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CRIME FORENSICS

# Enhancing Law Enforcement Efficiency

## A Comparative Study of Manual and Biometrics Systems in PSP[1]

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The urgent need for technological modernisation in law enforcement, particularly to combat cybercrime and enhance IT security, is evident. Current manual procedures are increasingly questioned regarding efficiency compared to advanced technologies like biometrics and AI, which are widely used elsewhere. This study evaluates the time, cost and security benefits of biometric sensors versus manual data entry. The methodology is post-positivist with an applied, explanatory approach using quantitative descriptive and inferential statistics. A post-positivist, applied and explanatory methodology, using quantitative descriptive and inferential statistics, was employed. Results from 175 records show that biometric sensors reduce data entry time to 13 minutes, compared to 8 hours and 21 minutes manually. Officers strongly support these technologies. Data from 2023 shows that 89% of 6,113 repeated item merges involve personal identification, highlighting the efficiency of automation. Biometric inputs improve data accuracy, essential for timely legal processes. The findings also reveal higher state expenditures on manual procedures, underscoring the need for technological investments to optimise resources. These results advocate for increased funding to modernise law enforcement, emphasising AI and biometrics as critical for enhancing operational efficiency and decision-making in combating cybercrime and securing IT systems.

**Keywords:** technological modernisation, biometrics, artificial intelligence, operational efficiency, decision-making effectiveness

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## Introduction

The Public Security Police (PSP) plays a critical role in maintaining societal order and upholding the rule of law, with a strong citizen-centric focus.[5] a citizen-oriented approach, in practice, aims to ensure public satisfaction, fostering trust and "loyalty". Customer satisfaction is defined as the degree to which a person's expectations align with their perceived experience.[6] Customer loyalty, inherently linked to satisfaction, increases when satisfaction levels are high.[7] According to Mismiwati, the likelihood of customer loyalty is 65% when satisfied and rises to 95% with higher satisfaction levels.[8]

For the PSP, this loyalty translates into establishing a trusting relationship with citizens, one that dissolves barriers between them and law enforcement. This operational work is carried out daily by police officers through various means, including community policing, foot patrols, motorised patrols and frontline services at police stations.

As Morgado notes, "in the economy, AI has both macro and microeconomic implications, particularly positive ones, such as the growth of productivity and the labor market".[9] In this context, technology is seen as a driver of efficiency. In the field of law enforcement, "security is a vital public good and a fundamental right, essential to life in society".[10] The demanding task of ensuring the safety and protection of society creates a trophic link between societal sectors and technology, which induces systemic stimuli and feedback.[11]

To address modern security challenges, "it is the duty of the police to be prepared to follow the path of technological policing, as it is the lever for combating crime".[12] Technological advancements, including AI and biometric technologies, play an increasingly important role in supporting law enforcement. Yet, as emphasised by Morgado and Felgueiras, the human element of policing (HumPol) remains at the core. While technological policing (TechPol) can enhance efficiency, it complements rather than replaces the essential human interventions that define effective policing.[13]

The human element of the police force – HumPol – plays a pivotal role in fostering proximity with citizens, making each interaction meaningful. However, to achieve this goal, the PSP must be equipped with adequate material resources to ensure high-quality service. Quality, in this context, is multidimensional, encompassing reliability, responsiveness, competence, courtesy, credibility, safety, accessibility, communication and consumer knowledge.[14] Achieving these quality standards requires financial investment.

Investment by the state in resources that enhance police services is, in essence, an investment in service quality and, consequently, in the well-being of citizens. Although the return on such investment may be difficult to quantify, it is essential both from the

[5] Dinis 2020.
[6] Gunawan 2022.
[7] Hutabarat–Prabawani 2020.
[8] Mismiwati 2016.
[9] Morgado 2023.
[10] Morgado–Felgueiras 2021: 57.
[11] Morgado et al. 2024b; Morgado–Mendes 2016.
[12] Morgado–Felgueiras 2021: 149.
[13] Morgado–Felgueiras 2021.
[14] Zeithaml et al. 1990.

perspective of the citizen-client and the police officer, who serves as a state asset. As the employer, the state expects productivity and efficiency from its assets, which can be maximised by providing the necessary tools for optimal performance.

