International Handbook of Forensic Intelligence and Criminology (pp. 65-76): Taylor and Francis.

Forensic-Led Regulation Strategies: Are They Fit for Security Problem-Solving Purposes?

Frank Crispino, Claude Roux

Reference :

Crispino, F. and C. Roux, *Forensic-Led Regulation Strategies: Are They Fit for Security Problem-Solving Purposes?*, in *The Routledge International Handbook of Forensic Intelligence and Criminology*, Q. Rossy, et al., Editors. 2017, Routledge: Abingdon, Oxon, UK. p. 65-76.

Abstract :

The 2009 NAS Report revealed a paradigm crisis of the dominant conception of forensic sciences as a patchwork of disciplines assisting the criminal justice system, by questioning the robustness of the scientific foundations of essentially all of the forensic science disciplines except perhaps DNA analysis. Instead of questioning the very ontological nature of forensic science, solutions to counter this dramatic statement have been mainly focusing on methodology upgrades to limit psychological bias and better assess accuracy, sensitivity and error rates of enabled techniques. This approach is epitomized by quality management strategies that are crowned by accreditation of laboratories and certification of individual forensic scientists.

A worldwide state of the art of forensic science practices justifies such a move that aims at promoting stakeholders' confidence. Besides, quality management policies may also be seen as efficient canvas to control processes in an econometric conception. While a forensic science world without quality management is senseless, its reported and observed implementation beg the question whether it has developed from a necessary tool to a constraint that may no longer be fit for purpose. Further, it could seem strange to (over-) formalize forensic services at a time the nature of this discipline is still open to debate. In other words, one of the many unexpected consequences of the generalisation of quality management in its present form is that it contributes to frame a mistaken view of experimental sciences dedicated to respond to criminal and litigation matters.

These interrogations question the adequacy of forensic-led regulation strategies for security problem-solving, and support a more thorough reflection of the nature of forensic science as a historical science that could benefit from a better understanding of its original link with criminological concerns.

Despite previous warnings regarding some forensic malpractices and questioning its scientific underpinnings (Huber 1991, Giannelli 2002, Saks and Koehler 2005, Pyrek 2007), the report of the US National Academy of Sciences "Strengthening Forensic Science in the United States : A Path Forward" (National Research Council 2009) shook the forensic science community as it presented this discipline as undefined, fragmented, without relevant dedicated research, provided by uncontrolled laboratories with weak scientific backgrounds, where employees were unaware of many cognitive biases due to the organisation of their services, if not because of the dependency to police forces (Edwards 2009). Although less polemic and more constructive, a Canadian similar review found results in agreement with the American report (Pollanen et al. 2013). Indeed, worldwide reactions to the NAS Report implicitly recognised

the relevancy of the critics at an international level (Mnookin, Cole et al. 2011, Ross 2011, Margot 2011a, Margot 2011b, Robertson, Kent et al. 2013). Without refuting the NAS assessment, only few managers and forensic scientists contextualized the findings, both integrating previous reports of the same vein by the NAS and reframing them in a more systemic failures of the criminal justice system (police, prosecution, forensic providers, trier of fact), underlining that forensic scientists had not waited for such a report to address these critics (Kaye 2010, Melson 2010). But even these few scientists opening the debate to the security system as a whole expressed their agreement with the main stream of commentators to address "issues of accuracy, reliability, and validity in the forensic science disciplines" (recommendation 3 of the NAS Report). Even if quality management processes were already implemented in many facilities as a general policy adopted to ensure traceability and reliability within a laboratory (Crispino, Touron et al. 2001), the NAS Report summoned forensic science to provide transparency and robustness in how conclusions were reached to Courts of law, which induced mandatory compliance with procedures and rules of justice systems. This move found in the implementation of quality system models a solution to such requirement, leading to the mere splitting of forensic data and of sophisticated techniques into specialised fields, framed in the quality triangle of standardisation, accreditation and certification (Lentini 2009, Hazard, Stauffer et al. 2013). However, this does not seem to tackle, at least, the fragmentation critics of the NAS Report. In fact there is a more fundamental question: is such a forensic-led regulation strategy viable for more general security problem-solving purposes? To address this question, it is pertinent to understand the origins and goals of current quality management strategies in forensic science (part I), to identify some of the limitations (part II) to finally propose complementary solutions to the reliability and efficiency of forensic science to a more general security involvement (part III and conclusion).

