crime environment or from political pressures), or by new threats and

opportunities offered by major technological developments (Crafts, 2021; The Police Foundation, 2022).[11]

Organisational **un**learning is equally vital for achieving organisational agility because people tend to hold onto beliefs and practices as long as they produce reasonable results (Kuhn, 1962), and may only abandon them once they have become completely untenable (Petroski, 1992). Encouraging unlearning within the organisation allows teams to recognise and shed outdated or ineffective approaches, creating room for fresh perspectives and innovation. Embracing this mindset enables organisations to adapt swiftly to change, stay competitive, and foster a culture of continuous improvement, ultimately ensuring long-term success in a dynamic political and crime environment (Drucker, 1993; Wang and Ahmed, 2003). This process will happen organically over time as older workers retire and are replaced by younger ones with a fresher perspective. Strikingly, Fenizia (2022) finds this organic process to be a primary force behind the effect of managerial quality on Italian public sector productivity growth. Good managers seemed to have a beneficial effect on productivity primarily as older workers left the organisation. The caveats of this approach is that unlearning can go together with the loss of experience. Moreover, in aging societies organisations will naturallly have to prepare for a larger share of older workers in the workforce and mitigate possible negative effects on productivity (Aiyar, Eberke and Shao, 2016).

Organisational learning is not the only way of looking at how to develop improvement processes within an organisation. Similar concepts to organisational learning can be found in the well-developed literatures on Six Sigma (Anthony et al., 2019), Kaizen (Alosani, 2020), and Knowledge Management (Lyles, 1992). While there are differences between the approaches, the core insights into the nature of improvements in organisational performance are essentially the same:
- Improvement is a process and not an event, and therefore should not be limited to one-off activities
- The process of improvement happens in virtue of the development of capabilities that allow the organisation to understand and sole problems; and
- This is effectively done by involving lots of information from many stakeholders, putting much emphasis on the role of technology to strengthen information exchange.

Organisation: Adaptive organisational design

Van Ark (2022) highlights the following elements as key to an adaptive organisational design:
- Public sector organisations which can operate in a flexible way are better in responding to changing priorities. Internal challenges, such as budget changes and shortages in staff or skills, and external issues, ranging from policy changes to altering citizen preferences, all have an impact.
- Public sector organisations should strive for a better balance between hard budget constraints and spending flexibility, for example by allowing flexible spending across budget lines and long-term budget covering 3-5 years of spend and investment.
- Balancing between scaling up the delivery of public services while tailoring to specific customer segments is also essential.

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[11] There is also some unresolved discussion in the literature of so-called 'triple-loop' learning, which focuses on the process of 'learning about learning' (Tosey et al., 2012). It requires organisations to review whether the way of reviewing and organisational learning is able to produce accurate insights and effective recommendations that can be followed through (Yuthas et al., 2004).

- Responding to contextual needs, especially regional or local requirements, is important for realising productivity gains in the public sector.

From the perspective of the police organisation, we found two specific aspects of adaptive organisational design in the literature.

Long-term planning

Firstly, long-term planning and strategic thinking are useful for police managers to improve responses to short-term challenges. Long-term thinking involves strategic planning to respond to anticipated changes in the demand an organisation faces over time, the delivery of long-term objectives, whilst also being able to deploy resources to solve immediate problems. Foresight and scenario planning are important instrument aspects of this capability (Peter and Jarratt, 2013). If a police force can adopt a long-term perspective in its budgetary decisions, spread over multiple years and with the flexibility to shift across budget items, then it will be able to improve budgetary efficiency over time. For instance, investing in advanced technology and training programs for officers might require higher initial costs, but it can lead to long-term cost savings by improving operational effectiveness and reducing the need for recurring expenses.

Scaling up and localisation

Secondly, police forces face the challenge of striking a balance between centralised scale and localised operations. A large and centralised force might achieve economies of scale, and appear to reduce overall costs, but it might struggle to address specific needs and lack local context in various local communities, and so suffer from worse outcomes. Conversely, a highly localised approach could be costly due to duplicated efforts and lack of resource sharing and creates inconsistency of service across a police area.

Overall, devolution systems can improve productivity for an organisation by four mechanisms: 1) tailoring to local needs, 2) innovative dynamism, 3) greater involvement of the private sector, and 4) the development of local democratic institutions that facilitate civic participation. By involving a wide range of key stakeholders in the planning process, a more inclusive and effective productivity improvement can be achieved, leading to broader community participation and support. Moreover, by granting decision-making powers to individual units, the centre ensures that more units have the capacity to conduct unique experiments, and explore new technologies, processes, and methodologies. This experimental capacity is best harnessed when combined with the ability to share insights across practitioners, so that productivity-enhancing innovation can diffuse across the system.

At the same time the advantage of devolution can be offset by sacrificing economies of scale, allowing regional economic inequality to also result in inequity of service provision, and create new bureaucratic burdens such as co-ordination costs (Rodríguez-Pose and Gill, 2005). Police chiefs need to assess the optimal level of devolution based on an assessment of specific tasks, unique requirements and budgetary constraints of police departments.

Learning regarding the optimum balance between centralisation and localisation can be obtained from the reorganisation of Police Scotland which was formed in 2013 from the amalgamation of the eight Scottish Police forces (SIPR et al, 2019). Whilst there has been a perception that the police were becoming less responsive to local policing, the consolidation has led to substantial annual cost savings (Police Scotland, 2020; The Police Foundation, 2022).

In the debate on scaling-up and localisation it is important to make a distinction between, on the one hand, scaling up an organisation in terms of strengthening integrated management and strategic decision making as well as centralising shared services versus, on the other hand, decentralisation of tactical and operational decisions (Blank and Van Heezik, 2017). This subtle balance can only be achieved with an emphasis on collaboration, cooperation and communication within the organisation at all levels. It also has implications for the process of budgetary decisions, and it requires a strong focus on evidence-based management (see Section 6).

Technology: Continuous improvement and innovation and digital transformation

On innovation and digital transformation, van Ark (2022) identifies the following key areas for improvement:

- The capabilities to innovate and to experiment depend on how much space is given to strategic thinking in the organisation.
- Digital transformation for driving continuous innovation in public sector organisations. These technologies can simplify, streamline and enhance the delivery of products and services.
- Digital transformation also leverages the new technologies and, importantly, the data they generate to develop a dynamic system of interconnected organisations, assets, processes, and people.
- Public sector organisations need to maintain an awareness of the new opportunities and threats that are posed by new technological developments.

The opportunities and risks of new technologies

Much of the literature on technology in the police sector relates to the implementation of Information and Communication Technology (ICT) projects. The development of new digital tools can impact the delivery chain in two ways:

Firstly, they may accelerate the fulfilment of existing tasks. An example of this is the AI-based system for identifying at-risk children, developed by Sheffield Hallam University in collaboration with West Midlands police (Flood, 2021). This new technology augments an existing activity – the risk assessment procedure – to help officers make better decisions about where they can target their resources. A substantial increase in the operational efficiency of this activity would mean that resources should be redeployed away from it in order to maximise productivity.

