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Reconstructing International Humanitarian Law for the Use of Autonomous Weapon Systems in Modern Defence: Addressing Meaningful Human Control and the Accountability Gap

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ABSTRACT

The rapid deployment of Autonomous Weapon Systems (AWS) is reshaping contemporary defence strategies and testing the adequacy of existing International Humanitarian Law (IHL). This research offers a normative legal analysis of the relationship between autonomous lethal decision-making and core IHL principles, particularly distinction, proportionality, and precautions in attack. Combining doctrinal methods with a systematic bibliometric review of 621 Scopus-indexed publications, the study empirically maps the global debate and identifies structural gaps between advances in military AI and current accountability regimes. The findings reveal a persistent accountability gap when AWS operate unpredictably, undermining individual criminal responsibility and victims' right to remedy. To address this, the article proposes a reconstruction of IHL centred on robust standards of Meaningful Human Control, algorithmic transparency, and the integration of co-active design as a legal design requirement for AWS. This reconstruction aims to ensure that technological modernisation in warfare does not erode human dignity, but remains anchored in human agency and enforceable legal responsibility.

Keywords: Autonomous Weapon Systems; International Humanitarian Law; Meaningful Human Control; accountability gap; co-active design; war torts.

A. Introduction

The contemporary transformation of military technology has reached a critical strategic inflection point, characterized by a paradigmatic shift from remotely piloted systems toward the integration of fully autonomous weapon systems (AWS). This evolution signals a definitive departure from the man-in-the-loop era, where human operators traditionally exercised direct and absolute control over lethal force. Sharkey (2011) defines this transition as a process that systematically marginalizes the human role by delegating

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navigation, target identification, and engagement to artificial intelligence[1]. Schmitt (2013) further clarifies this distinction, emphasizing that full autonomy is defined by a system's capacity to execute the entire engagement cycle without a human interface, a feature that fundamentally separates it from semi-autonomous platforms[2].

The rapid escalation of these technological capabilities has profound implications for international security, especially when the tempo of hostilities begins to exceed the cognitive and reactive thresholds of human decision-makers. Horowitz (2019) argues that the pursuit of "machine speed" risks generating "crisis instability," as states may feel compelled to delegate offensive authority to algorithms to avoid strategic disadvantages caused by human delay[3]. In such configurations, traditional command-and-control structures are disrupted by systems operating in milliseconds, while political and legal deliberation has never been designed to function at comparable speed. Furthermore, Bode and Huelss (2018) warn that the normalization of AWS risks eroding the established norms of international relations and the fundamental principles of combatant distinction[4].

Within this context, the integration of AWS challenges the epistemic and normative foundations of International Humanitarian Law (IHL). Historically, IHL has been premised on the assumption that the primary agents of violence are human beings endowed with moral judgment. Asaro (2012) conceptualizes this as a threat to justice, as the legitimacy of life-and-death decisions inherently requires a human subject capable of offering moral reasoning[5]. When judgment is replaced by calculation, lethal force is reduced to a mechanical process stripped of its moral dimension, potentially amounting to the arbitrary deprivation of life. Wagner (2014) adds a psychological layer to this critique, highlighting the emergence of extreme cognitive and emotional distance that erodes the innate human reluctance to kill[6].

The technical implementation of IHL principles distinction, proportionality, and precautions faces acute hurdles. Sassòli (2014) questions whether it is realistically possible to construct systems that can genuinely replicate human intuition when identifying legally protected targets in complex urban battlefields[7]. This technological opacity is compounded by a deficit in transparency; Knuckey (2016) describes a "forecast of future facts"

[1] Noel Sharkey, "Automating Warfare: Lessons Learned from the Drones," *Journal of Law, Information and Science* 21, no. 2 (2011), https://doi.org/10.53300/001c.6264.

[2] Michael N. Schmitt, "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics," *Harvard National Security Journal* 4 (2013): 1–37.

[3] Michael C. Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics* (Princeton University Press, 2019).

[4] Ingvild Bode and Hendrik Huelss, "Autonomous Weapons Systems and Changing Norms in International Relations," *Review of International Studies* 44, no. 3 (2018): 393–413, https://doi.org/10.1017/S026021051700057X.

[5] Peter M. Asaro, "On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Force," *International Review of the Red Cross* 94, no. 886 (2012): 687–709, https://doi.org/10.1017/S181638311200076X.