The scope of this issue becomes clear when considering that in 2022, the PSP recorded 47.4% of all criminal reports nationwide. In 2023, within the Lisbon Metropolitan Command (COMETLIS) alone, 103,653 reports were filed, 61,211 of which were criminal complaints. Given PSP's critical role in processing civil and criminal reports, this study seeks to evaluate the efficiency of current registration procedures: Are officers maximising productivity during the reporting process? Are records being uniformly processed? Do the recorded data contribute to the generation of valuable police intelligence? Is there room for improving these processes?

These questions prompted an investigation into the role of Information and Communication Technologies (ICT) in this process, specifically their impact on the productivity of police officers. The study also explores the potential of integrating fingerprint scanning into registration processes, comparing its efficiency to manual data entry.

Amidst the Fourth Industrial Revolution, which Schwab describes as "unlike anything humanity has experienced before",[15] added up by Fifth (5IR),[16] Portugal has sought to align itself with global technological advances, as outlined in its Digital Transition Action Plan (2020).[17] This strategy aligns with national and international political directives, particularly within the European Union's 2021–2027 Cohesion Policy. Investment in technological modernisation extends the principles of the New Public Management, bridging the public and private sectors by adopting traditionally private methodologies and techniques,[18] ultimately increasing efficiency, reducing costs and improving organisational transparency.[19]

In this context, many private healthcare institutions have streamlined data entry through direct electronic reading of citizens' ID cards, including biometric data access. However, despite such technological advancements in the private sector, public institutions, such as the PSP, have yet to fully implement similar systems.

As Morgado and her co-authors state, technology is a critical resource in law enforcement – TechPol – and its integration is directly linked to mission-oriented security objectives. The irreversible role of technology in modern society has created an interdependence between its use and societal function.[20] This research aims to evaluate the current citizen registration processes in high-volume PSP subunits within COMETLIS, particularly in the manual entry of personal data, to assess the efficiency of current methods and explore the potential benefits of digital ID readers and fingerprint scanning, comparing the time spent on manual data entry versus automated processes and evaluating the impact on officer productivity.

15 Schwab 2019.
16 Ali et al. 2022.
17 República Portuguesa 2020.
18 Dias 2023.
19 Morgado 2013.
20 Morgado et al. 2024a.

## Biometric technology

History has shown that a country's economic development is closely tied to industrial progress, making this sector a key driver for innovation and competitiveness on the global stage. The way nations exploit their raw materials and modernise production processes determines their evolutionary pace, directly influencing their international competitiveness. Toffler identifies three waves of transformation in human and societal development: the first, the transition from a nomadic lifestyle to a sedentary agricultural society; the second, the rise of industrialisation and the industrial society; and the third, the post-industrial society, characterised by the emergence of the Information and Knowledge Society, encompassing art, finance, education and business sectors.[21]

In his *Green Paper on the Information Society* (1997),[22] Toffler, a visionary regarding the trajectory of society, stated that "the evolution of modern society will no longer be driven by energy or force but by the mastery of information".[23] Among the four recognised industrial revolutions, the latter two are particularly relevant to our context. The Third Industrial Revolution, also known as the Digital Revolution, began to take shape between the 1950s and 1970s, marked by the proliferation of semiconductors, computers, automation and robotics in production lines. These advancements allowed for digital information processing, mobile communication and the rise of the internet.[24]

Since the early 21st century, we have witnessed exponential growth in the development of advanced hardware and software, driven by decreasing production costs of electronic components and continuous innovation in machinery. At the 2011 Massachusetts Institute of Technology (MIT) Industrial Technology Fair, the concept of Industry 4.0 was introduced. This evolution in Information and Communication Technologies (ICT) has influenced not only industrial productivity but also the communication dynamics between manufacturers, customers and suppliers.[25]

The primary goal of Industry 4.0 is to enhance production systems, making them more flexible and collaborative. These cutting-edge technologies, often integrated with the internet, are designed to enable machines to self-optimise and self-configure, even utilising Artificial Intelligence (AI) to complete complex tasks more cost-effectively.[26] As Santos and his co-authors emphasise, "companies aiming to progress toward Industry 4.0 must evaluate their capabilities and adapt their strategies to implement them in appropriate scenarios".[27] Biometric technology plays a pivotal role in this transformation.