The second way that new digital tools can improve the delivery chain is by creating opportunities for new activities. An example of this is drone technology, which makes aerial surveillance much cheaper for the police, and so can be employed in far more situations like search and rescue, crime investigation, and assailant pursuit (Bentley, 2019). These cases demonstrate how the new opportunity may require a rearrangement of the current activities in order to make the best use of this technology – for instance, drones may be used to follow suspects who are attempting to evade police capture. In this case, officers should focus fewer resources on pursuing the suspect, and more on using the intelligence to set up a trap. Garicano and Heaton (2010) find evidence that delivery chain rearrangements may be needed to obtain the benefits of innovation. They observe that IT projects only deliver an impact on police outcomes if they are paired with an organisational reform programme.

However, as both the AI and drone cases illustrate, new technologies also come with new risks for the delivery chain. Neural networks (colloquially known as AI, although that term also includes robotics and symbolic systems (Cockburn et al., 2018) can lead to profiling when trained on biased or discriminatory datasets, perpetuating and amplifying the biases present in the data (Hong and

Williams, 2019). This can lead to the network making unfair and prejudiced predictions or classifications. When used disproportionately, drone technology becomes a threat to civil liberties and the legitimacy of the police, because they represent a substantial increase in the ability of the police to pry into people's lives. Regardless of whether the intentions are good, this capability can provoke a backlash (Bentley, 2019). As such, the uncritical usage of those tools can lead to a disproportionate targeting of police resources against certain groups, which would threaten police legitimacy.

New technology can also create new situations for the police to deal with. Generative AI systems may be able to falsify evidence, produce targeted fraud material, and manipulate markets (King et al, 2020). Drone technology can be used to transport illicit goods, provide surveillance for criminals, and disrupt air traffic (BBC, 2018). These threats constitute new incidents for the police to respond to, and so the police should be able to develop and adapt their delivery chain as necessary.

Why Information and Communication Technology (ICT) projects are often not successful

ICT projects often suffer from a high risk of failure (Flyvbjerg and Budzier, 2011; Fishenden and Thompson, 2012) and large cost overruns (Whitfield, 2007). If this area can be addressed, not only will organisational budgetary efficiency benefit, but also the reputation of IT projects as a whole will be increased. This would make it easier to build support and overcome resistance to IT projects, and so it would be easier to select the optimal level of investment in technological innovation.

The problem is widespread across the economy, but the public sector in particular appears to suffer from cost overruns (PASC, 2011). The issue that underlies a lot of the failures of ICT projects is that government has a tendency to prefer large and unwieldy projects (PASC, 2011; NAO, 2020). As large projects may be composed of multiple tasks, the public sector client hires one primary contractor on the understanding that they will manage all sub-projects (Holgeid and Thompson, 2013).

In the context of large ICT change programmes, it is imperative to use a management approach that maintains adaptability to significant changes and ensures alignment with existing procedures, existing equipment, and new technologies that developed in concurrence. Many large ICT projects have not succeeded to do so, as is demonstrated, for example, by the unsatisfactory performance of the ESN (Emergency Services Network) upgrade programme. This attempt to update the emergency services' communications system has suffered from excessive rigidity in its delivery approach, and is characterised by 'arbitrary' deadlines, poorly integrated activities, and 'unrealistic' plans (Public Accounts Committee, 2023). As a result, the project has been severely delayed, and is substantially over budget (Clark, 2022).

One way to address issues about the complexity of tech projects would be to move towards an 'end-to-end' methodology for project management.[12] This system has been successful in the private sector, and it would enable an organisation, like the police, to maintain the capabilities that are needed to face the inherent volatility in large ICT projects, such as the ability to adjust managerial approaches, modify project deliverables, and reconfigure relationships with stakeholders and contractors.

There are multiple reasons though why consolidated technology projects in the public sector organisations fail:

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[12] See for example, https://www.indeed.com/career-advice/finding-a-job/end-to-end-project-management.

- Sauer, et al., (2007) suggest that the risk of failing increases with project size and volatility (related to changes in project manager or sponsor, and changes in schedule, budget and scope). There are many examples of government projects suffering from changing priorities and goal-posts due to political, technical or budgetary considerations.
- Large and complex projects can only be delivered by a small pool of large contractors (PASC, 2011). These contractors are then able to leverage the lack of competition to make excessive profits.
- Large projects are often less agile, and do not respond as effectively to changes in the scope and need (Holgeid and Thompson, 2013).
- There are also risks of over-specification of security and privacy requirements as a reason for project overruns (PASC, 2011).

A more fundamental reason why the consolidated approach can lead to failure is that risk management and stakeholder engagement cannot be easily outsourced to the contractor (Holgeid and Thompson, 2013). The contractor may not have the appropriate incentives to speed up project delivery. Or the public sector client may lack the technical skills needed to integrate the projects and act as intelligent customer with the sub-project workers, and lack the leadership skills needed to manage the stakeholders (Wood-Harper, 2007; PASC, 2011).

Flyvberg and Budzier (2011) develop a new framework intended to help strategise towards 'hyper emergent' projects, which are big on both size and volatility, emphasising the need to split large efforts into manageable pieces according to risk profile while maintaining a clear view of the bigger picture. This at the core of an agile approach to project management, while avoiding the risk of typical waterfall management approaches referred to above.

Continuous improvement and innovation

Public sector organisations are often plagued by the tension between demands for large transformation and organisational inertia to quickly adjust. This can easily lead to unreliable support for the development of new technology, with projects starting too big and failing when processes and people cannot be aligned (see also Section 6). Continuous improvement of existing processes and services and innovation is therefore an importance principle behind the use of new technologies. Daglio et al. (2014) have looked at how an innovation lens can help to identify the capability and capacity of public sector organisations, and how the elements of organisational structure, process, culture, and technology interact to determine the innovation behaviour of individuals and teams.

A recent example of a continuous improvement approach is from the South Wales Police force, which focused on improving the quality of idea generation, strengthen sharing and enable idea capture and implementation through new digital project management tools. In line with the emphasis on workforce well-being in the Policy Foundation's 2022 report, the innovation focus was on ideas for staff wellbeing leading to 29 ideas that were implemented ranging from mentoring for junior officers through to the introduction of wellbeing dogs.[13]

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[13] https://www.simplydo.co.uk/solutions/how-we-helped-a-police-force-build-a-culture-of-continuous-improvement.

People: An agile workforce

Van Ark (2022) defines an agile workforce as one that gets work done with maximum flexibility and minimum constraints by using the full potential of full-time, part-time and contingent workers who are constantly engaged with the organisation. He makes the following key observations regarding the characteristics of an agile workforce:

- On workforce skills: while digital technologies require STEM skills, softer skills are key to the creation of an agile workforce that can understand customer needs.
- On managerial skills and competencies: an increase in managerial talent can raise productivity substantially.
- While an agile workforce tends to generate greater employee satisfaction and higher morale, it needs to be preceded by strong consultative processes and ownership of new working arrangements by those most involved in the delivery.

Each of those elements of the agile workforce is discussed in more detail below.