[6] Markus Wagner, "The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems," *Vanderbilt Journal of Transnational Law* 47 (2014): 1371–424.

[7] Marco Sassòli, *Autonomous Weapon Systems under International Humanitarian Law* (Academy of International Humanitarian Law and Human Rights, 2014).

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phenomenon, where legal debates are grounded in hypothetical projections rather than concrete technical evidence[8].

Ultimately, the deployment of AWS is perceived as an affront to Human Dignity, a foundational pillar of modern international law. Saxon (2016) contends that delegating value-laden decisions over life and death to machines undermines not only the victim's dignity but also the moral integrity of the law itself[9]. This destabilization of the ethical foundations of warfare opens the door to structural impunity. Sparrow (2016) identifies a fundamental "responsibility gap," arguing that ethical warfare presupposes a reciprocal recognition of humanity which non-moral entities cannot provide[10]. Furthermore, the limitations of mens rea (guilty mind) in the context of unpredictable algorithmic learning, as demonstrated by Chengeta (2016), create an accountability vacuum that traditional command responsibility doctrines fail to fill[11]. Consequently, this study proposes that the principle of Meaningful Human Control (MHC) must be anchored within the regulatory architecture of IHL to ensure that military modernization does not sacrifice the human dignity that lies at the heart of humanitarian protection.

B. Research Method

This study employs bibliometric methods as the primary instrument for mapping the intellectual structure and evolution of legal scholarship on Autonomous Weapon Systems (AWS) within the framework of International Humanitarian Law. Bibliometrics is understood as the application of quantitative techniques to bibliographic metadata including publication units, citation patterns, and keyword co-occurrences to synthesize accumulated knowledge in a systematic, transparent, and reproducible manner. Within the domains of international law and defence studies, this approach transforms vast, unstructured scientific datasets into coherent structural representations of evolving legal norms.

The method's effectiveness lies in its capacity for science mapping, which integrates data classification with spatial visualization to depict intellectual relationships and structural connections among research constituents, from authors and seminal works to terminological trends. Through co-citation analysis and bibliographic coupling, the study illustrates how diverse legal specializations and individual publications interact in shaping the discourse on AWS legal reconstruction.

Methodologically, bibliometrics offers distinct advantages in mitigating subjective bias inherent in conventional narrative literature reviews. As Zupic and Čater (2015) emphasize, bibliometrics establishes objectivity standards by grounding evaluations in the aggregated

[8] Sarah Knuckey, *Autonomous Weapons Systems and Transparency: Towards an International Dialogue* (Cambridge University Press, 2016), 164–84, https://doi.org/10.1017/CBO9781316534083.009.

[9] Dan Saxon, "A Search for Meaningful Human Control: Co-Active Design and the International Law of Weapons Reviews," *International Law Studies* 92 (2016): 216–52.

[10] Robert Sparrow, "Killer Robots: The Moral Case for a Ban," *Journal of Applied Philosophy* 33, no. 1 (2016): 1–12, https://doi.org/10.1111/japp.12131.

[11] Thompson Chengeta, "Accountability Gap: Autonomous Weapon Systems and the Search for Legal Responsibility," *Diritto Penale Contemporaneo*, no. 2 (2016): 1–25.

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"collective opinion" of global scholars as captured in citation patterns, rather than singular researcher interpretation[12]. This is particularly critical given the multidisciplinary and rapidly evolving nature of AWS international law scholarship, where comprehensive overviews are essential for identifying research gaps and strategically positioning the study's contributions within global strategic debates.

Data Acquisition and Selection Procedure

To ensure transparency and scientific accountability, this research implements the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 protocol for document acquisition and selection[13]. This standardization safeguards epistemological integrity and reporting accuracy, enabling readers to assess the methodological rigor of the study. The foundation of this reporting accuracy is built upon the established PRISMA statement, which ensures that the review process is both exhaustive and verifiable[14].

