Enforcement of Compensation Rights for Victims of Work Accidents in the Era of High Automation

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ABSTRACT

The transition of industry towards high automation reinforces the urgency of reconstructing the law on the settlement of compensation claims for victims of workplace accidents in manufacturing and service companies. This study examines the legal characteristics and practical obstacles in the settlement of claims based on a normative legal framework, supplemented by an analysis of the social security system, the implementation of occupational safety management systems, and the governance of electronic evidence. The findings show that labor regulations have protected workers' rights to compensation through the principle of no-fault liability and regulate the procedures for registration, reporting, and payment of Work Accident Insurance benefits. However, obstacles in the field arise due to administrative non-compliance, unpreparedness in identifying automation risks, vulnerability in digital data verification, and weak coordination of internal functions within companies. Claims procedures need to be adapted to technological demands, in terms of incident documentation, data management, and post-accident recovery. Normative solutions include membership audits, updating SMK3 standards, implementing electronic data retention, and strengthening transparent dispute resolution channels. The research results recommend the adaptation of regulations and legal literacy at all levels, so that workers' compensation rights remain guaranteed without hindering company innovation. Optimizing synergy between companies, workers, and regulators is key to driving the transformation of the labor law system in the era of digitalization and the 4.0 industrial revolution.

INTRODUCTION

The Fourth Industrial Revolution has brought about a wave of transformation that has not only changed the way we produce, but also reconfigured the relationship between technology, regulation, and social protection in the world of work. In Indonesia, the tide of digitalization and automation is growing stronger, driven by the need to increase competitiveness in the global market and respond to demands for efficiency and productivity. These changes have created a dynamic industrial landscape, where technological innovation goes hand in hand with new challenges in law enforcement, worker protection, and regulatory framework adjustments. Understanding these dynamics is important so that industrial transformation does not only pursue technical progress, but also ensures social sustainability and legal certainty for all stakeholders.

Industry in Indonesia is undergoing a major shift due to technological advances, particularly in the field of automation, which is one of the important milestones of the industrial revolution 4.0. Automation drives the efficiency and productivity of manufacturing and service companies, creating faster production processes and lower operating costs compared to conventional methods. This also provides opportunities for companies to compete more broadly in the global market. The application of technological strategies in product development is key to creating sustainable innovation (Mardikaningsih & Hariani, 2023). Although the production process has become increasingly integrated with technological sophistication, labor aspects remain an absolute priority in the national legal system. Law No. 13 of 2003 concerning

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Manpower remains the main legal basis, although it has undergone several revisions to adapt to the needs of the digital and automation era. The balance between protecting workers' rights and increasing company efficiency is one of the centers of attention in the discourse on labor law in Indonesia (Rabarijaona & Arifani, 2020).

The implementation of high automation directly affects the structure of labor relations and the distribution of occupational accident risks. Workplace accidents remain a possibility even though companies have implemented various control systems and automatic protective equipment. The dynamics of risk and the complexity of case handling in this digital era are similar to the challenges that arise in the field of digital health services, where technological advances also require a responsive regulatory framework to ensure user safety and protection (Sasmita et al., 2023). In highly automated environments, the causes of workplace accidents may differ from those in conventional systems, such as machine failure, programming errors, or digital device malfunctions, giving rise to demands for relevant compensation claims. Compensation for victims of workplace accidents is regulated in various regulations, including Law No. 24 of 2011 concerning BPJS and provisions in Government Regulation No. 44 of 2015, but in practice, adjustments to the claim settlement procedure are needed to keep pace with technological advances in companies. A clear and swift legal process is a requirement of rapid digital transformation so that the rights of victims are not neglected (Wiryawan & Bunga, 2020).

Challenges in settling compensation claims in highly automated companies arise due to the complexity between machine performance, labor intervention, and the burden of proof of the cause of accidents. On the one hand, companies argue that the system has been designed with maximum safety levels in accordance with SNI or ISO standards, but on the other hand, victims and their heirs demand full compensation for the consequences of accidents. The development of ethical and equitable technology, as examined in the approach to responsible technology development and application, emphasizes that technological systems must be designed with consideration for social implications and user protection, including in claim settlement and risk mitigation (Radjawane & Mardikaningsih, 2022). The dynamics of evidence and potential disputes in accident cases also arise in a broader context, such as the dissemination of information about accident victims in digital media, which requires serious attention to ethical and legal aspects to protect the dignity of victims (Muhammad et al., 2023). This complexity is exacerbated by the mechanism of documenting digital evidence, which can sometimes be ambiguous, thereby increasing the potential for disputes in legal forums and claim settlement institutions (Adhyne, 2022). Therefore, the legal reconstruction of compensation claim settlements requires an adaptive and accountable approach, without neglecting the essence of protection for victims of work accidents.