Workforce skills and competencies

In comparison to the private sector, investment in human capital is low in the public sector. CIPD (2015) finds that the median per-employee training budget is 37% lower in the public sector compared to the private sector. The literature highlights the need for organisation to have a targeted skills strategy. The success of such a strategy depends on the degree to which it is tailored to the reasons that people do or do not engage in skills development. The decision to engage in learning depends on several factors, such as organisational and personal awareness of a skill gap, the perceived availability of learning opportunities and an understanding of learning objectives (Noe, 1996; Boomaars et al., 2018). Older employees and individuals lower in the hierarchy are often found to be less likely to seek out learning and employment opportunities. There appears to be a lack of clear evidence on the contribution of human capital to police productivity, which may have caused underinvestment in human capital for the police.

While somewhat artificial, a distinction may be made between needs for hard skills, relating to competencies and abilities to complete work, and soft skills, which are personal qualities and traits that impact how you work.[14] Both are important in creating the outputs required, while soft skills may even matter more for raising the effectiveness by which outputs are turned into outcomes.

Investigatory skills encompass a diverse range of abilities that enable officers to gather, analyse, and interpret evidence while conducting thorough and unbiased investigations. Critical thinking and problem-solving skills help the police connect the dots, uncover patterns, and identify potential suspects. Effective communication skills are essential for interviewing witnesses, victims, and suspects to extract relevant information accurately. Additionally, technical proficiency in using modern investigative tools and technologies is vital for efficiently handling digital evidence and cybercrimes. Moreover, the ability to work collaboratively with other law enforcement agencies and forensic experts enhances the overall efficiency and success of investigations.

As most crime scenes now involve a digital aspect, and even routine investigations may require gathering digital evidence from various sources, officers with strong **digital skills** are essential for effective policing in the modern era. One significant area where digital skills are critical is in responding to online child sexual abuse (CSA). Unfortunately, only a small percentage of generalist

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[14] See: https://lifelonglearning.waldenu.edu/resource/what-is-the-difference-between-hard-skills-and-soft-skills.html.

officers have been trained in online investigation and collecting digital evidence. This lack of core digital skills training for non-specialist officers leads to lengthy investigations, inconsistent practices, and missed opportunities for investigation and safeguarding (Muir and Walcott, 2021). Digital forensics is another field where skilled practitioners are vital for police productivity. Most investigations now involve digital evidence, but forces often lack the skilled staff and technology to process such evidence efficiently (The Police Foundation, 2022).

Soft skills focus on **relational skills**. Effective policing is built on strong social relationships, both within the police force itself and with the wider community. These skills enable officers to successful navigate the increasingly complex social environment that requires police to possess excellent interpersonal skills to maintain legitimacy. Emotional intelligence is found to be strongly correlated with job performance (Ono et al, 2011).

The Police Foundation (2022) finds that comprehensive training and assessment for verbal and non-verbal communication skills are powerful tools to enhance officer productivity. These skills include active listening, empathy, building rapport, using positive language, and de-escalation techniques. By equipping officers with such essential tools, confrontations can be prevented, and the demand for conflict management reduced, ultimately bolstering the legitimacy of policing efforts (HMICFRS, 2020).

Stakeholder engagement skills are increasingly recognised as vital for modern policing (Needham and Mangan, 2014; Dzur, 2021). Public servants, including the police, must now collaborate with citizen experts to achieve better results. Neighbourhood policing, in particular, requires strong engagement with local communities in determining the immediate safety problems that are facing the community.

Victim care is another critical area where officers require strong interpersonal skills. Victims' confidence in the police has been dwindling due to issues like poor communication, inaction, rudeness, and disrespectful attitudes (Victims Commissioner, 2020). To address these issues, it is essential to provide greater police training in trauma-informed practice and victim support.

Given the increased burden on the police to deal with individuals with mental health problems, it is important for officers to be equipped with the knowledge and tools to handle mental health-related incidents effectively. Familiarity with neurodevelopmental conditions like autism and ADHD would be beneficial, particularly when dealing with young people in custody (Police Foundation, 2022). Identifying and providing appropriate support for neurodiverse individuals can reduce unnecessary stress, anxiety, and conflict during police encounters.

Collaboration with mental health professionals and educational institutions can enhance officers' understanding and confidence in addressing such situations. Scantlebury et al. (2017) examined the co-operative arrangement between North Yorkshire Police and the University of York to provide training for officers on mental-health conditions. The authors found that the officers displayed greater knowledge and confidence, and were more able to deal with the incidents productively.

Whilst officer behaviour is widely understood to be an important determinant of the productivity of the police, there has been relatively little research into which factors determine officer behaviour (Canales et al., 2022; Skogan et al., 2015). Smith and Aamodt (1997) find that prior completion of tertiary education has a positive effect on productivity, but the effect is only visible after the officer has received several years of experience. Training targeted at specific skills has also been observed to be effective at improving resilience (Arnetz et al., 2009) and procedurally just behaviour (Canales et al., 2022; Skogan et al., 2015).

However, not all training programmes are equally successful (The Police Foundation, 2022). Research into the factors that determine the effectiveness of a training programmes appears to be limited (Desmond et al., 2020). Mastrofski and Ritti (2006) examined one programme that showed highly variable results in different precincts and found that the difference was explained by the level of managerial commitment to the objectives of the training programme. This is consistent with Betts and Farmer (2019), who observed that attendance at specialist courses was dependent on an officer having the support of their line manager – highlighting that people tend to participate more effectively in training programmes when they believe they will gain something valuable from them. They assess the training's worth, in part, by considering input from their colleagues and supervisors.

Managerial skills and competencies

There is significant empirical evidence on the relationship between management competencies and productivity in private sector organisations (Bloom et al., 2012). Modern management techniques, such as targets, incentives, and monitoring, can also be applied to raise productivity in public sector organisations (Bloom et al., 2015). However, these techniques work particularly well in relatively small organisations, such as schools or public service organisations with a relatively narrow range of responsibilities. Managerial quality becomes particularly crucial for large organisations due to the complex structures and extensive operations that must be overseen. Here best practice management techniques ensure more efficient co-ordination, strategic decision-making, and optimal resource utilisation. While, as noted above, the introduction of ICT cannot be directly related to better police performance, those investments can be linked to improved productivity when complemented with changes in organisational and management practices (Giracano and Heaton, 2010).

Whilst management practices have been the subject of a substantial literature, there has been relatively little discussion on how management skills and competencies have a positive effect on outcomes (Branch, et al., 2012; Bloom, et al., 2013). Deming (2017) has shown that interpersonal skills of managers (akin to the discussion of relational skills above) are increasingly valued in the private sector as they cause lower staff turnover and are particularly important in retaining the staff with high levels of human capital (Hoffman and Tadelis, 2021). Hence, good managers primarily have a positive effect on productivity in virtue of their ability to help workers to enjoy their jobs.