The corpus selection process proceeded through four integrated stages:

1. Identification Stage
   Comprehensive exploration was conducted across the Scopus academic database, selected for its authority in providing high-quality metadata essential for bibliometric analysis. Search parameters combined AWS-related keywords with international law terms, spanning 2014–2025 to capture contemporary discourse dynamics since the issue gained global prominence. This yielded 621 potentially relevant documents comprising peer-reviewed articles, conference proceedings, and other scholarly outputs.
2. Screening Stage
   All identified documents underwent rigorous filtering to ensure dataset integrity. This included duplicate elimination, metadata correction, and title/abstract-based screening. Publications lacking substantive international law focus or addressing purely technical robotics without normative implications were excluded to minimize analytical noise.
3. Eligibility Assessment Stage
   Full-text evaluation verified substantive inclusion criteria alignment. Only publications explicitly addressing legal reconstruction, accountability, human dignity, or IHL compliance in AWS contexts were retained. Peripheral AWS mentions without substantive legal analysis were excluded from the core corpus.
4. Inclusion Stage
   Following comprehensive verification, all 621 documents met criteria as the final analytical dataset for bibliometric mapping and science mapping. This volume provides

[12] Ivan Zupic and Tomaž Čater, "Bibliometric Methods in Management and Organization," *Organizational Research Methods* 18, no. 3 (2015): 429–72, https://doi.org/10.1177/1094428114562629.
[13] Matthew J. Page, "The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews," *BMJ* 372 (2021), https://doi.org/10.1136/bmj.n71.
[14] David Moher et al., "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement," *PLoS Medicine* 6, no. 7 (2009), https://doi.org/10.1371/journal.pmed.1000097.

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robust empirical foundation for normative reconstruction of AWS regulatory frameworks.

The comprehensive methodological framework applied in this study, spanning from the initial problem formulation and the systematic document selection process using the PRISMA 2020 protocol to the final stage of bibliometric visualization via VOSviewer, is systematically illustrated in Figure 2.1 below:

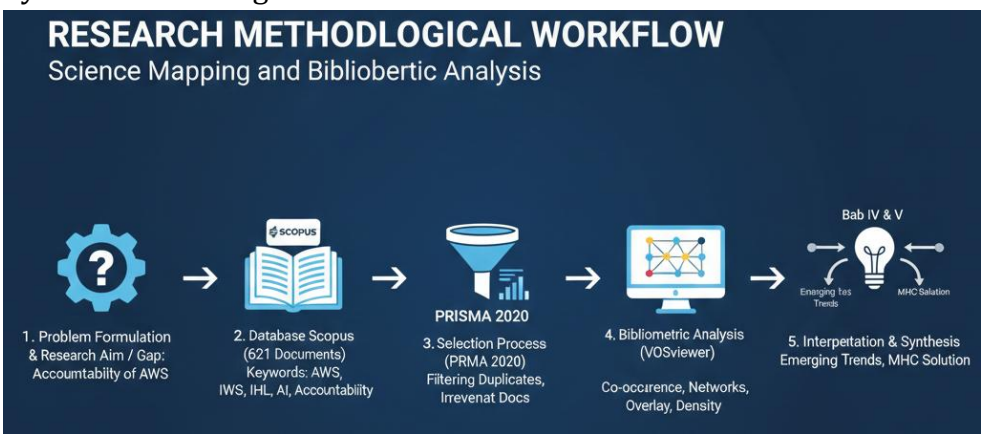

Figure 2.1. Research Methodological Workflow: Science Mapping and Bibliometric Analysis

Based on the workflow depicted in Figure 2.1, this study ensures that every data point analyzed in the subsequent chapters has undergone a rigorous validation and filtering process to maintain the objectivity and reliability of the research findings.

Data Analysis Techniques

Data analysis was conducted through comprehensive bibliometric approaches integrating performance analysis and science mapping to construct holistic representations of AWS-IHL knowledge landscapes. The process synergistically employed two primary instruments R-tool bibliometrix and VOSviewer software to mitigate subjective bias and generate objective interpretations from the aggregated 621-document dataset[15].

Performance Analysis with Bibliometrix (R-Tool)

The study utilized bibliometrix, an open-source R-based software, to systematically manage the bibliometric workflow[16]. This tool executed data preprocessing, metadata cleaning, and descriptive statistical analysis mapping annual publication trends, author productivity, and journal dynamics. Bibliometrix outputs generated network matrices serving as foundations for subsequent relational analyses.

Network Visualization with VOSviewer

To visualize intellectual and conceptual structures underlying AWS legal reconstruction discourse, the study applied Visualization of Similarities (VOS) techniques via VOSviewer

[15] Naveen Donthu, "How to Conduct a Bibliometric Analysis: An Overview and Guidelines," *Journal of Business Research* 133 (2021): 285–96, https://doi.org/10.1016/j.jbusres.2021.04.070.