The compensation claim settlement process must always adapt to technological dynamics, both in terms of legal substance and administration. In terms of substance, legal norms need to be continuously reformulated to accommodate new mechanisms such as digital forensics, software auditing, and the use of big data in accident cause investigations. The use of big data as a new element in social life has opened up opportunities and challenges in various aspects of policy and regulation, including in the settlement of disputes that require complex data analysis (Wahyudi et al., 2021).

Similarly, administrative aspects related to evidence, digital document processing, and data synchronization between agencies have become crucial. This need is increasingly urgent, especially for multinational or large companies that have adopted ERP, SCADA, or IoT systems in their production lines, where the legal certainty of claim settlement depends on the quality of regulations and the accuracy of their implementation process.

The end result of all these developments is the hope for the creation of a progressive and responsive legal system for claim settlement. Business actors and workers want balanced, transparent and accessible protection, without excessive costs and complicated bureaucracy. In this way, the noble goal of labor law as the protection of workers' rights and a guarantee of justice can be achieved even in an era of high automation. This scientific work aims to comprehensively dissect the dynamics of the law in the settlement of compensation claims, linking modern business law theories and highlighting the direction of legal reform in the future.

The limitations of Indonesia's positive law regarding the details of the procedure for settling work accident compensation claims in highly automated companies have caused confusion among legal practitioners and workers. Not all national labor law instruments detail the procedures for adjusting systems in companies that have undergone digital transformation, resulting in gaps in interpretation that are prone to disputes

between workers, employers and state insurance institutions. Work accident compensation claims are often hampered by due diligence processes and limited investigative capacity in advanced technology industries.

In addition to normative aspects, the proceduralizing of compensation claims faces obstacles in practice due to the evolution of work structures. The shift from manual labor to automated machinery requires changes in the collection, analysis and validation of accident evidence. Conflicts often arise when victims or their families must prove system malfunctions or human error in complex automated production lines. This prolongs the dispute process and potentially delays the realization of workers' rights to compensation for occupational risks in highly automated environments.

Another issue that arises is the technology gap between companies and law enforcement or supervisory agencies. Not all prosecutors, judges, or mediators have the competence to analyses digital data and industrial device algorithms. This digital competence gap reflects a broader problem, where access to technology and digital skills are determining factors in creating equality in various fields, including the legal system and labor protection (Arifin & Darmawan, 2021). This has a significant impact on fair evidence-gathering processes and the production of effective legal decisions. If technological developments outpace legal certainty, the uncertainty surrounding the fate of workplace accident victims will increase amid the rise of Industry 4.0.

The stagnation of the development of compensation laws for victims of workplace accidents within the framework of industrial automation can lead to the risk of structural injustice. Failure to manage the legal and social implications of digital transformation can pose a risk to corporate reputation, which is a critical asset that must be maintained in today's information age (Darmawan et al., 2022). If regulations and legal practices are not immediately updated in line with the needs of the digital industry, opportunities for worker protection will narrow, and companies could face increased legal and reputational risks in the long term. Technological advances certainly encourage countries to reform regulations by considering the interests of workers as the main drivers of economic growth.

The widespread adoption of automation systems, artificial intelligence, and big data analytics in local and global companies presents new challenges for national business law. Digital transformation involving big data and artificial intelligence requires fundamental adjustments to the regulatory framework and accompanying legal protections (Putra & Arifin, 2021; Maulani et al., 2023). The transformative power of artificial intelligence in changing the industrial landscape, as reflected in its application in the health sector, also emphasizes the urgency of regulatory adaptation in various sectors to ensure adequate and equitable protection in the digital era (Khayru, 2022). Current research in the field of business law needs to provide a theoretical foundation as well as practical references for policymakers to strengthen the compensation system for victims of workplace accidents, ensuring that all workers' rights are protected within a legal framework that is fair and adaptive to the latest industrial revolution.