Time is a scarce resource for managers, and organisations should be highly strategic in how management resources are being used. There is evidence that managerial multi-tasking can have a negative effect on the quality of service that the manager provides (Chen et al., 2020), and one should therefore be mindful of the number of areas of responsibility that managers have. Organisations need to be aware of how much analytical and managerial capacity they have, and how many productivity enhancement and other improvement programmes that capacity can deliver. With this in mind, it is then possible to determine how that improvement capacity will best be used, by identifying which bottlenecks are the most constraining, and how many resources will be needed to resolve them (see Section 6 on the Theory of Constraints).

The literature provides only limited evidence on how effectively managerial responsibilities are currently being allocated within the police, and hence what is the extent of the opportunity for productivity growth. The average tenure of a police manager has steadily declined since the 1980s to the present average of 3.65 years (HMICFRS, 2019). The same source claims that 1 in 10 police managers register a critical anxiety score. Poor responsibility allocation will not be the only factor in creating this level of staff turnover and anxiety (The Police Foundation, 2022). However, it is possible

that managers are being pushed beyond their capacity, and there may be opportunities for productivity improvement through better allocation of management responsibilities.

Transformational leadership and productivity

Understanding the fundamental mechanisms through which leadership influences productivity is a matter of considerable significance for law enforcement agencies. Effective leadership, management, and supervision can profoundly shape officers' morale, teamwork, and overall performance. By comprehending the dynamics that underly the impact of leadership qualities, police organisations can implement strategies that foster positive working environments, enhance communication, and encourage skill development.

In the public sector, particularly in law enforcement, the predominant conversation centres around the need to transition towards a more dynamic and transformational approach to leadership (Police Foundation, 2022). The current paradigm is considered to be too dependent on a command-and-control style of leadership, wherein the police officers are expected to defer to the highest-ranking officer (Herrington and Calvin, 2016). This style of leadership is considered to be transactional in nature, as officers primarily obey instructions in order to gain reward or avoid sanction (Mastrofski, 2006). The command-and-control style is also said to be 'the greatest obstacle to the culture of candour and challenge'. (College of Policing, 2015).

The transformational style of leadership is said to improve communication, create stronger relationships, encourage a more motivated workforce (Cockroft, 2014), and inspire workers to go beyond their prescribed workload (Campbell and Kodz, 2011). However, there is also evidence that a transformational leadership style can result in an organisational culture where whistleblowers are regarded as 'whingers or troublemakers' (Davis and Silvestri, 2020; Alvesson and Spicer, 2012; Collinson, 2012).

The above discussion stands in contrast to the literature from the private sector – where it is generally agreed that there is a fundamental difference between management and leadership (Kotter, 1990). Managers take a transactional approach to dealing with people, and focus on structure, authority, and ensuring the smooth delivery of established activities (Watson, 1983; Hull and Ozeroff, 2004; Algahtani, 2014). Their skill sets encompass technical proficiency, negotiation, organisation, delegation, and conceptual thinking (Kappa, 1991; Katz, 1955). Leadership, on the other hand, entails inspiring change, fostering a visionary outlook, and motivating teams toward long-term outcomes (Kotter, 1990; Bennis and Nanus, 1997). Leaders need passion, integrity, an attitude that is open to risk-taking, and a willingness to be visible so they can lead by example (Capowski, 1994; Algahtani, 2014).

Bennis and Nannus (1995) summarised the difference between leaders and managers as 'leaders do the right things, managers do things right'. This is notably similar to the difference between effectiveness and efficiency given by van Ark (2022), suggesting that managers can be regarded as best suited for focussing on organisational productivity and outputs, while leaders are best suited for focussing on effectiveness and outcomes. Clearly, the two are deeply interconnected and so the challenge is to leverage both managerial and leadership talent, without leading either to impinge on the other.

This framework from the private sector for understanding management and leadership is substantially different from what is currently used in the public sector. From the literature alone, it is not possible to know whether this framework is objectively better, and it may be an important topic for future empirical research.

Wellbeing is more than just the absence of disease (Page and Vella-Brodrick, 2008). Keyes (2002) outlines how employee wellbeing extends across a spectrum from illness, to languishing, and ultimately to flourishing, and is based on the individual's emotional, physical, and mental state. Ryff (1995) states that an individual's wellbeing is determined by six core dimensions: 1) self-acceptance, 2) accurate perception of reality, 3) autonomy, 4) mastery of one's environment, 5) opportunities for personal development, and 6) harmony between one's behaviour and psychological traits (i.e. if a person is gregarious, then they may find it stressful to do work that doesn't involve interacting with other people).

Wellbeing can be considered an augmentation of human capital because it directly impacts an individual's skills and productivity. Indirectly, wellbeing also impacts on an individual's engagement and morale, and hence a greater motivation to contribute positively to the organisation and society. This is backed up by strong evidence that organisational productivity is improved when employee wellbeing is high (Page and Vella-Brodrick, 2008; Krekel et al., 2019).The first reason why wellbeing impacts productivity is because a flourishing workforce is more likely to perform their duties efficiently and effectively. Officers with high levels of wellbeing exhibit increased discretionary effort, which means they go above and beyond their basic responsibilities to serve the public (Robertson and Cooper, 2011).

The second reason why wellbeing is important for productivity is because a languishing or unwell workforce will have a higher level of absenteeism and staff turnover. Failure to support employees' wellbeing can result in increased costs related to sick leave, medical expenses, reduced performance, as well as the cost of hiring new staff to replace those that leave, either because they are unable to continue, or because they believe that they can find greater fulfilment elsewhere (Vitality, 2019). High rates of sickness and long-term sick leave among police officers, especially for psychological reasons, highlight the urgent need to address the wellbeing issue (Home Office, 2021; BBC, 2016). By establishing how the police can maintain a high level of wellbeing, police agencies can mitigate these financial burdens and allocate resources more effectively.

Thirdly, strong wellbeing can support the ability of police officers to exercise their responsibilities. Exposure to trauma is a prevalent issue within policing, with officers at greater risk of mental health conditions like post-traumatic stress disorder (PTSD) (Miller, 2019; Violanti & Gehrke, 2004). Trauma can impair officers' capabilities and lead to chronic stress, fatigue, and emotional challenges (Andersen, 2015; Tehrani, 2020). These conditions can hinder decision-making, affect situational awareness, and erode the overall effectiveness of policing operations. Anxiety can lead to heightened risk aversion and threat perception, which can lead to inappropriate use of coercive force and limited attempts at de-escalation (Blanchette and Richards, 2010; Regehr and Leblanc, 2017). Officers with anxiety are also found to be more easily distracted by task-irrelevant threat-related information, and demonstrate worse verbal reasoning skills (Regehr and Leblanc, 2017).

Fourthly, well-being contributes to better morale in the organisation. Morale is defined as the psychological state of a whole organisational unit, which influences the willingness, determination, and resilience of staff to accomplish assigned tasks and overcome adversity (Neely et al., 1999). It encompasses the collective attitudes, confidence, motivation, and sense of purpose within the organisation. It reflects the level of cohesion, trust, and loyalty among the members of the unit, as well as their belief in the importance and effectiveness of their mission. High morale is associated with increased dedication, teamwork, and effectiveness, while low morale can lead to decreased performance, disengagement, and reduced combat readiness. Maintaining and enhancing morale is

a critical capability for those in a leadership position, and it involves factors such as effective communication, training, welfare, recognition, and the provision of adequate support and resources. These issues will be addressed in more detail in Section 6 on practical productivity management.