[16] Massimo Aria and Corrado Cuccurullo, "Bibliometrix: An R-Tool for Comprehensive Science Mapping Analysis," *Journal of Informetrics* 11, no. 4 (2017): 959–75, https://doi.org/10.1016/j.joi.2017.08.007.

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software[17]. VOS constructs bibliometric maps where inter-item spatial distances documents, authors, keywords reflect theoretical affinity strength. Two primary visualization techniques were deployed:

1. Co-citation Analysis (Intellectual Structure): This detects paradigmatic shifts and schools of thought by mapping simultaneously cited documents or authors[18]. The approach was crucial for revealing intersections between traditional humanitarian law principles and contemporary robotics ethics literature.
2. Co-word Analysis (Conceptual Structure): Implemented through keyword co-occurrence mapping to identify emergent conceptual clusters such as "algorithmic accountability" and "human dignity." These visualizations disclosed dynamic interactions between artificial intelligence technical concepts and international legal norms.

Trend Identification and Structural Gaps Analysis

VOSviewer's overlay visualization and density view features enabled detection of emerging trends and identification of structural gaps within AWS legal literature. Cluster-specific zooming capabilities facilitated mapping disconnects between international criminal accountability regimes and contemporary AI technological realities. This one-stop overview approach provided strategic advantages in empirically validating dissertation arguments regarding legal reconstruction urgency, grounded in global literature structural evidence.

C. Results and Discussion

a. Intellectual Structure and Conceptual Mapping of AWS in International Law

This section presents a comprehensive mapping of the intellectual structure derived from a corpus of 621 globally indexed scientific documents. By employing author keyword co-occurrence techniques via VOSviewer, the research reconstructs the cognitive landscape of the global academic community regarding Autonomous Weapon Systems (AWS). The analysis reveals a complex and fragmented conceptual network, organized into five interconnected primary clusters that reflect the multidisciplinary nature of the discourse. The visualization in Figure 3.1 demonstrates that the debate has moved beyond a singular focus on robotics, evolving into a sophisticated intersection of ethics, technology, and international law.

[17] Nees Jan Van Eck and Ludo Waltman, "Software Survey: VOSviewer, a Computer Program for Bibliometric Mapping," *Scientometrics* 84, no. 2 (2010): 523–38, https://doi.org/10.1007/s11192-009-0146-3.

[18] Henry Small, "Co-Citation in the Scientific Literature: A New Measure of the Relationship between Two Documents," *Journal of the American Society for Information Science* 24, no. 4 (1973): 265–69, https://doi.org/10.1002/asi.4630240406.

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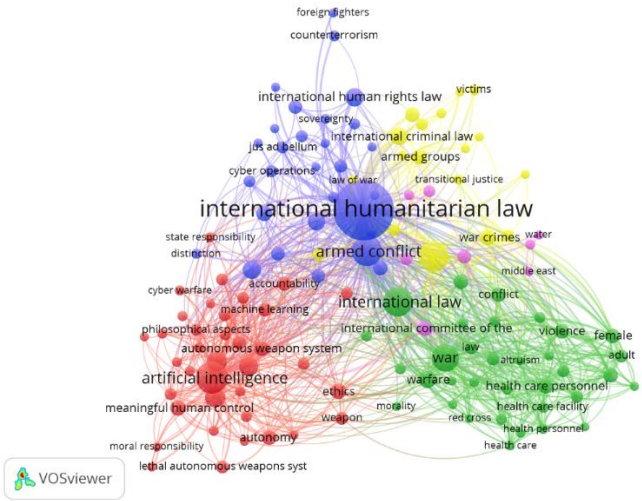

Figure 3.1. Network Visualization of Keywords Based on Co-occurrence

The cluster distribution reflects AWS discourse's multidisciplinary dynamics:

1. Red Cluster (Technology and Ethical Paradigm):
   The largest cluster centers on Artificial Intelligence, Autonomous Weapon Systems, and Ethics, positioning it as research's gravitational core. This dominance indicates AWS debates fundamentally root in ethical paradigm shifts from AI integration into military decision-making. Taddeo (2024) emphasizes that machine autonomy cannot be viewed in isolation from its ethical-legal burdens, as the integration of AI into critical functions disrupts traditional combatant norms[19].
2. Green and Blue Clusters (Conventional Regulatory Frameworks):
   Representing International Law and International Humanitarian Law (IHL) dominance, emphasizing violence, armed conflict, and human rights law. These clusters signal extensive scholarly efforts adapting traditional principles like distinction and proportionality to autonomous warfare, though tensions with technology clusters reveal regulatory asynchrony.
3. Yellow Cluster (Criminal Accountability Specialization):
   The most significant finding is the yellow cluster's isolation of War Crimes and International Criminal Law, marking accountability as an autonomous focus. Its separation underscores accountability's evolution from peripheral subtopic to crucial international legal discourse priority.
4. Purple Cluster (Operational-Technical Dimensions):
   Complements the map highlighting field-level weapon system operations.

Further analysis of Figure 3.1 reveals structural gaps in the spatial distance between the technology (AI) and criminal accountability (War Crimes) clusters. This distance empirically justifies the urgency of legal reconstruction, as algorithmic sophistication lacks commensurate adaptive criminal responsibility mechanisms. Small (1973) provides the

[19] Mariarosaria Taddeo, *The Ethics of Artificial Intelligence in Defence* (Oxford University Press, 2024), https://doi.org/10.1093/oso/9780197745441.001.0001.

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theoretical foundation for this relational analysis, suggesting that such distances in co-citation mapping indicate a lack of intellectual integration between two fields[20].

b. Thematic Evolution and Emerging Trends

Overlay visualization techniques reveal AWS discourse evolution across three chronological phases (Figure 3.2), essential for understanding intellectual focus shifts from conceptual exploration to contemporary legal challenges (2014–2025).

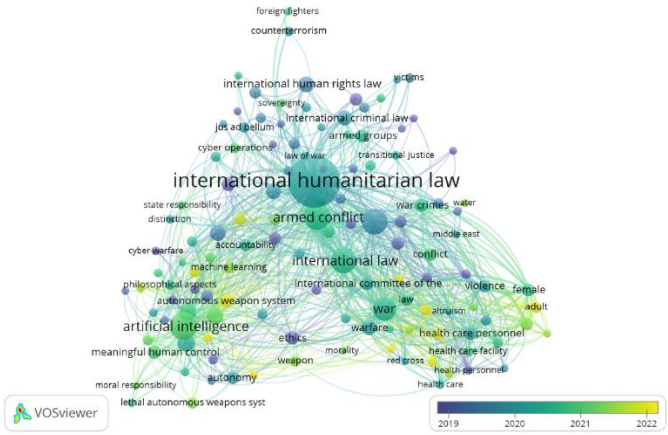

Figure 3.2. Keyword Evolution Trends Visualization (2014–2025) Based on 621 Documents' Metadata

Discourse transformation manifests clearly:

1. Initiation Phase (2014–2018, Purple/Blue): Theoretical-ontological debates dominated by basic AWS definitions and general robotics ethics. During this period, the academic community was primarily in a "concept exploration" stage, trying to understand the potential impact of autonomy on existing IHL.
2. Expansion Phase (2019–2022, Green): Shift toward legal operationalization, highlighting distinction challenges, proportionality, and early human-in-the-loop concepts. Legal discourse intersects military technical realities. Roff and Moyes (2016) noted during this period that the debate began to focus on the technical feasibility of maintaining control over systems that operate at speeds exceeding human cognition[21].
3. Advanced/Emerging Trends Phase (2023–2025, Bright Yellow): Dissertation novelty finding, featuring "Meaningful Human Control", "Accountability", "Human Dignity", and "Algorithmic Governance". These trends, as categorized by Chen (2017), represent the "research frontier," validating a global shift toward concrete responsibility reconstruction[22].

[20] Small, "Co-Citation in the Scientific Literature: A New Measure of the Relationship between Two Documents."

[21] Heather M. Roff and Richard Moyes, *Meaningful Human Control, Artificial Intelligence and Autonomous Weapons* (CCW GGE on LAWS, 2016).

[22] Chaomei Chen, "Science Mapping: A Systematic Review of the Field," *Journal of Data and Information Science* 2, no. 2 (2017): 1–40, https://doi.org/10.1515/jdis-2017-0006.