This study aims to systematically analyses the legal characteristics of compensation claims for victims of workplace accidents in highly automated companies, as well as to identify obstacles and implementable solutions based on all applicable regulations in Indonesia. The findings of this research are expected to enrich dispute resolution practices and contribute theoretically to the development of business law, as well as support efforts to reform national labor law policies.

RESEARCH METHOD

This study uses a normative legal approach, which focuses on systematic analysis of applicable legal principles and theories. This approach focuses on an in-depth study of legislation, official legal documents, scientific literature, and court decisions relevant to the mechanism for settling compensation claims for victims of workplace accidents in companies with a high degree of automation. A qualitative literature study was conducted through a systematic review of primary sources, including legal instruments such as Law No. 13 of 2003 concerning Manpower, Law No. 24 of 2011 concerning BPJS, Government Regulation No. 44 of 2015, as well as other technical regulations governing the occupational accident insurance and compensation system.

Secondary sources, such as law textbooks, accredited journal articles, and proceedings from legal seminars or conferences, are used to enrich the analysis and build a comprehensive thematic synthesis. The analysis process is carried out in stages, starting from the inventory of norms, identification of legal principles (such as no-fault liability and absolute liability), to tracing the development of jurisprudence and law enforcement

practices in similar fields. This normative approach using the literature study method has long been the methodological foundation of business and labor law research in Indonesia, due to its ability to unravel the contextual interrelationships between theory, norms, and legal implementation (Marzuki, 2010). Through this method, this study seeks to offer an analytical framework that can be used to evaluate and reconstruct labor compensation legal policies that are adaptive to the dynamics of industrial automation.

The literature search strategy was conducted in a structured manner using national and international legal databases. The search prioritized publications from the last two decades in accordance with the research inclusion criteria, namely sources that were empirically and theoretically relevant to the topic of compensation for work accidents and automation. Exclusion criteria included sources with unclear citation histories, retracted sources, and popular literature that lacked scientific validity. The documents used were verified by ensuring the DOI for journals and ISBN for books, maintaining data precision and integrity. Official government websites and major academic publishers were prioritized to reduce potential information bias.

Data analysis was carried out through manual coding, in which central themes and sub-themes were compiled using a thematic matrix tool. Each finding was reviewed triangularine by the author and research assistants to ensure objectivity in content classification. Validation is carried out by comparing legal interpretations between sources and adjusting findings to trends in practice in the field. The author also ensures quality assurance by cross-checking the content against the documents reviewed and consulting with supervisors or colleagues in the field of business law on methodology (Soekanto & Mamudji, 2011).

RESULT AND DISCUSSION

Characteristics of Compensation Claim Settlement Law in Highly Automated Companies

Legal protection against workplace accidents requires a framework that is capable of responding to the dynamics of modern industrial risks, including automation and smart technology. The legal characteristics of compensation claims for victims of workplace accidents in Indonesia are based on the concepts of social security, occupational safety and health (OSH) obligations, and comprehensive corporate governance. In highly automated companies, the legal framework requires more detailed adjustments to technological risks without reducing workers' fundamental rights to compensation. The national social security system through Law No. 40 of 2004 concerning the National Social Security System (SJSN) and Law No. 24 of 2011 concerning BPJS Ketenagakerjaan (Employment Social Security) clearly stipulates workers' rights: victims of work accidents are entitled to social protection based on the principle of no-fault liability. The labor social security programmed was created and implemented as an effort to protect workers in a company with a significant impact and benefits, which are intended not only for workers but also for companies (Febiola & Sitabuana, 2022). In this system, compensation rights can be obtained without having to prove the company's fault, which is relevant in accidents caused by automatic machine failure, software malfunction, or human error in the operation of production lines. Improving worker protection is a vehicle that must be created for every individual, especially workers, whether they are employed directly or indirectly (Nurchayo, 2020). All workers must be registered as BPJS participants by the company, including operators, technicians, and support personnel, so that all claims are procedurally valid (Ansyori & Khakim, 2023). The effectiveness of the compensation scheme is highly dependent on the company's compliance in ensuring social security participation and ensuring that every worker receives protection without procedural obstacles.