There are a large number of potential wellbeing interventions that the police can use. Kukuscka et al. (2023) provide an overview of the literature on the types of wellbeing programmes that are available, and what the evidence is on their efficacy. However, the variety of options and the variation in the efficacy demonstrates the importance of having the ability to identify the programmes that are most appropriate. For this, a police force needs the ability to understand the cause of low wellbeing in their team, and then they need the ability to establish which programme will be most appropriate. It would also be useful at the strategic level for the police to be able to evaluate the programmes that they use, so they can build up a greater understanding of which interventions will work, and under which circumstances they are successful.

The hierarchical nature of policing is an area of concern when it comes to individual wellbeing. Officers in higher ranks tend to report higher job satisfaction, better emotional energy, and fewer symptoms of anxiety and depression (Graham et al., 2021). This suggests that factors such as authority and autonomy play a role in promoting wellbeing. It is essential to recognise the impact of hierarchy on the daily experiences of frontline officers, as those in more reactive roles with little control over their activities and higher exposure to trauma often report lower wellbeing (Graham et al., 2021; College of Policing, 2019).

Employee engagement, which refers to the level of enthusiasm and dedication a worker feels towards their job, is a vital enabler of productivity enhancement for the police, especially in an environment with limited resources. Engaged and motivated officers are more likely to exhibit higher levels of commitment, creativity, and teamwork. When officers feel valued, empowered, and connected to the organisation's mission, they are more inclined to go above and beyond to optimise their performance, leading to improved operational efficiency and the ability to do more with limited resources, ultimately enhancing overall effectiveness in serving the community. Hence, it is essential for public sector organisation to create an engaged workforce that can take ownership of their new working ways and shape them in practice through frequent communication with management.

6. Putting Police Productivity into Practice

Sections 3-5 have discussed the insights from the literature on how to think about public sector productivity, how it can be measured, and what the drivers of productivity are. In this subsequent section, our focus shifts to what the literature says about the practical implications for organisational decision-making. It focuses on the question what mechanisms and tools managers can use to deploy their resources in the most optimal manner and resolve the barriers to productivity that they face.

The evidence on practical management tools to raise public sector productivity is fragmented and incomplete, which is reflected in the literature on productivity performance at the organisational level. In contrast to the previous sections, the literature for this section is partly academic, but also based on a large body of work that was created by private firms, consultancies, and trade groups. There is somewhat of a disconnect between the bodies of literature produced by academics and practitioners, particularly in regard to focus, terminology and methodology. This disconnect may be even greater for the public sector. Traditional models of organisational performance, which are mainly drawn from the private sector, are based on the need to only maximise one outcome, which is profit. These models may not easily translate into a public sector context, where organisations typically need to consider a large number of desired outcomes, many of which cannot be easily measured (van Ark, 2022).

As an organising principle for this final section, we use the concept of change management, with which we begin. We then proceed with three focal points of practical management for public sector productivity as identified by van Ark (2022), and examine each with a specific focus on the police sector:

- Systematically identify and solve constraints
- Measure and manage organisational performance
- Collaborate and communicate on productivity

Best practices for change management

As mentioned in Section 5, large public sector organisations, like the police, need to manage large transformational changes while at the same time dealing with daily pressures that continually shift in terms of operational and tactical priorities. To balance both pressures, police organisations need to adopt a change management approach. This involves the design of clear processes and strategies (such as planning, implementing, and monitoring changes) in such a way that it does not impact the organisation's daily business too much while maximising the likelihood of successful outcomes.

Policy churn has been a major threat to public sector productivity (Pabst and Westwood, 2021). One potential way to address this is offered by Kotter (1995), who outlines eight success factors for building and maintaining the momentum of an organisational transformation programme, in order to ensure that change projects are able to embed themselves and have longevity. These eight steps are described in more detail in Appendix B:

1. **Establish Urgency**: Understanding the urgency is essential for creating the motivation and co-operation that is necessary for success.

2. **Create a Powerful Guiding Coalition**: Successful transformation programmes are able to draw on evidence and expertise from a wide variety of stakeholders on the problem.

3. **Create a vision**: Transformation programmes need to be able to state a clear and compelling vision for where the organisation is going.

4. **Widely Communicate the Vision**: The vision should be infused into as many communications as possible.

5. **Remove Obstacles to the New Vision**: Obstacles to change can be structural but may also relate to performance systems that do not align with the new vision.

6. **Systematically Plan and Create Short-Term Wins**: A consistent stream of short-term wins are needed to demonstrate that the programme is a good use of people's time.

7. **Consolidate Improvements and Produce More Change**: The momentum that has been created can be used to continue building on the progress that they have made.

8. **Institutionalise the New Approaches**: In line with the principle of continuous improvement, change can be woven into the fabric of the organisational identity.

One key issue from the change management literature is that managers may view transformation as an event, rather than a process. As such, there is a tendency to skip important steps in the transformation process, which creates the illusion of speed but reduces the likelihood of success (Holgeid and Thompson, 2013).

There are limitations to any management model. For example, Kotter's model envisages change as being driven by a revolutionary vanguard that operates outside of the conventional organisational structures. There is only limited room for consensus building, organic change that happens through shifting collective attitudes of the staff, or even the formal processes of organisational learning, as discussed in Section 5. Alternative management change theories like Kaizen, McKinsey's 7-s, Lewin's change management model as well as the Theory of Constraints model, which will be discussed next, put greater emphasis on those elements.

The Theory of Constraints approach to management

Large organisations such as the police often have to select between a large range of potential projects that promise to improve performance. In order to prioritise the most important projects, the Theory of Constraints (ToC) is a change management philosophy that calls for the identification and resolution of the most critical constraints on the performance of an organisation's delivery processes (Goldratt, 1990; Simsit et al, 2014). By systematically addressing these constraints, the theory aims to optimise the entire system's efficiency and effectiveness, leading to improved productivity, reduced waste, and enhanced outcomes.

The ToC involves an iterative process of prioritising actions for change (a more detailed case study of a ToC applied to crime investigation police, can be found in Appendix C):

1. Identifying the key factor of change

The first step is to identify the delivery chain's most important weaknesses that need to be tackled to improve performance. This step may be controversial for public sector organisations, where everything seems important and connected. It is also important to distinguish between the areas which improvement will be easy versus the areas where improvement will have the greatest impact on performance. It is also worth considering whether solving the bottleneck will have an impact on other parts of the delivery chain – resolving a bottleneck may free up

capacity at one point in the delivery process, but if there is not extra capacity down the chain, then it is unlikely that there will be an impact on the overall outcome.

For example, in the case of a criminal investigation, an increase in the number of detectives may lead to a substantial rise in the clearance rate. But if the court system is unable to process all of the cases brought before it, then there will still be a low conviction rate, and so the overall impact of police activities on the crime rate will be unaffected. For this reason, it is generally preferable to resolve bottlenecks that are further down the chain.