The Origins and Goals of Current Quality Management Strategies in Forensic Science

In general, certification and accreditation rightly appear as the solution not only to counter the deficiencies of forensic science, but also as a way to regulate a large number of very diverse laboratories to enforce confidence in the criminal justice system. For example, in the USA more than 200 forensic labs at national, state, county and city jurisdictions are regulated this way[1] (Jonakait 1991, Giannelli 2008, Zimmerman 2011, Siegel 2013, Lord Thomas 2015) It offers a comprehensive response to legitimate, but not necessary scientifically supported, blames on forensic science for being the main body at fault for miscarriages of justice (Collins and J 2009, Neufeld and Scheck 2010). Beneath, it surely comes out as a prerequisite for sharing evidence between laboratories, feed databases and for international cooperation to fight against crime (Malkoc and Neuteboom 2007, Padar, Nogel et al. 2015).

But it should also primarily be understood as the achievement of an older quality management conception, which began in the 70's through proficiency tests (Peterson, Fabricant et al. 1978, Lentini 2009, Robertson, Metz et al. 2010). Through inter-laboratories tests, the process aimed at detecting pitfalls in the conduct of forensic examinations for the sake of volunteered laboratories to participate. Even if these tests are still carried out today, their intrinsic limits are recognised – e.g. what does a failure to a single test mean? Does a successful test guarantee the absence of any error on a daily routine? As a result, they are complemented by

[1] For an idea of the present US provision, see http://www.ksg.harvard.edu/netgov/html/research_dna_cj_labs.htm

individual certification and institutional accreditation procedures. These components are overarched today by general requirements imported from the industrial and commercial arena, with ISO 17025 for the competence of testing and calibration laboratories at laboratory level, but also a still debatable ISO 17020 for the operation of various types of bodies performing inspection dedicated to crime scene units. These systems are understood as performers of their "parent organizations, or authorities, with the objective of providing information about the conformity of inspected items with regulations, standards, specifications, inspection schemes or contracts" (https://www.iso.org/obp/ui/#iso:std:iso-iec:17020:ed-2:v1:en).

Notwithstanding the needed adaptation of these general requirements to the crime laboratory at hands (as such as ASTM E1732 for standardizing terminology in the USA, CAN-P-1578 guidelines for the accreditation of forensic testing laboratories in Canada, AS 5388 Australian Standards on forensic analysis, etc.) and interrogations about the organizational links existing between crime scene units and forensic laboratories, such general requirements were clearly adopted to secure well-defined notions of scientific traceability and reliability of the examinations performed to the recipients of the service (police corps, attorneys, trier of fact), beyond the more formal and juridical chain of custody. It is worth reminding that traceability is an objective concept that could be summarized as "nothing is hidden and everything is written". Through this concept, each step of the process can be followed and understood. On the other hand, reliability is a subjective concept, which means that no case is taken into account with a biased *a priori*, to let the customers (judges, policemen) confident with the provided results (Crispino, Touron et al. 2001). Interestingly, ISO 17025 (but also ISO 17020) are focusing on traceability, while most criticisms raised in the NAS Report relate to reliability.

Regardless, accreditation remain especially legitimate because it relies on quality procedures usually validated by relevant scientific working groups of the various forensic fields as such as the European Networks of Forensic Science Institute (ENFSI) network or a special committee of an authoritative body (e.g. the Organization of Scientific Area Committees (OSAC) of the American National Institute of Standards and Technology (NIST) that recently replaced the American Scientific Working Groups although the latter appeared to be closer to the practitioners). The accreditation itself is delivered by a variety of bodies for forensic science that have flourished around the world, such as the Laboratory Accreditation Board of the American Society of Crime Laboratory Directors (ASCLD/LAB), the Forensic Specialties Accreditation Board (FSAB), the National Association of Testing Authorities (NATA) in Australia or the European cooperation for Accreditation (EA). At the individual level, certification is generally awarded by professional organizations to their members, notwithstanding uncontrolled questionable credentials such as the American College of Forensic Examiners Institute (ACFEI) (Ciedel 2012). But once granted, this attribute is mainly dependent on the personal deontology of the individual fellows, with few, if any effective policy available to regulate them, either due to their private and volunteer status, financial constraints or fear to publicize its powerlessness (Melson 2012). Finally, the very concept of accreditation could become operatively senseless not only for security, but also justice purposes, because of the high complexity and low consensus surrounding the analysis of uncontrolled traces for reconstructing a single event, for which quality management procedures emphasize fragmented protocols. However, as supported by Willis (2014), this is not the appropriate focus:

" *[…] it is necessary to refocus on people. Forensic science is not a bundle of tasks or routine processes although it includes these. It needs productive thinking, problem solving, cognitive ability and decision-making about which, when and why. None of this is at variance with accreditation. In fact if used in a continuous improvement way, accreditation acknowledges these skills. However the more fragmented the process becomes, the less accreditation helps address the need for an overall approach to the questions raised to help solve crime and evaluate findings in the judicial process*" (Willis 2014).

The need to settle confidence with stakeholders (often justice representative only) is well understood. However, from this consensus a culture that is dictated by the quality movement coming from the manufacturing economic model emerged (Speaker 2009a, Willis 2010). In this culture, new business relationships between customers (defense attorneys, prosecutors, but also law enforcement agencies) and forensic science service providers are defined. It remains unclear if such a move is a consequence of, or an incentive for, a contested neoliberal conception of security at large, policing in particular (Roberts 1996, Koppl 2005, Lawless 2010, Lawless and Williams 2010, Lawless 2011, Maguire, Houck et al. 2012, McAndrew 2012, Jackson 2013, Gallop and Brown 2014, Gallop and Squibb-Williams 2015). Following this credo, quality management should both optimize the quality of the forensic service provision and lessen its costs (Houck, Riley et al. 2009, King and Maguire 2009, Speaker 2009b, Speaker and Fleming 2010, Newman, Dawley et al. 2011, Bonetti, Crowley et al. 2012, Stimson 2013, Ludwig, Edgar et al. 2014, Speaker 2015), even if pioneers of scientific quality expressed concerns about its misappropriation both by analysts, who would only understand quality management to control and upgrade their technical strategies (devices and analysis) and administrators who would focus on laboratories' life managing through general instructions (Dupont 1998, Suzuki 1998).

At this stage, we ought to ask the questions: As quality management is specific to any sector that wants to be competitive while being effective and efficient through quality standards met by monitoring and evaluating the different stages of a process, did not this management perspective in terms of performance lose sight from the shore of the very mission of forensic science ?

Limitations

Indeed, as forensic science is embedded in a complex investigation process (Brown and Willis 2010, Julian and Kelty 2015), isn't there a risk to let the stakeholders believe in a misleading quality assurance uniquely grounded on accreditation procedure (Stauffer and Schiffer 2007, Willis 2010, Willis 2011, Ross 2013), as it only supports that the entire process in the laboratory has been mastered and is trustworthy ? Worse, such localized considerations could prevent forensic practitioners from identifying where the problems really lie with regards to the criminal justice system (Hazard et al., 2013). To summarise, the last 2015 annual report of the chief scientist adviser of the UK government seems to sound the alarm for the excess of the chosen policy of privatisation of forensic science services in England and Wales that should have been secured and regulated by quality management accreditation and certification. Although "it has saved costs, reduced case turnaround times, maintained quality and, to some extent, inspired innovation, […] the way services are procured has become increasingly fragmented, threatening future innovation and potentially undermining public confidence in the criminal justice process" (Gallop and Squibb-Williams 2015).

But, in reality, the challenge is well extended beyond the single experimental forensic provision, as it indicates the difficulty to stretch this model to the whole investigative phase, even when the latter is restricted to its scientific aspect. Indeed, most of the existing standards focus on the analysis stage, even not considering pre-and post-laboratory stages, namely the crime scene performance and the interpretation of the results, be for intelligence purposes or for court. Failure to consider forensic science in its totality (Roux, Crispino et al. 2012) has an obvious impact on the effectiveness of quality assurance as it is currently designed. "The forensic science community struggles today with the comprehensive quality approach because it failed to develop its own approach, instead, mistakenly copying the work from the manufacturing sector" (Hazard, Stauffer et al. 2013).