According to the Biometrics Identity Management Agency (BIMA), human characteristics can be categorised as either static (physiological features such as fingerprints, facial structure, iris patterns, etc.) or dynamic (behavioural traits such as gait, voice, or handwriting).[28] For

21 Toffler 1999.
22 European Commission 1997.
23 Gonçalves 2009: 4.
24 Coelho 2016; Ferreira 2020.
25 Urbikain et al. 2017 cited in Santos et al. 2018.
26 Bahrin et al. 2016.
27 Santos et al. 2018: 112.
28 Jain et al. 2008.

decades, biometrics has been associated with security systems,[29] and over recent years, biometric data has gained prominence in identification and recognition methods, used both by authorities and in consumer electronics. For instance, LG (2020) ranks facial recognition and fingerprint scanning as the most effective screen lock security mechanism.

Given that everyone possesses unique, distinguishing characteristics, biometric recognition systems identify individuals by extracting relevant features from a specific part of the body to create a digital "signature".[30] This signature is then compared against a stored reference in the system to establish a match, allowing for identification.

Today, biometric recognition systems, particularly fingerprint recognition, are widely integrated into daily life, enabling access to common technology such as mobile phones, computers and secure entry systems. According to Matos, fingerprint recognition is one of the most popular identification methods globally, often used in forensic investigations due to its high accuracy.[31] Fingerprints are now commonly used to unlock devices and track workplace attendance.

## Historical overview

The interest in fingerprints dates to ancient civilisations, such as the M'ikmag people, Egyptians, Greeks and Chinese, who used fingerprints to sign contracts or authenticate transactions.[32] Scientific studies on fingerprints began in 1684 with Nehemiah Grew, who pioneered research into dermatoglyphics and published his findings in the *Philosophical Transactions of the Royal Society of London*. Marcello Malpighi later expanded on this work, describing the ridged patterns on human skin and their role in gripping objects.[33]

The recognition of the uniqueness of fingerprints came from anatomist Johann Christoph Andreas Mayer in his publication *Anatomical Copperplates with Appropriate Explanations,* making him the first to document the individual specificity of ridge patterns.[34] Around 40 years later, Johannes Evangelista Purkinje contributed to this field with a detailed description of nine distinct fingerprint patterns in his thesis *Commentary on the Physiologic Examination of the Organs of Vision and the Cutaneous System*.

Fingerprint recognition gained legal and forensic significance in the 19th century. By 1902, the first trial in England using fingerprints as forensic evidence took place, and New York's Civil Service implemented systematic fingerprinting of criminals. In the same period, scientists like Francis Galton and Henry Faulds developed classification systems and methods for documenting fingerprints, significantly advancing the field.

In the digital era, biometric systems evolved with the advent of computing. In 1974, the Automated Fingerprint Identification System (AFIS) was created by the FBI, which digitally stored minutiae – distinctive points on the ridged skin – used for matching

29 Teixeira 2008.
30 Matos 2010.
31 Matos 2010.
32 Barnes 2011.
33 Ghosh–Pahari 2021.
34 Ghosh–Pahari 2021.

fingerprints.[35] Modern AFIS systems can search through millions of fingerprint records in seconds, playing a critical role in criminal investigations and cross-border information sharing between law enforcement agencies worldwide.

In this context, fingerprint recognition has become a cornerstone of biometric security systems globally. Advanced systems like the FBI's Next Generation Identification (NGI) and India's Aadhaar identification program demonstrate the scalability and potential of biometric databases. The Aadhaar system, for example, is the world's largest biometric database, used for identity verification across various public services.[36]

Moving from Asia to Europe, we examine the Visa Information System (VIS), which has been operational since 2011, encompassing all Schengen Agreement member states. VIS facilitates the exchange of visa-related information among member states and law enforcement agencies, allowing the European Union to establish an area of freedom, security and justice. To streamline visa procedures and enhance external border control, biometric data (including digital fingerprints and photographs) of visa applicants are collected and stored in VIS for five years.

## Integration of biometric data and information systems in public security operations: The case of Immigration and Borders Service – SEF and PSP

With the recent transfer of airport security duties from SEF to the Public Security Police (PSP), PSP officers now manage visa verification at airport border control booths. According to the informational brochure of SEF on VIS, the system contains biographic and biometric data of all individuals applying for Schengen visas – amounting to approximately 80 million identities. This biometric database is crucial for verifying the identity of travellers at external borders.