Most of the time, the key bottlenecks are not the ones that take the most time and effort to process but the ones that create the longest queue in the delivery chain relative to the cost of the resolution. For example, while the most obvious solution to a slow response time for the emergency response function might be to invest in fast new response vehicles, this solution may take years to realise, even after the funding is made available. However, changing an inefficient vehicle monitoring and control system to prioritise the most urgent incidents might be the key bottleneck by which to achieve better and faster results. Rather than purchasing new equipment and hiring more staff, a better solution might be to overcome the digital, managerial or bureaucratic barriers to better utilisation of the resources that the police already have.

2. Prioritising the constraint

This step involves deciding which bottlenecks to prioritise along with the ability to focus on it until it is relieved. This requires a clear understanding of what needs to be achieved in order to resolve the bottleneck, what work needs to be done, and what resources - funding, managerial attention, and expertise - are required.

It is also important to determine what short-term steps will be taken in order to mitigate the bottleneck until a permanent solution can be found. This involves asking what resources can be freed up from the activities that are not yet causing a constraint, as this will provide the 'slack' that speeds up the removal of the key obstacle.

Public sector managers need to come up with strict protocols that prevent the stop-gap measure becoming permanent. If managers retain a reactive 'fire-fighting mentality', then once the immediate problem has been mitigated by stop-gap measures, their attention may be drawn to the next fire. It is best practice for managers to focus on the bottleneck until it is fully resolved.

3. Resourcing the change

The final step focuses on determining the action needed to reduce the pressure on the bottleneck or increase its capacity. It may necessitate the upgrading of the activities, or the replacement with a new method to improve the flow. In this step, the difficult part is leveraging the organisation's scarce resources (analytical capacity and management time) to examine and provide an effective solution to the weakest link.

While the ToC approach was originally developed for private sector organisations, there are specific applications for the public sector.[15] Nevertheless, public sector organisations may have a low tolerance for the application of private sector management methods (Stevenson, 2013). Identifying key bottlenecks is hard, especially when the delivery chain is complex. Public sector organisations have many expectations placed on them, either informally or by statutory requirement. This causes

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[15] See: https://www.tocico.org/page/government_portal.

complex governance and accountability processes, requirements to tailor services to highly differentiated needs, the need for multiple rather than just one simple success measure, and heavy public scrutiny. However, by applying the constraints methods, managers in public sector organisations create the analytical space to understand the root of the problems across the organisation and not get overwhelmed by the symptoms (van Ark, 2022).

The constraints approach requires prioritisation and de-prioritisation in equal measures. De-prioritisation is especially difficult in public sector organisations, where managers have to navigate a complex field of stakeholders that each have their own priorities. The competition between providing resources to support regular activities or resolving the weakest links is often difficult, especially if the improvement process disrupts day-to-day activities. A police station cannot simply stop delivering its daily core services.

No management approach works without having the key stakeholders on board, which is why the two concepts of an adaptive organisation and an agile workforce can only be obtained together. To apply the constraints approach, organisations need to create core delivery teams from across the delivery chain to focus on bottleneck solutions, create space to experiment and provide sponsorship and involvement by senior leadership. For the constraints approach to be applied effectively in the public sector, change management, measurement of results, collaboration, and communication are key components (van Ark, 2022).

Measure and manage organisational performance

Measurement to support management

There is a critical distinction between the measurement of police performance to track productivity of the sector (Section 4) and the measurement of performance at the level of the organisation to practically manage improvements and productivity (this Section). For example, at the level of crime investigation:

- Crime performance for the police sector as a whole is typically measured by crime survey data on committed crimes weighted by the cost to the police of dealing with such activities and, when possible, adjusted for quality using survey measures (see Section 4).
- Crime performance at an organisational level would be directly measured by the number of crimes the police force deals with. The challenge with that measure is that it can lead to tactical behaviours such as limiting time spent on small offences and focus on bigger offences in order to bring aggregate crime numbers down.

Good performance measurement at organisational level often requires multiple indicators for each specific activity. For example, Sparrow (2015) describes four measures that are collected and used frequently:

- Reduction in the number of serious crimes reported, most commonly presented as local comparisons against an immediately preceding time period.
- Clearance rate (i.e. holding offenders accountable).
- Response time.
- Measures of enforcement output (e.g., numbers of arrests, citations or usage of stop-and-search powers).

However, none of those measures are particularly useful for performance measurement. For example, real success in crime control would not produce substantial year-to-year reductions in crime figures because genuine and substantial reductions are only possible when crime problems

have first grown out of control. Best practices in enforcement will also not quickly raise the numbers of arrests or coercive interventions because these depend on carefully designed and well-tailored responses rather than extensive and costly campaigns. Therefore, the two classes of metrics that are still used most widely in police departments — crime reduction and enforcement productivity — are not reflective of the best performance in crime control (Sparrow, 2015).

Davis et al. (2012) has identified other key dimensions to management performance which are harder to measure and more difficult to interpret, including:

- Reducing fear and enhancing security (feel safe in home, neighbourhood)
- Increasing safety and order in public spaces (e.g., reduce traffic accidents, increase public use of parks)
- Using force sparingly and fairly (minimise shootings, promote racial equality).
- Using public funds efficiently and fairly (deploy officers fairly, keep costs down).
- Enhancing "customer" satisfaction.

The purpose of measurement

While data analysis is a valuable complement to a solid understanding of an organisation's delivery chain, it is not a substitute for that understanding. Data analysis is a tool that sits within the broader framework of decision-making in organisations. Elevating evidence-based policy analysis to a mystical pedestal can undermine the value that the insights provide for supporting strategic thinking (Dunn, 2015). For this reason, it is paramount to have a clear understanding of what role the data analysis will play in informing decision-making.

Any organisational data strategy requires an assessment of what the available data can be used for, and what new data are needed. Frontline workers often have valuable knowledge about their service delivery activities and are therefore best placed to help managers understand what data needs to be captured, what data would be irrelevant (or misleading) and what could be improved. Some things cannot be captured by data, such as public interaction, bottlenecks in the organisation, special circumstances or individual motivation. While such observations are not easily included in performance measures, they should be documented; these types of qualitative observations matter when interpreting productivity numbers.

Every organisation has its own context, and therefore it is not straightforward to gain best practice by observing other sectors organisations. Measures for the aggregate sector to which an organisation belongs (for example, a change in the mix of crime types) are often not useful for management purposes for an individual force (as some crime types may be more prevalent due to contextual circumstances). It should also be kept in mind that data collection can also be used to evaluate policies and programmes, as well as keeping track of productivity.