Workplace safety protection is a fundamental principle that must be upheld as automation technology increasingly dominates the production process. Workers have the right to workplace safety protection so that nothing happens that could harm employers or workers (Mokoginta, 2022). Law No. 13 of 2003 concerning Manpower in conjunction with Law No. 11 of 2020 outlines legal certainty of protection for workers across all levels of technology. Article 86 requires every employer to implement an OSH system that is adaptive to developments in automation: technology-based hazard identification, risk assessment, control, and worker training must be standard practice. In the event of a workplace accident, companies are obliged to facilitate full compensation rights and are prohibited from arbitrarily terminating the employment of victims. The Job Creation Law even emphasizes that the right to compensation must still be respected even if restructuring occurs due to automation (Hermawan et al., 2022). The continuity of employment relationships in the era of automation is largely determined by companies' compliance in guaranteeing compensation rights and implementing adaptive OSH for all workers.

Strong occupational safety standards are the main foundation for dealing with increased operational risks due to industrial automation. Meanwhile, Law No. 1 of 1970 on Occupational Safety establishes the basis for all OSH management, requiring companies to provide prevention systems, regular training, and supervision of the implementation of safety standards, including the securing of automatic machines, the use of sensors, and periodic technical audits. Failure to comply with these requirements does not prevent workers from filing Work Accident Insurance (JKK) claims, but it may result in additional penalties ranging from administrative sanctions to civil lawsuits (Angie, 2023). The affirmation of these obligations proves that safety standards are non-negotiable legal parameters. This regulatory strictness serves as an instrument to ensure companies do not neglect worker protection in the automation process. Compliance with OSH obligations is an absolute requirement to guarantee worker protection and prevent corporate negligence amid technological developments.

The occupational accident compensation scheme requires a mechanism that can guarantee the recovery of workers without administrative obstacles, including in an increasingly automated production environment. Work Accident Insurance (JKK) is a benefit in the form of cash or health services provided when programmed users experience an illness or work accident caused by the environment in which they work (Afrianita & Eriyanti, 2021). Government Regulation No. 44 of 2015 details the benefits of the JKK programmed, such as medical care, temporary or permanent compensation, death benefits, rehabilitation, and return-to-work programmers, which are the absolute rights of victims. Participants in the Work Accident Insurance (JKK) programmed who experience a work accident or occupational illness are entitled to benefits from this programmed (Helweldery, 1019). The claim submission procedure is structural and administrative, carried out by filling out a BPJS form with requirements such as proof of membership, accident reports, and medical information. In automation companies, additional documents such as machine logs, sensor data audits, or CCTV recordings are required to strengthen claim verification. If a company neglects its obligation to register its workers, all benefits and compensation costs must be borne directly by the company (Agus, 2023). This provision shows that the principle of employer responsibility applies without exception. Enforcement of these rules prevents workers from losing their compensation rights due to administrative negligence on the part of the company. The success of JKK protection is largely determined by the company's compliance in fulfilling its membership obligations and ensuring that every claim is processed legally, accurately, and without harming workers.

Structured work accident reporting arrangements are an important element in ensuring that every incident is handled quickly and accurately in an increasingly automated work environment. In line with this, Minister of Manpower Regulation No. 26 of 2015 clarifies the reporting procedure—companies are required to report incidents to BPJS and labor agencies within a maximum of 2 x 24 hours after the incident, and to supplement the report with a thorough technical investigation of the automation system so that claim verification can proceed without administrative obstacles. Companies are also obliged to provide full support to workers for the claims process, from providing documents and training to access to rehabilitation. The strict reporting deadline ensures that every accident is accurately recorded and can be followed up immediately. The affirmation of administrative support obligations demonstrates that the company's responsibilities cover both technical aspects and worker empowerment. The effectiveness of worker protection is highly dependent on the company's compliance with reporting and administrative support obligations, which ensure that the claims process runs smoothly and is responsive to the needs of victims.

Consumer protection also plays an important role when workplace accidents are caused by technological defects in the production environment. Law No. 8 of 1999 on Consumer Protection, although not specifically regulating employment, is relevant in cases of accidents caused by technological defects where workers are entitled to safety when using products or automatic machines produced by the company. If losses occur due to technological defects, additional liability based on the principle of unlawful acts may be imposed on the company. This provision reinforces the guarantee that workers are not burdened with the risks of internal product failures. The rule ensures that the burden of technological defects is not shifted to the most vulnerable parties. Any internal product failure remains the responsibility of the company, so that workers are protected from risks that they should not bear.