It is also recognised that the nature of forensic science is still being debated. Adopting a more holistic view of forensic science questions the way we define rules of conduct and quality procedures for a body of knowledge whose epistemological nature is still debated (Kirk 1963, Ginzburg 1984, Evett 1996, Cleland 2001, Cleland 2002, Kennedy 2003, Koppl, Kurzban et al. 2008, Houck 2010, Evett 2015). Is forensic a science in its own right, a police practice or a set of disconnected enabled disciplines called forensics when devoted to the courtroom (Roux, Crispino et al. 2012) ? While the conception of this domain is still at stake, is it wise to adopt a purely commercial regulation strategy? Indeed Hazard et al. noticed that « Although it was relatively straightforward to define and implement a quality system with laboratory procedures, it is a whole other problem with scene examination or opinion development. » (Hazard, Stauffer et al. 2013).

Regardless, it seems obvious that the object of interest, the trace or mark defines the forensic science domain.. To be differentiated from an item that is a controlled sample from a known population, the trace is generally a unique specimen, degraded, mixed, of bad quality of an inferred source of interest, produced during another inferred[2] action of interest (Margot 2011a, Margot 2014). Despite this realistic statement, the trace remains the safest source of information to reconstruct an event under investigation, within a holistic approach (Kind 1994, Kind 1999, Delémont, Esseiva et al. 2014). Of course, scientific process should not worsen the few available information carried out by the trace. As such, chain of custody and analytical traceability are relevant constraints for long. Standardization offers a further relevant mean to enable critical surveys of forensic analysis and allow for national and international data sharing. But it also raises up the question as to where uncertainty lies in forensic science. Does it make sense to secure the forensic analysis phase further, when jurists, sociologists and criminologists try to better assess what modern evidence is (Tillers 1983, Tillers 1989, Patenaude 2001, Lagnado 2011, Tillers 2011a), when they defend a silo-dismantling approach (Kelty, Julian et al. 2013, Lord Thomas 2015) and when even judges question both their ability to manage or understand scientific evidence or the unscientific chess game led by prosecution and defense lawyers behind the adversarial procedure (Judge Edwards 2012, Laurin 2013) ? Ironically, it draws law and security closer to long existing scientific questions about relevancy and interpretation (Appell, Darboux et al. 1904, Finkelstein and Fairley 1970, Aitken and Stoney 1991, Robertson and Vignaux 1995, Evett 1996, Evett 1998, Taroni, Champod et al. 1998, Aitken and Taroni 2004, Tillers 2007, Champod

[2] It should probably be reminded here that « to infer » means « to rise up an hypothesis under uncertainty".

and Evett 2009, Aitken, Roberts et al. 2011, Tillers 2011, Tillers 2011, Biedermann 2013, Roberts and Aitken 2014, Taroni, Biedermann et al. 2014, Evett 2015).

At least, it appears traditional quality management removes opportunities for an alternative conceptualisation approach that would better focus on formation, education, selection and supervision of practitioners (Horswell 2004, Kelty and Julian 2010, Kelty and Julian 2011a, Kelty and Julian 2012, Crispino, Rossy et al. 2014), or define dedicated forensic science research (Mnookin, Cole et al. 2011, Kelty and Julian 2011b, Margot 2011b), which would address the various types of inferences developed at the early phase of the investigation (Peirce 1898, 1995, Ginzburg 1984, Ginzburg 1989, Baber, Smith et al. 2006, Pape 2008, Schuliar and Crispino 2013, Hazard 2014, Bitzer, Albertini et al. 2015). Finally, do certification and quality management strive after helping or coercing practitioners (Crispino, Touron et al. 2001, Kolowski 2015) ?

Without refuting that standard operating procedures also aim at reducing cognitive biases (Dror, Kassin et al. 2013, Dror 2016), there is no question that they are not an exclusivity of forensic science, but a sociological if not political self-evident fact (Tversky and Kahneman 1974, Plous 1993). Hence, where is the rationale to impose legitimate reliability and transparency of forensic practice – focused and restricted at court level (McCartney 2015)- , while permitting a variable geometry for decision-makers, whose understanding of forensic probative value should certainly be enhanced as a prerequisite (Providers 2009, Vuille 2013, Crispino, Rossy et al. 2014) ? Worse, focusing, instead of raising awareness among forensic scientists, about cognitive bias could delay their core research, which is to understand the occurrence of available traces in criminogenic vs daily-usual situations (Champod 2014). As Ribaux wrote in a previous chapter of this book, “The narrowness of traditional views on forensic science is far from allowing the structured, useful and comprehensive exploitation of all data whose treatment should fall under its responsibility”, even ignoring that the experience of forensic practitioners are not critically taken into account within the current trend, as it certainly could at least for intelligence purposes.