New avenues for evidence-based management

A high-quality measurement regime at the organisation level is essential for the effective project management, process evaluation, and resource allocation. Public sector organisations are often rich in data due to their statutory requirements for performance and data transparency. Big data analytics and AI techniques open new opportunities to filter relevant knowledge from massive databases and to share insights more widely. A dynamic dashboard approach can also make the insights from the data more accessible on organisational budgets, inputs, outputs, and outcomes. Organisations can leverage these opportunities by taking a strategic approach to data – working out what role data will play in their organisation, and establishing what organisation-wide processes

need to be in place to enable this role. Such a strategic approach will also inform which investments need to be made to deliver the intended data processing capabilities. (van Ark, 2022)

A more scientific and experimental approach to the measurement of police performance would involve the development, collection, and rigorous analysis of new statistics and would help to ensure an effective measurement regime that has staying power. For example, it is critical for good performance measurement to base the metrics on a sound understanding of the delivery chain of the service. The purpose of performance metrics is to show that the service is doing what it should. As such, the metrics should reflect the inputs into the organisation, the output activities that are performed, and the outcome impact that is intended for the beneficiaries. It could also create the basis for an organisation's value proposition which can help to coalesce teams around the measurement propositions.[16]

A joined-up approach to data management offers several benefits for organisations and government entities. One of the key advantages is the improved data quality achieved at reduced costs. By integrating budgeting, in-year reporting, and end-year reporting processes, data can be collected and stored in a shared data warehouse, ensuring consistency and accuracy. This integration also facilitates cross-checking of departmental data, reducing the time and effort required to reconcile and explain discrepancies between different data sources.

Moreover, a joined-up approach enables easier comparison and reconciliation between various measures of public performance used by entities like the Office for National Statistics (ONS) and the Treasury. The integration of key measurement activities, such as Compstat (regular performance meetings that involve comparing statistics) and PEEL (Police Effectiveness, Efficiency and Legitimacy programme), into a comprehensive system further enhances the quality of data collection and validation, addressing quality issues and minimising duplication of data collection. While any new system can rectify many procedural issues, ongoing user training and support are essential to ensure effective data input and utilisation.

Collaborate and communicate on productivity

The importance of collaboration and communication has been frequently referred to in this report as a prerequisite for productivity improvements in the police sector. Public sector organisations are often constrained in quickly obtaining new resources to drive change. As a result, change is often more dependent on discretionary effort in co-operation from key stakeholders. Failure to secure buy-in can easily become a critical bottleneck for continuous innovation, and negatively impact on morale.

Communication

Communication is therefore a critical part of creating the conditions for productivity growth. Police organisations should honestly, transparently and consistently communicate performance measures internally, and where needed externally. Continuous communications around productivity metrics help to identify bottlenecks and constraints, track and monitor improvement plans, and establish how such metrics relate to the objectives of the police. Such measures should be part of leadership discussions, but not turn into a checklist of targets to be ticked off. Communication is also key to the success of change and constraints management programmes as discussed above.

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[16] See https://www.gov.uk/service-manual/measuring-success/how-to-set-performance-metrics-for-your-service#base-your-metrics-on-a-sound-understanding-of-your-services-purpose.

Collaboration

Collaboration between two police organisations refers to the close sharing and integration of resources, expertise, and capacities between different police departments or agencies. Through effective collaboration, police organisations can optimise resource allocation, reduce redundant expenses, and enhance overall law enforcement efficiency. Examples include shared counterterrorism, organised crime units, and emergency control rooms (HMIC, 2014).

External collaboration can help in creating a community in which the police can work with other public and private sector organisations to learn from each other about productivity enhancing opportunities. For example, regarding the management of mental health cases and missing person cases, The Police Foundation (2022) has pled: 'There is no solution to problems such as mental health crises and vulnerable children going missing that does not involve improved collaboration between the police, the NHS and local government.' (p. 106). (See also McLean and Marshall, 2010).

Collaborations between health organisations and police organisations are plentiful, ranging from suicide prevention, to reducing alcohol-related harm and raising awareness of dementia. For example, within Community Safety Partnerships (CSP), authorities work together to develop and implement strategies to protect their local communities from crime and to help people to feel safe. They develop local approaches to deal with issues including anti-social behaviour, drug or alcohol abuse, domestic violence and re-offending, and work in partnership with a range of other local public, private, community and voluntary groups and with the wider community. Establishing strong and long-term relationships, by building trust and sharing knowledge across professional and organisational boundaries, is critical to success (Public Health England, 2016).

Co-operation

Co-operation involves the formal arrangement of a police force working alongside different external entities, such as other law enforcement agencies, local authorities, community organisations, or private entities with whom the police share a priority. Embracing co-operation enables police forces to leverage additional expertise and capabilities, expand their operational reach, and avoid unnecessary expenditures.

One example includes the formation of Mobile Crisis Teams (MCTs) which involve the co-operation of the police and mental health services when responding to incidents with a mental health component. Scott (2000) found that MCTs reduced the number of detainments under the mental health act by 45%, which resulted in cost savings of 23%. In a co-operative effort with Sheffield Hallam University, West Midlands Police developed an artificial intelligence-based algorithm that aids in the identification of at-risk children, demonstrating their commitment to employing innovative solutions for community safety (Flood, 2021).

Co-operation with local research institutes offers an avenue to facilitate innovation for police departments at a reduced cost. By networking and fostering connections with the local academic ecosystem, police departments can access specialised expertise and resources to address complex challenges effectively (Kirchmaier, 2019). The police can proactively look for common ground between academic research objectives and operational needs, creating a mutually beneficial situation that generates innovative solutions while advancing their academic pursuits. In recent years, large urban police forces have established 'evidence-based policing' groups. These can provide a platform for joint innovation or training, and interventions to de-risk new technologies by collectively setting standards, and even lead to more effective procurement. More formally, Data Envelopment Analysis (DEA) techniques, Randomised Controlled Trials (RCTs) and behavioural

studies can be developed for public sector organisations with similar objectives to provide insights on best practice.

There is considerable literature about the role of the public sector in innovation ecosystems, especially those that are regional and otherwise place dependent (Holden et al., 2017). Local government, the private business community and educational organisations can be critical drivers in developing innovative solutions, disseminating tools or resources to make innovation easier, creating incentives for innovation, bringing key private and public agents together, and sustaining the ecosystem as a whole. Such ecosystems, in turn, help to support the sharing of productivity-enhancing methods across public sector organisations.

Recently, there have been suggestions to view public sector organisations as part of a social infrastructure - producing collective services to safeguard and improve the health and wellbeing of communities. Such an approach would make organisations more resilient against shocks and crises impacting the system (Turner, 2020). The social infrastructure concept requires a strong collaborative environment in which organisations look for complementarities and the creation of joint benefits ('spillovers') between them.

7. Final Observations

This report has aimed to identify what the literature tells us about how the police should think about the productivity problems that they are facing. The discussion has been based on publicly available documents, drawn from across the public and private sector and from the UK as well as from abroad.