Modern organisations rely heavily on Information Systems (IS) due to the value that data and its processing hold across various sectors. These systems enable the collection and management of large volumes of data, playing a vital role in organisational activities.[37] Within the PSP, the need to adopt an IS for managing operational data has become increasingly evident, particularly for supporting decision-making processes in security operations.

The Strategic Information System (SEI), implemented in May 2004, was the result of a long-term project aimed at improving PSP's data management capabilities, culminating in the Information Systems Plan (PESI) in 2022.[38] However, following the garbage in, garbage out principle,[39] poor quality data inevitably leads to poor quality information, which diminishes its usefulness. For a public security organisation tasked with maintaining public order and safety, the handling of inaccurate, incomplete, or inconsistent data severely hampers both strategic and operational efficiency, undermining the organisation's core mission.

35 Gibb–Riemen 2023.
36 Government of India 2024.
37 Pereira–Almeida 2023.
38 Pereira–Almeida 2023.
39 Valacich–Schneider 2017 cited in Pereira–Almeida 2023.

Ensuring consistent and standardised data entry across the organisation is not always achievable, which highlights the considerable effort and resources required for data detection and correction. Financially costly and time-consuming, unreliable data leads to inefficiencies that could otherwise be avoided through correct initial input, freeing up resources for more critical tasks that require specialised intervention.

There is a consensus within academic circles that organisations should develop tools and processes aimed at both correcting data errors and preventing the causes of poor data quality,[40] which is a key objective of this study.

Within the PSP, data is collected across a range of security-related activities, including data on locations, organisations, objects and individuals. While the volume of collected data is generally sufficient, the quality remains variable, depending on who performs the data collection and entry.[41] In 2021, there were 630,652 data entries, of which 13,525 were identified as duplicates. In 2022, the number of entries increased to 762,461, with 19,052 duplicates identified.

Pereira and Almeida further note that the percentage of duplicated entries may be even higher than reported, as items entered with typographical errors or incomplete data were not classified as duplicates.[42] Given this, it was deemed essential to determine the number of NIP (National Identification Process) merges that occurred in 2023. A request for criminal data extraction was made, revealing a total of 6,113 NIP merges.

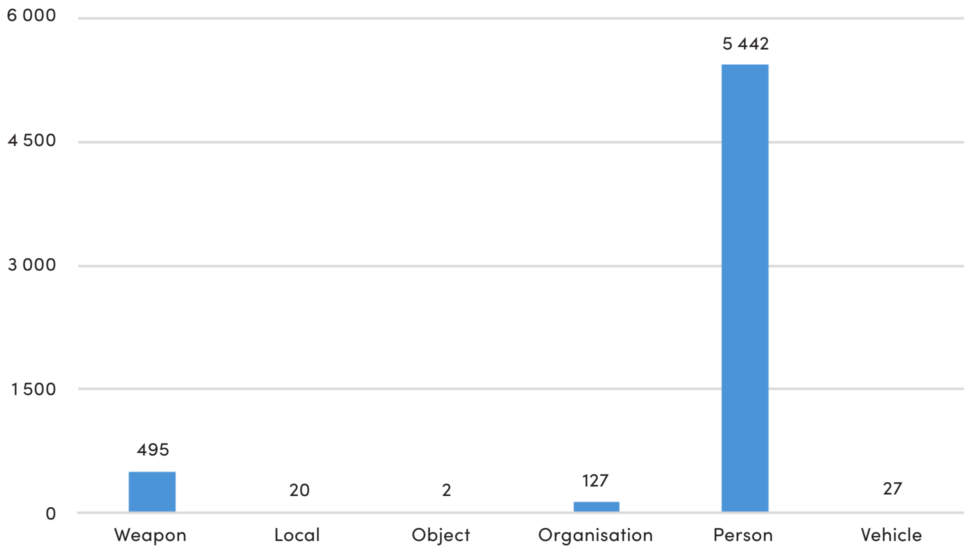


*Figure 1: Total NIP merges by item*
*Source:* Adapted from SEI criminal data extraction by the National Directorate of the PSP. Copyright: DN–PSP

[40] Janssen et al. 2020, 2017 cited in Pereira–Almeida 2023.
[41] Mitar 2004 cited in Pereira–Almeida 2023.
[42] Pereira–Almeida 2023.