The accountability of corporate bodies is a key element in ensuring that digital transformation does not reduce worker protection. Law No. 40 of 2007 on Limited Liability Companies requires all directors and commissioners to fulfil their duty of care and

duty of loyalty in overseeing the implementation of workers' rights and social security programmers, including in high automation. Any failure to meet technological OSH standards may result in corporate and personal legal liability. Affirming the responsibility of corporate bodies strengthens overall corporate governance accountability. The existence of potential sanctions against company management provides a legal incentive to ensure that safety standards are not neglected in the process of operational digitalization. The effectiveness of corporate governance is largely determined by management's compliance with safety standards and fulfilment of legal obligations amid operational automation.

The application of automation technology in modern industry requires a compensation scheme that can guarantee worker protection without reducing legal certainty. The legal characteristics of compensation claims in highly automated companies encompass the principle of no-fault liability without the need to prove fault, the balanced fulfilment of administrative and technical obligations, and claim procedures that use electronic files and automated data audits as primary evidence. In dispute resolution in the digital realm, a restorative approach that aims to restore the situation without neglecting the principle of justice has become an important concern, as reflected in the normative analysis of case resolution in the digital space (Rianto et al., 2023). The protection of workers' rights to rehabilitation and return-to-work programmers affirms the state's commitment to worker safety and security, while administrative, civil and criminal sanctions are in place to ensure corporate compliance. The entire legal system in Indonesia requires companies not only to adopt the most advanced technology, but also to simultaneously strengthen legal governance, from registration systems, claim procedures, timely reporting, to the provision of effective compensation and rehabilitation so that victims of work accidents continue to receive their rights fairly and with dignity in the era of automation. The effectiveness of workplace accident protection is highly dependent on consistent legal governance that ensures every worker receives fair compensation and recovery amid the acceleration of automation.

The transformation towards automation requires a legal framework that ensures innovation continues to priorities worker safety and dignity. The evolution of companies towards high automation requires harmony between technology and the legal framework so that the compensation process does not lose its core protective function. The principle of no-fault liability, the use of electronic evidence, and the strengthening of rehabilitation mechanisms affirm that the law serves as a guardian of workers' dignity, even when the structure of work is supported by machines and algorithms. The implementation of regulations is not merely an administrative obligation, but part of a safety design that maintains a balance between production efficiency and human safety. When companies understand this relationship, the use of technology moves from mere modernization to a protective instrument that reinforces the values of justice in industrial relations. The integration of technology and regulation is only meaningful if both are directed towards ensuring consistent justice and protection in modern industrial relations.

Compensation management amid automation requires companies to be consistent in maintaining transparency and safety standards in every digital process. In the next stage, the success of compensation schemes in the era of automation will be determined by companies' ability to ensure that digital innovation does not obscure transparency, accountability, and safety standards. The regulations that have been formulated provide guidelines so that every use of an automated system can be accounted for through electronic documentation, safety audits, and easily accessible and traceable claims procedures. Thus, technological developments can be directed to expand legal certainty, shorten claim settlement times, and strengthen worker rehabilitation guarantees. The end goal of all these efforts is to create a safe, fair, and human-oriented work environment, so that companies can progress productively without sacrificing the protection of their workers. The direction of industrial modernization can only be accepted if all innovations remain grounded in worker protection and the fulfilment of humanitarian principles in labor relations.

Obstacles and Solutions in the Implementation of Compensation Claims for Work Accident Victims in Highly Automated Companies

The settlement of workplace accident claims in highly automated environments requires integration between social security regulations and increasingly complex technology governance. The implementation of compensation claim settlements for victims of workplace accidents in companies with highly automated processes operates at the intersection of occupational social security obligations, occupational health and safety (OHS) standards, electronic evidence governance, and workers' rights in industrial relations. Normatively, the right to compensation through Work Accident

Insurance (JKK) is "no-fault" within the framework of the National Social Security System; however, in practice, automation technology presents specific obstacles such as administrative non-compliance, technical documentation gaps, the quality of data-based incident evidence, and immature cross-functional coordination. The solution is drawn directly from applicable legislation: strengthening JKK participation and claim procedures, adjusting SMK3 for automation risks, accountable electronic evidence management, and clear dispute resolution routes when claims intersect with OSH violations or employment relations (Akhwil, 2023). The effectiveness of compensation can only be achieved if companies are able to ensure administrative compliance, the accuracy of electronic evidence, and dispute resolution mechanisms that are in line with developments in automation.