This literature reviews points at some key areas of attention to drive improvements in the productivity performance of the sector:

5. There is a need for clearly mapping out the service delivery chains for each function in the police force. A better understanding of budgets, inputs, output and outcomes for each core and ancillary function will help to determine what success looks like and what the needs are to drive productivity.
6. Measurement of police productivity at both the aggregate level (where productivity growth is assumed to be zero as outputs equal deflated inputs) and the organisational level (where measures are sparse, difficult to aggregate and to compare) should be a major priority. However, such measurement efforts either require investment in new data collection or significant imputations.
7. Sustainable productivity growth is obtained through the nurturing of the three drivers of productivity growth. The first factor is the organisational driver, and success in this area will result in an adaptable organisational design. The second factor is the technological driver, and success in this area will result in digital transformation. The third is the individual driver, and success in this regard will result in an agile workforce. Organisational learning is a key principle to unlock those key drivers of productivity, as a learning organisation will be able to continually identify and implement productivity improvements.
8. Practical management of productivity requires an integrated approach to change management as is common practice in large scale private-sector organisations. Change management and the prioritisation of new projects through the constraints approach reduce risk of failure. Evidence-based management, transparent communication, and internal and external collaboration are key drivers to manage productivity on a consistent basis.

A key observation from our review is that the literature on what the key issues are regarding police productivity, as well the key drivers of productivity (points 1-3 above) is more advanced than the practical implementation of that knowledge to improve performance (point 4). At an organisation level there are a range of barriers when implementing productivity enhancing methods in the police. These, in part stem from budget constraints, frequent policy interventions and 'firefighting' small incidents which are distracting attention from the focusing on initiatives which are conducive to productivity. In part, barriers are also caused by a lack of bandwidth with leaders in the force to follow through with critical initiatives already underway in a clear, consistent and scale-up manner on. However, the fundamental underlying explanation for the gap in understanding and implementation of measures to improve police productivity is the substantial complexity of the police organisation as a multi-output and multi-outcome organisation to implement changes.

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Appendix B – The Eight Steps in Change Management (Kotter, 1995)

1. Establish Urgency – Kotter (1995) finds that most successful change programmes start when individuals look at the long-term issues and opportunities that an organisation is facing. They focus on the practical implications of those issues, and then find a way to effectively communicate this information dramatically and widely. This creates the motivation and co-operation that is necessary for success. Kotter finds that the urgency rate is high enough for a strategic transformation when about three-quarters of managers are genuinely convinced that business-as-usual is unacceptable.

2. Create a Powerful Guiding Coalition - Successful transformation programs begin with a small team but expand as the guiding coalition expands over time. This group should be led by a senior figure, but it can operate outside the conventional hierarchy, to draw on experience and expertise from across the organisation. The guiding coalition might start with three to five members and expand to 20 to 50 as it progresses.

3. Create a vision – For every successful change programme, the guiding coalition develops a picture of the future that is relatively easy to communicate to other stakeholders. This always goes beyond just numbers, and helps to clarify what direction the organisation is moving in. As a rule of thumb, Kotter states that the vision should be explainable in less than five minutes, at which point the value of the transformation should be obvious to the listener.

4. Widely Communicate the Vision – Continuity in communicating of the transformation vision is key, and needs to be infused into the rest of the company communications. The vision also needs to identify how proposed activities, behaviours, and solutions fit into the bigger picture. A key element is also to manage disruptions and identify impacts (such as restructuring and dismissals) to avoid negatively impacting the morale of the workforce.

5. Remove Obstacles to the New Vision - Obstacles to change can be structural, such as an overly narrow scope of work for an individual's role, but may also be related to performance systems that do not align with the new vision. Reluctance across parts of the leadership needs to be identified and resolved early on.

6. Systematically Plan and Create Short-Term Wins – Progress needs to be sustainable in long-run, but also requires short-term goals to meet and celebrate. Commitment to short-term wins can help to maintain the urgency level and force detailed analytical thinking that clarifies the vision. Managers should plan for ways to obtain clear performance improvements in the yearly planning system, achieve the objectives, and reward the people involved with recognition, promotion, and bonuses.

7. Consolidate Improvements and Produce More Change – Successful change initiators know that transformation takes years. Changes take five to ten years to fully sink into the organisational culture, and until that time the change is fragile and vulnerable to reversion. Change initiators should use their newfound credibility to tackle even bigger problems, tackle structures that are not consistent with the vision.

8. Institutionalise the New Approaches - Change becomes ingrained when it becomes "the way we do things around here," woven into the fabric of the organisational identity. Until new behaviours take root in social norms and shared values, they remain susceptible to erosion once the pressure for change subsides. It is essential to actively demonstrate to people how new approaches, behaviours, and attitudes have contributed to performance enhancement, and to invest ample time to ensure that the upcoming top management generation truly embodies the new approach.

Appendix C – Theory of Constraints (ToC) applied to police sector

By applying this adapted 7-step Theory of Constraints system to improve the criminal investigations process, the police force can enhance the efficiency and effectiveness of their investigative operations. The approach involves identifying constraints, optimising the bottleneck's work, leveraging non-bottlenecks, promoting collaboration, and constantly reassessing the process to maintain continuous improvement. This method ensures a more streamlined, responsive, and resource-efficient criminal investigations system, ultimately leading to better outcomes for the police force and the community they serve.

By carefully analysing the entire delivery chain, the police force can pinpoint areas where delays or resource limitations may hinder the investigations. For the sake of illustration, let's imagine that the constraint is the limited availability of experienced detectives to handle complex cases due to high caseloads and resource constraints.

1. **Find (Identify the Bottlenecks):** The first step is to identify all the potential bottlenecks in the criminal investigations process. A bottleneck refers to a specific point in a process or system where work accumulates, leading to backlogs up the delivery chain, while downstream resources remain underused due to the limited flow of work through the constrained area.

2. **Optimise (Focus on one Bottleneck):** Once the possible bottlenecks are identified, the police force needs to evaluate the potential return on investment that would come from resolving each bottleneck. This involves assessing the costs, benefits, and expected impact of implementing solutions for each bottleneck. The goal is to determine which process will yield the most significant improvement in the investigations process while utilising resources effectively. Once this has been done, this most significant bottleneck should be focussed on.

3. **Co-ordinate (Non-Bottleneck Support):** Other members of the investigations team, such as administrative staff, forensic experts, and support personnel, can be coordinated to provide assistance to those working in the bottleneck activity. This coordination ensures that administrative tasks, evidence gathering, and paperwork are streamlined, allowing detectives to focus on the core investigative work.

4. **Collaborate (Working Together Effectively):** Collaboration between those working in the bottleneck activity and other team members is essential to ensure effective handling of cases. Regular meetings and open communication channels can be established to discuss challenges and brainstorm innovative ways to leverage the expertise of various team members without compromising the quality of investigations.

5. **Curate (Reduce Demand or Increase Capacity):** To reduce the demand on those involved in the bottleneck activity, strategies such as prioritising cases based on severity, implementing efficient case assignment algorithms, and hiring additional detectives.

6. **Upgrade (Improve Resources):** Upgrading resources involves providing additional support to the bottleneck or replacing it with a bigger, faster model. In this case, the police force can consider working to reduce staff turnover rate, so the force has detectives that are more experienced, investing in detective skills, or using AI-powered investigation tools to augment their capabilities.

7. **Start Again (Identify New Bottlenecks):** The process is iterative, and once the biggest bottleneck is addressed, there will always be a next biggest bottleneck. The police force should continuously evaluate their investigative processes, monitor performance metrics, and identify new areas that hinder performance. This will allow them to address the most critical constraints systematically.