As expected, the Person Item accounted for the largest share of NIP merges, with 5,442 merges, far surpassing the next highest category, Weapon, which had 495 merges. The Organization Item accounted for 127 merges, while the remaining items (Location, Object and Vehicle) showed residual values, with less than 50 merges each.

It is important to note that the data provided by the Police Information Department reflects only the number of NIP merges, representing a reduction in the total number of duplicates. Despite ongoing efforts, duplication remains a significant issue, requiring routine management of duplicate items and subsequent merges – an accepted and ongoing task within the organisation.

Furthermore, despite the high percentage of duplicated entries related to the Location Item (averaging 87.70%), only 20 NIP merges were recorded in this category, indicating a potential area for improvement in data handling.

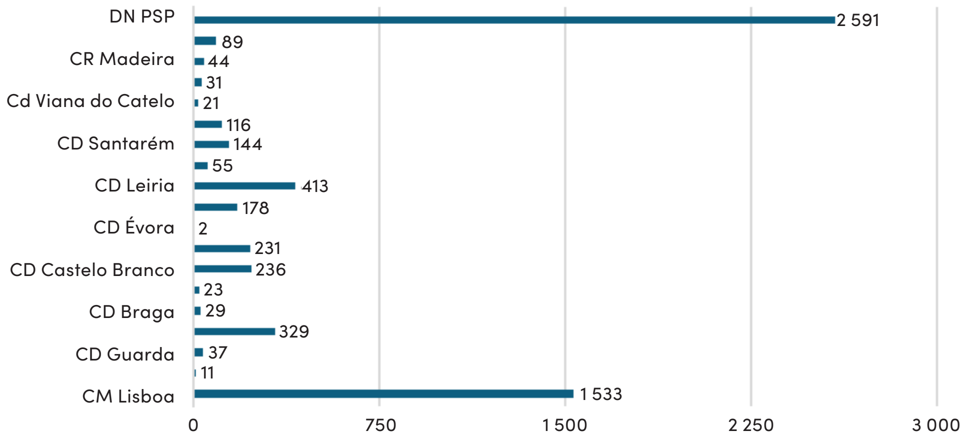


*Figure 2: NIP merges by command*

*Source:* Adapted from SEI criminal data extraction by the National Directorate of the PSP. Copyright: DN–PSP

The National Directorate (DN) PSP had the highest number of merges, with 2,591 merges, representing 42.39% of the total. These merges are distributed across various departments, including Arms and Explosives, Private Security and Police Information. COMETLIS followed with 1,533 merges (25.08%), while the District Commands of Leiria (6.76%), Aveiro (5.38%), Castelo Branco (3.86%) and Coimbra (3.78%) also showed significant numbers of merges (Figure 2).

Initial analysis suggests that the second-largest command in the country registered only 11 NIP merges, representing a mere 0.18% of the total, while significantly higher values were observed in the District Commands of Leiria, Aveiro, Castelo Branco and Coimbra.

For our study, it is crucial to understand the impact of these merges, specifically on the Person Item. Given the disproportionality in the totals, the DN PSP recorded the highest number of merges (42.15%), followed by COMETLIS (26.06%). The District

Commands of Leiria (6.87%) and Aveiro (5.79%) maintained their positions, as did Castelo Branco (3.93%) and Coimbra (3.64%).

These figures suggest a significant effort by the Helpdesk to manage these cases. Based on a rough estimate of 6,114 merges over 227 working days (excluding weekends, holidays and vacation days), the Helpdesk would need to process an average of 27 NIP merges per day, indicating the substantial workload involved in resolving these duplicates.

In summary, biometric technologies, particularly fingerprint recognition, have become indispensable in modern security and identification systems. Their implementation has transformed both criminal investigations and everyday personal security, with a clear trajectory of continued integration and development in the digital age.

## Methods

To accurately measure time during operational service in police subunits, direct observation was employed. This observational technique, as described by Quivy and Campenhoudt (2005), involves a set of procedures in which the analytical model is tested against observable data. Direct observation entails the collection of information without intermediaries, relying solely on personal observation without interference in the observed process.