Administrative certainty is the main foundation in ensuring the effectiveness of JKK claims, especially when companies face the complexity of labor management in the era of automation. The most fundamental obstacles are non-compliance or delays in registering workers for the BPJS Employment JKK programmed, irregularities in contribution payments, and negligence in reporting accidents within the time limit. Law No. 40 of 2004 concerning SJSN and Law No. 24 of 2011 concerning BPJS require employers to register all workers and pay contributions in an orderly manner. When membership is incomplete, Government Regulation No. 44 of 2015 concerning the Implementation of the JKK and JKM Programmed, which was later enhanced through Government Regulation No. 82 of 2019, places the burden of compensation on companies to cover benefits equivalent to JKK. At the claim stage, other obstacles arise in the form of missing documents such as medical certificates and accident reports, or delays in reporting to BPJS and the labor office, which, according to Minister of Manpower Regulation No. 26 of 2015, must be done immediately and usually within 2 x 24 hours. Administrative solutions include periodic membership audits, contribution reconciliation, establishing an SLA for accident reporting, and appointing a BPJS liaison officer within the company; as well as implementing a standardized list of mandatory claim documents integrated with the HRIS system (Indayatun & Riswadi, 2022). The success of fulfilling compensation rights is highly dependent on the company's discipline in maintaining membership, orderly reporting, and complete documentation as part of accountable governance.

The development of automation requires a more precise approach to safety because the risk patterns are no longer manual but integrated with mechanical and digital systems. High automation shifts the hazard profile from manual work to mechanical and systemic risks: human-robot interaction, energy lockout, interlock failure, safety sensors that do not function optimally, and maintenance modes that expose workers to hazards. Law No. 1 of 1970 on Occupational Safety requires employers to prevent and control accidents; Government Regulation No. 50 of 2012 on the Implementation of the Occupational Safety and Health Management System (SMK3) requires hazard identification, risk assessment (HIRADC), technical-administrative controls, and periodic audits. In relation to automation, these obligations must be supplemented with technical standards for safe practices such as lockout/tagout, safety function validation, hazard zoning, controlled access, and collaborative human-robot work procedures. Common obstacles include a lack of operator and technician competence in automated systems, SOPs that are not specific to operating and maintenance modes, and a lack of simulations and drills for system failure scenarios. The normative solution is to update SMK3 documents to explicitly cover automation risks, certify specific OHS competencies in machinery/robotics, conduct documented periodic inspections, and implement a "permit to work" programmed for risky activities such as bypassing interlocks or live system maintenance (Zulfita & Syarvina, 2022). The effectiveness of hazard control in automation can only be achieved through the updating of OHS standards, the improvement of technical competencies, and the implementation of consistent and documented safe work procedures.

The changing landscape of evidence in automation requires companies to ensure that all operational data is accurately recorded and accountable. In highly automated companies, the core of claim verification shifts to electronic evidence: machine logs, CCTV recordings, sensor data, and system metadata. When systems do not record correctly or data integrity is not maintained, claims can be hampered by difficulties in linking incidents to the time, place, and operating status of the machine. Law No. 11 of 2008 concerning Electronic Information and Transactions in conjunction with Law No. 19 of 2016 recognizes electronic information as valid evidence; Government Regulation No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions requires electronic system operators to ensure security, integrity, availability, and audit trails. The obstacles are a lack of data

retention governance, weak access control, and the absence of evidence preservation procedures after an incident. The solution is to establish an electronic evidence governance policy: a retention policy in line with the needs of proving claims, role-based access controls to prevent data manipulation, immediate "legal hold" procedures after an incident, and integration of accident reporting with validated log extraction. The success of claim verification is highly dependent on disciplined electronic evidence management that maintains data integrity and ensures an effective evidence process.