In such circumstances, we ought to ask the question: are current forensic-led regulation strategies fit for security problem-solving purposes? Regarding the flexibility, skill, adaptability and innovation of organised crime in regards to not only of a seemingly quality management silo culture, but also of the poor efficiency of trace exploitation (Ribaux and Talbot Wright 2014), the present paper would negatively answer this question, as far as this question equates whether quality management policies are appropriate for policing (be it intelligence-led, problem-solving or even community oriented) (Ratcliffe 2011). But, as our critical analysis was framed within an holistic perspective, it could also be reminded that the “ambivalent role of forensic science is also inherited from the difficulties to configure security and justice through coherent strategies and organizations” (Brodeur and Shearing 2005). Hence, no real other criminological alternatives can be proposed at this point.

Complementary solutions

Understanding traditional quality management policies (Part I) and their limitations (Part II) and considering social, economic and also political constraints tend to support a re-think of current trace management models (Collins JR 2013, Fisher 2013, Gialamas 2013, Lucas 2013) As some proponents of straight quality management policies suggest to have a look to

the QA medical layout (Christian 2011), a more general clinical approach of forensic science inspired from this field of practice invites to a more thorough survey (Pottier and Planchon 2011, Margot 2011b). Indeed, medical science is not only aimed at curing a single case, but also preventing illness through a symptom watch network or identifying an epidemic through repetitive cases, as forensic science is not restricted to present evidence in courts, but could also nurture prevention and intelligence schemes at tactical, operational and strategic levels (Ribaux 2014). Hence, mimicking medical quality procedure could only strengthen the present deficiencies of forensic quality management-led regulations, if no better understanding of the medical system is pursued. For instance, as three levels of intervention and responsibility is easily identified in the medical organization - the paramedics or frontbench, the specialists at the other end and the general practitioner who rationalizes the efficiency of this structure either for the sake of the patient or of the public health, all of them educated in a medical paradigm that let them understand each other - , the situation is blurred for forensic science. Crime scene examiners are generally, if not consider themselves as trace providers for detectives (Ludwig, Fraser et al. 2012), hard to be identified as trace GP able to discuss with over-specialized and independent experts as supported by the NAS report and the trend of so said quality management process. It could support the hypothesis that high quality also depends on the way a forensic science culture is assimilated (into specific education-training and workplaces) and understood at a systemic point of view, which could invite to question the philosophy of clients, customers and providers (Kobus, Houck et al. 2011) for a more collaborative approach (what Ribaux called a procedural vision in this book) relying on an epistemology based on the trace, the fundamental element of forensic science (Margot 2014). It seems that forensic-led regulations largely participated to the closure of the UK Forensic Science Service that was unanimously considered as an international reference for interpretative operative research that could not be supported by the private sector (Commons 2011, Evett, Pope et al. 2012, Logan 2012, Gallop and Brown 2014). The same paradigm continues to contribute if not justify closing down seminal forensic science fields such as trace evidence departments (Roux, Talbot-Wright et al. 2015, Stoney and Stoney 2015). It appears we should therefore seriously assess the consequences of such regulations before continuing in that direction. Actually, with the advent of the digital era few investigations are conducted today without numerical traces. As a result, the volume and variety of data has dramatically increased in the early phase of an investigation. As it is hard to conceive the integration of these data flow through external systematically accredited laboratories, why not appraising the push they induce for a more collective security approach, and why should traditional forensic traces be excluded from such a thought?

Conclusion

Questioning security regulation strategies open a Pandora ’s Box. In particular it reminds us that “forensic intelligence and crime investigation are about crime reconstruction. Such a logic can hardly be mechanised and call for imagination, for drawing analogies and for associating ideas” (Ribaux in this book). How much of these skills have to be standardized, and how can they be standardized? While it seems a collaborative approach relying on an epistemology based on the trace would go a long way to address this challenge, only time will tell. In the meantime, we invite the reader to contrast the current inconsistent regulation of security through technical constraints with Goldstein’s 37-year old warning : “All bureaucracies are becoming so preoccupied with running their organizations and getting so involved in their

methods of operating that they lose sight of their primary purposes for which they were created" (Goldstein 1979).

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