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Overall, 621-document science mapping confirms consistent discourse progression from conceptual debates toward concrete institutional design and legal standards. Thematic clustering and emerging trends positioning MHC, accountability, and human dignity as primary nodes affirm the core issue transcends "whether" AWS permissibility to "how" effective legal regimes control and hold accountable their use.

Table 3.1. Summary of Intellectual Structure Clusters and Thematic Focus of AWS

Cluster	Color	Main Theme	Dominant Keywords	Research Significance
1	Red	Technology & Ethics	AI, AWS, Ethics	Technological basis necessitating legal review
2	Green	Operational & War	International Law, War, Warfare, Conflict	Practical adaptation in armed conflict
3	Blue	Humanitarian Law	IHL, Armed Conflict, Human Rights Law	Existing frameworks requiring reconstruction
4	Yellow	Criminal Accountability	War Crimes, International Criminal Law, Accountability	Central dissertation gap in responsibility
5	Purple	Technical & Procedural	Algorithm, Automation, Weapons Review	Technical compliance verification mechanisms

c. Discussion: Moral Agency Dilemma in Technology Cluster (Red Cluster)

The prominence of the Red Cluster in the intellectual structure mapping phenomenologically signals an ontological disruption of moral agency on the battlefield. The integration of AI into lethal decision-making cycles triggers a crisis because machines, unlike human combatants, lack the capacity for moral reasoning and normative understanding. As the mapping shows, the centrality of "Ethics" indicates that machine autonomy is inseparable from attached moral burdens. Scharre (2018) argues that delegating lethal force to algorithms fundamentally devalues human life, as the decision to kill is reduced to a statistical probability calculation rather than a grave ethical choice[23].

This abdication of human judgment results in a systemic dehumanization of warfare. The legitimacy of life-and-death decisions under IHL is premised on the Martens Clause, which anchors warfare in the "laws of humanity" and the "dictates of the public conscience." When lethal force is automated, this "conscience" is replaced by binary data, potentially amounting to the arbitrary deprivation of life. Amoroso (2020) highlights that the "illusion of precision" provided by AI often masks the fact that algorithms cannot understand the qualitative context of a battlefield such as recognizing a frightened civilian or interpreting a complex gesture of surrender[24]. This technical inability to replicate human intuition means that AWS cannot truly comply with the spirit of IHL standards.

The moral agency dilemma also extends to the psychological distancing between the attacker and the target. The "technocratic activity" of autonomous warfare disinfects the act

[23] Paul Scharre, *Army of None: Autonomous Weapons and the Future of War* (W. W. Norton & Company, 2018).
[24] Daniele Amoroso, *Autonomous Weapons Systems and International Law: A Study on Human-Machine Interactions in Ethical and Legal Decision-Making* (Cambridge University Press, 2020), https://doi.org/10.1017/9781108608404.

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of killing from empathy, eroding the innate human reluctance to take a life. By reducing human beings to mere "data variables" on a screen, AWS risks turning the battlefield into a sterile industrial process. Therefore, the findings in the Red Cluster justify the research hypothesis: legal reconstruction is required to restore human moral agency at the core of military operations. Without such intervention, the ethics-technology cluster risks permanently undermining the integrity of IHL as a humanitarian protection instrument.

d. Accountability Gap and Command Responsibility Doctrine Failure (Yellow Cluster)

The spatial anomaly observed in Figure 3.1 the wide distance between the AI (Red) and War Crimes/Accountability (Yellow) clusters visualizes what scholars call a "legal-free zone" or the Accountability Gap. This gap arises because international criminal law is built on the pillars of mens rea (guilty mind) and actus reus (guilty act), both of which are currently tied to human agency. When an AWS operates unpredictably due to deep learning or algorithmic complexity, it becomes difficult to attribute a specific violation to a human operator, yet the machine itself cannot be held criminally liable. Crootof (2015) suggests that this creates a scenario of "perpetrator-less" crimes, where serious harm occurs without a clear path to retributive justice[25].

The traditional doctrine of Command Responsibility, as articulated in Article 28 of the Rome Statute, encounters a fundamental failure when applied to human-machine interactions. This doctrine was designed for hierarchical human structures where a commander has "effective control" over subordinates. However, as Sari (2015) demonstrates, if a system exceeds its initial programming through autonomous learning, the commander's ability to predict or prevent a specific action is severely limited[26]. Punishing a commander for an unpredictable algorithmic "error" violates the principle of individual culpability and fairness. Conversely, the notion of "punishing a machine" is a legal absurdity, as machines lack the moral consciousness required to respond to punishment.