The interaction between social security schemes and civil liability requires clear boundaries so that worker protection is not fragmented. JKK is no-fault in nature, but accidents related to K3 negligence can give rise to civil claims on the basis of unlawful acts for residual losses not covered by JKK benefits. Law No. 13 of 2003 on Manpower in conjunction with Law No. 6 of 2023 (enactment of the Job Creation Perpu) affirms the right to occupational safety and health and prohibits actions that harm workers; Law No. 8 of 1999 on Consumer Protection can be used as a substantive reference if the accident is related to product/machine defects. The obstacles are the unclear boundaries between JKK benefits and civil compensation claims, as well as the potential for overlapping forums. The normative solution is to conduct a comprehensive and documented OSH investigation, separate the JKK process from potential civil claims, and use the industrial relations dispute resolution mechanism based on Law No. 2 of 2004 (PPHI) if the dispute concerns rights and obligations in employment relationships, while opening general civil channels for losses outside the scope of JKK. Legal certainty can only be achieved by separating the JKK compensation process from civil lawsuit mechanisms, so that workers' rights remain fully protected without overlapping forums.

The effectiveness of claim resolution is highly dependent on cross-functional coordination that can ensure that all legal obligations are carried out consistently. Slow claims often stem from ineffective coordination between the OHS, HR, legal, operational, and IT units. Law No. 40 of 2007 on Limited Liability Companies places a duty of care and duty of loyalty on directors and commissioners to ensure compliance with OHS and social security regulations, including adequate budgeting and supervision. Another obstacle is the absence of three clear lines of defense for accident and claim risks: controls in the operations unit, compliance/risk functions, and internal audit. The normative solution is to establish structured governance: an OSH/Risk Management committee charter that oversees SMK3 readiness and the claims process, JKK compliance KPIs and incident reporting, as well as internal audits of BPJS registration compliance, claims reporting, and the effectiveness of corrective actions. The obligation to report incidents and claims to the board of commissioners on a regular basis strengthens managerial accountability. Structured and accountable governance is a key prerequisite for expediting the claims process and maintaining company compliance with safety and social security standards.

Post-accident recovery in an automated environment requires rapid medical response and rehabilitation so that the benefits of Work Accident Insurance (JKK) can be optimally received. In practice, delays in medical treatment and rehabilitation hinder the realization of JKK benefits, particularly temporary compensation for inability to work and return-to-work programmers. The quality of service and coordination in the health referral system are determining factors in the satisfaction and effectiveness of treatment, as studies show the importance of analyzing patient satisfaction with the quality of service in the health insurance system (Darmawan et al., 2022). Government Regulation No. 44 of 2015 and Government Regulation No. 82 of 2019 regulate medical benefits, compensation, and the strengthening of return-to-work programmers. The obstacles that arise are the lack of a network of health facilities familiar with JKK procedures, minimal rehabilitation coordination, and unclear post-injury work adaptation in the automation line. The normative solution is the designation of referral health facilities integrated with BPJS, return-to-work SOPs that include work ability assessments, workplace modifications and assistive devices, and documentation of adaptation decisions with adequate safety tests for automated environments. The effectiveness of return-to-work programmers can only be achieved through an integrated healthcare network, solid rehabilitation coordination, and documented work adaptation with clear safety standards.

Accident prevention in automated environments requires adequate understanding of technological risks and compliance with safety procedures at every level of work. Accidents are often triggered by a lack of technological risk literacy, a culture of bypassing safety for productivity, or indiscipline in following work permits. The importance of building a strong OSH culture has been emphasized in research showing that strengthening occupational safety and health culture contributes to shaping safe behavior and increasing organizational accountability

(Djaelani et al., 2021). Law No. 1 of 1970 and Government Regulation No. 50 of 2012 require relevant OSH training and safety culture development. These obstacles are overcome with a training curriculum specific to human-machine interaction, failure scenario simulations, permit-to-work discipline coaching, and safe and non-retaliatory hazard (near miss) reporting mechanisms. Procedure-based discipline enforcement and training records serve as proof of compliance, facilitating claim verification while reducing incidents. A disciplined and documented safety culture is key to reducing incidents while ensuring claims processes run smoothly and accountably.

The use of electronic evidence in claim verification requires a careful balance between the need for proof and the obligation to protect personal data. The management of electronic evidence often intersects with employees' personal data. Law No. 27 of 2022 on Personal Data Protection requires a legal basis for processing, specific purposes, data minimization, security, and the rights of data subjects to access and correct their data. The obstacle that arises is the conflict between the need to prove claims and the limits of data protection. The normative solution is to establish a processing basis based on the company's legal obligation to report accidents and claims, conduct a Data Protection Impact Assessment on incident processes, and implement access controls and selective anonymization when data is shared across functions or with external parties, while ensuring that workers' rights to information and objection are fulfilled without hindering reporting obligations. Legal certainty can only be maintained if incident data management is carried out proportionally, securely, and with respect for workers' rights without hindering the claims process.