Given the need for an indefinite observation period dictated by the flow of citizens to police stations, a data extraction from the Strategic Information System (SEI) was requested. This extraction identified the subunits within the Lisbon Metropolitan Command (COMETLIS) with the highest volume of reports and complaints. Using Microsoft Excel, the extracted data was processed to determine which stations actively engage in public service, analyse the volume of both complaints and reports and identify instances of lost documents, such as Citizen Card loss reports.

To capture the time required for filling in the "Person" data field in the SEI and to check for duplicates, fieldwork was conducted using a stopwatch to measure the interval from "Associate Person" to "Save" in the system. A Data Recording Form was developed to systematically document the time measurements, capturing the researcher's details, the officer entering the data and the exact time required for the data entry process.

Additionally, sociodemographic information about the police officers was gathered, including age, gender and educational background. Professional details were also recorded, such as rank, years of service, training (whether they completed the Agent or Chief training program), subunit, and shift during which the data was collected. Furthermore, the type of service (i.e. complaint or report), the method of identification (verbal or by document), duplicate record verification and the duration of the identification process were also noted.

As part of this study, the performance of a fingerprint scanner (Suprema BioMini Plus) used at airport border control was evaluated. Five readings were taken to measure the time required to authenticate fingerprints and verify visa authenticity, yielding the following times: 5.1 seconds, 4.5 seconds, 3.6 seconds, 4.3 seconds and 4.9 seconds.

Considering the research objectives and the operational context, we hypothesise that the implementation of biometric fingerprint scanners will improve efficiency by reducing both the time required for data entry and the associated labour costs (Hypothesis 1).

## Participants

To calculate the Mean Operational Time (MOT), the study focused on a defined scope of analysis constrained by the available fieldwork time for direct observation. After processing the SEI data, it was determined that a total of 78 police stations provided public service, with a total of 103,653 reports filed in 2023.

The representativeness of each subunit within COMETLIS was calculated by dividing the total number of records into quartiles, with the third quartile (75%) used as the reference, yielding a minimum threshold of 1,786 records per station. Based on this threshold, 20 police stations were identified, and their proportion within the total universe was calculated. To ensure a statistically representative sample, a margin of error of 5% and a confidence level of 95% were applied, resulting in a necessary sample size of 381 records, which were stratified accordingly. Data collection was phased, focusing on the top 10 subunits, aiming to gather 190 records for analysis.

Descriptive statistical techniques were used to analyse the collected data, focusing on central tendency (mean, mode, median) and dispersion (standard deviation). All analyses were conducted using Microsoft Excel (Microsoft 365).

For data collection, an extraction request was submitted to SEI for Lisbon 2023 records, including Police Process Number, Command, Division, Station, type of occurrence, as well as personal data related to the "Person" field (e.g. sex, age, nationality, profession). Additionally, the number of NIP (National Identification Process) merges completed in 2023 was requested to assess workload volume in this aspect.

Upon approval, the extracted data was refined, excluding subunits that do not provide public service (e.g. the Hospital São José Police Post), as well as tourism-specific stations, where biometric sensors are not applicable due to foreign citizens being the primary users. A Data Collection Form was refined based on earlier academic work conducted as part of a security technologies course.

Once the highest-volume police stations were identified, authorisation was requested from the COMETLIS Training Unit to visit these subunits and notify the station commanders of the researcher's presence. Given the uncertainty of data collection speed, all 20 stations in the quartile were included in the request. Scheduling was aligned with the availability of the researcher and the station's operational demands.

As data was collected, it was recorded in Microsoft Excel, along with the days spent at each station and the time required to gather the necessary records.

## Results

Over a total of 124 hours and 50 minutes (approximately five days), 175 records were collected, with the assistance of 32 police officers. Of these officers, 12 were Agents, 11 Principal Agents and 9 Chiefs. Four officers held university degrees, with a mean age of 36 years and an average service time of 11 years and 7 months. The majority (31) were male, with only one female officer observed.

Regarding the types of reports, it was noted that 100% of the lost Citizen Card reports relied on verbal identification without any supporting documentation. The total time dedicated solely to filling out the "Person" field amounted to 8 hours, 21 minutes and 33 seconds. The mean time for data entry was 2 minutes and 52 seconds (SD = 0.0015 minutes), with a mode of 1:50 and a median of 2:32. The low standard deviation indicates minimal dispersion, increasing confidence in the reliability of the meantime. The proximity of the median to the mean further supports the consistency of these time measurements.