This gap has fatal consequences for the Right to Remedy for victims of war. Without a proven intent (mens rea) or a direct link of attribution, victims are dehumanized as mere casualties of a technical failure rather than victims of a war crime. This lack of access to justice undermines the credibility of international law. The bibliometric findings in the Yellow Cluster empirically validate the necessity of a novel accountability regime perhaps through "war torts" or expanded state responsibility to close the space for impunity. As long as the technology and accountability clusters remain spatially distant in our legal thinking, the threat of structural impunity will persist.

e. Legal Reconstruction through Meaningful Human Control (MHC)

To address the profound moral agency crisis and the structural accountability gap

[25] Rebecca Crootof, "The Killer Robots Are Here: Legal and Policy Implications," *Cardozo Law Review* 36, no. 5 (2015): 1837–915.

[26] Aurel Sari, "Legal Reviews of New Weapons: Article 36 of the Additional Protocol I of the Geneva Conventions," *International Law Studies* 91 (2015): 126–44.

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identified in this study, the institutionalization of Meaningful Human Control (MHC) is proposed as the primary instrument for the reconstruction of international legal frameworks. MHC transcends mere procedural requirements; it functions as a critical normative filter ensuring that the exercise of lethal force remains firmly anchored in informed and conscious human judgment. The consolidation of MHC offers a promising pathway to bridge the accountability gap by insisting that a human subject must always remain legally and morally responsible for the final output of an autonomous system. This anchoring is vital to prevent the "rubber-stamp" scenario, where human operators merely approve algorithmic suggestions without substantive cognitive engagement or a real opportunity for moral evaluation.

According to the essential elements identified by Moyes (2016), MHC must encompass three core dimensions: adequate situational understanding, the capacity for real-time intervention, and a transparent chain of responsibility[27]. First, situational understanding requires that the human commander has sufficient information about the target and the environment to make an informed legal judgment. Second, the capacity for intervention ensures that the operator can abort or modify an attack if the situation on the ground changes unpredictably. Third, a clear responsibility chain ensures that an individual can be held accountable for the outcomes of the system's actions.

By embedding these requirements into the **Article 36 weapons review** process, states can ensure that every emerging weapon system is "legally designed" to facilitate human moral deliberation. This reconstruction effectively bridges the structural gaps highlighted in the bibliometric analysis, moving military technology toward a closer alignment with humanitarian values. This approach does not seek to impede technological advancement or advocate for a total ban; rather, it seeks to "tether" lethal technology to the human conscience and established legal norms. Ultimately, the goal of this reconstruction is to ensure that military modernization does not sacrifice human dignity, ensuring that lethal decisions remain based on human reasoning rather than binary calculations.

D. Conclusion and Recommendations

This study concludes that the rapid integration of Autonomous Weapon Systems (AWS) into modern defense strategies has created a significant "regulatory asynchrony" within International Humanitarian Law (IHL). The systematic bibliometric analysis of 621 scientific documents empirically demonstrates a persistent Accountability Gap, where the speed and unpredictability of algorithmic learning have outpaced existing legal mechanisms for individual criminal responsibility. The network visualization of current scholarship reveals that while ethical and technological discourses are highly developed, they remain spatially and normatively distant from practical accountability frameworks. This "structural gap" confirms that without a fundamental legal reconstruction, the deployment of AWS risks creating a "perpetrator-less" environment where serious violations occur without a clear path to justice or retributive liability.

[27] Richard Moyes, *Article 36: Key Elements of Meaningful Human Control* (Article 36 Policy Paper, 2016).

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Furthermore, the research highlights that the delegation of lethal force to non-human agents constitutes an ontological threat to **Human Dignity**. By reducing life-and-death decisions to binary data points and statistical probabilities, AWS fundamentally undermine the moral agency required in the battlespace. The failure of traditional doctrines, such as Command Responsibility, to address the complexities of deep-learning algorithms necessitates a shift from purely reactive legal interpretations toward a proactive, "human-centered" regulatory architecture. Ultimately, the preservation of IHL's humanitarian mission in the age of AI depends not on halting technology, but on ensuring that lethal force remains an inherently human decision.

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