To estimate the cost per hour of the observed labour, 2023 remuneration rates from the Public Administration Salary System (SRAP) were applied. As the precise remuneration rates of the observed police officers were unknown, an average hourly wage was calculated for Agents, Principal Agents and Chiefs, yielding the following results:

*Table 1: Cost per hour*

| Rank | Average salary | Representativeness | Hourly rate |
|---|---|---|---|
| Agents | €1,107.28 | 38% | €6.29 |
| Principal Agents | €1,412.30 | 34% | €8.02 |
| Chiefs | €1,526.34 | 28% | €8.67 |

*Source:* compiled by the authors

Based on these data, the weighted hourly labour cost (H/H) was calculated to be €7.56. For the 175 records collected, the total monetary cost associated with the data entry process amounted to €63.24.

Extrapolating this analysis to the 103,653 records processed in 2023 and using the average time per record (2:52), the total annual labour cost for manual identification processes would be €26,922.31.

By introducing a fingerprint scanner for this task, such as the BioMini Plus used in airport border control, with an average processing time of 4.48 seconds, the cost for the same 175 records would drop to €1.64, resulting in a savings of €61.60. For the total 2023 records, this would reduce costs from €26,922.31 to €700.20, yielding savings of €26,095.03.

The current market price for the latest BioMini Plus 2 model is €153.75. For the entire COMETLIS subunit, the acquisition cost, including a 10% discount, would be €11,992.50, and €61,500.00 for all national police stations.

These results validate Hypothesis 1, confirming significant improvements in police productivity using fingerprint scanners compared to manual identification processes. This conclusion is further supported by the literature, which highlights the adoption of biometric sensors by law enforcement agencies in other countries.

## Conclusions

The results of this study demonstrate the productivity gap between the current manual data entry system and the potential benefits of adopting biometric technology. Rather than asking "how much can we gain, and how quickly, if we invest", the findings illustrate how much is currently being lost due to the lack of investment in more efficient systems.

During the fieldwork, the analysis of the Mean Operational Times (MOT) for citizen identification revealed an average data entry time of 2 minutes and 52 seconds. Notably, in three instances, the MOTs were significantly longer, reaching 13:51, 11:45 and 11:09 minutes for the simple entry of personal data. This led to observable discomfort in citizens waiting at the police stations. In contrast, the fastest MOTs were 00:07, 00:09 and 00:19 seconds, all achieved using pre-existing National Identification Process (NIP) numbers provided by the citizens themselves, demonstrating the impact of optimisation.

Converting the MOTs into financial terms enabled us to quantify both the productivity and cost-effectiveness of police operations. The findings highlight the potential financial savings from adopting biometric fingerprint scanners, revealing the significant losses incurred by maintaining manual processes. For example, in 2023, the total cost of manually entering personal data in the Lisbon Metropolitan Command (COMETLIS) amounted to €26,922.31. In contrast, with the use of fingerprint scanners, the cost would be reduced to just €700.42. These scanners are already in use by the PSP at border controls, in the National Registry Office (IRN) and public healthcare facilities. The savings generated by this technological innovation could cover nearly half the cost of purchasing 400 fingerprint scanners, enough to equip all police stations, further increasing financial savings through improved hourly cost-efficiency (H/H).

This study, focused on police operational services, also sought to understand the perception of police officers regarding this technological shift. The verification of the first and second hypotheses, coupled with the refutation of the third, led to the conclusion that police officers generally support the introduction of biometric sensors. They recognise the technology's potential for improving productivity, are receptive to integrating the Strategic Information System (SEI) with Citizen Identification Systems (SIC), and acknowledge the need for innovation in public administration. Furthermore, they identify limitations in the current process, particularly the repetition of NIP entries and the introduction of incorrect data.

The fact that out of 6,113 NIP merges conducted in 2023 5,449 were related to the "Person" field underscores the inefficiency of the current system. This task is consuming human resources that could be better utilised in other areas. With an average of 27 merges per day, the adoption of biometric technology could significantly reduce the workload, freeing up resources for other critical tasks.

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