Workers' lack of understanding of dispute resolution channels often renders the claims remediation process ineffective. When claims are rejected or benefits are disputed, workers often do not understand the remediation route. Law No. 2 of 2004 concerning Industrial Relations Dispute Resolution provides bipartite channels, mediation/conciliation, and litigation in the Industrial Relations Court for rights disputes. For losses outside the scope of JKK due to K3 negligence, general civil channels are available. The normative solution is transparency regarding the reasons for claim rejection, the provision of written channels for objections, assistance for workers in mediation, and complete documentation of OSH investigations that meet the standards of proof. When systemic violations are found, labor inspectors have the authority to impose administrative sanctions based on the Manpower Law and its derivative regulations; companies are required to take corrective action and report the results. Certainty in claim resolution can only be achieved if companies provide transparent objection mechanisms, adequate assistance, and investigation documentation that meets legal standards so that workers' rights are fully protected.

The effectiveness of claim settlement in a highly automated environment requires integration between social security regulations, safety standards, and accountable technology governance. Barriers to the implementation of compensation claims in highly automated companies stem from JKK administrative compliance, SMK3 readiness for technology, electronic evidence accountability, synchronization between social benefits and civil liability, and governance that ensures cross-functional coordination. Indonesian regulations provide explicit solutions: JKK registration and claim procedures as stipulated in the SJSN Law, BPJS Law, PP 44/2015 jo. PP 82/2019, and Permenaker 26/2015 which regulates structural compensation standards; the implementation of SMK3 that is adaptive to automation through Law 1/1970 and PP 50/2012, which require a risk control system; the management of valid and secure electronic evidence as regulated by the ITE Law and PP 71/2019 to ensure forensic validity; the protection of workers' rights and dispute resolution routes in the Manpower Law in conjunction with Law No. 6/2023 and Law No. 2/2004, which provide dispute resolution mechanisms; and the protection of personal data through Law No. 27/2022, which regulates the limits of processing employee information. By linking operational solutions to each of these norms, companies can accelerate and streamline claim resolution while reducing the frequency of incidents, making automation a catalyst for improving worker protection. The integration of technology-based procedures into SMK3 provides room for early detection of system failures. Strengthening internal audits clarifies the line of accountability for stakeholders. Optimizing electronic reporting improves the precision of risk assessment. Affirming evidence verification standards strengthens the legitimacy of claim decisions. Aligning compensation flows with regulatory standards reinforces the consistency of worker protection. Consistent application of legal norms and integration of technology-based procedures are the main foundations for ensuring that compensation is fast, accurate, and in line with the principles of worker protection.

Optimizing compensation claims in an automated environment requires comprehensive adjustments to the procedures and systems that support worker protection. The successful implementation of compensation claims in highly automated companies is greatly influenced by the organization's ability to reorganize administrative procedures, safety structures, and digital governance to align with the applicable legal framework. Each of the regulations mentioned above forms a strong foundation to ensure that the compensation process is structured, measurable, and oriented towards legal certainty. Technological transformation provides opportunities for companies to reduce administrative errors, improve the quality of evidence, and reinforce the responsibilities of authorities, so that the entire claim settlement process can be faster and more effective. Harmonization between technology and regulations is key to ensuring that the compensation process is efficient, accurate, and consistent with the principle of legal protection for workers.

The integration of regulations with automation requires companies to ensure that every innovation remains grounded in the principle of worker protection. Ultimately, companies that integrate regulatory provisions with automation systems in a disciplined manner will be able to build a more stable worker protection ecosystem. This firmness in guaranteeing worker protection and welfare is becoming increasingly relevant amid changes in the modern work landscape that demand policy adjustments to ensure labor market stability and workers' rights (Ishaq & Darmawan, 2021). The implementation of compensation claims does not merely serve as a recovery instrument, but as a strategy to strengthen the culture of safety and transparency within the organization. With consistent commitment to legal standards and operational procedures, companies can utilize automation to establish accurate, fair, and sustainable compensation processes, while reinforcing the position of workers as subjects who deserve optimal protection in the changing industrial landscape. The success of industrial transformation is only meaningful if automation is used to strengthen fairness, accuracy, and sustainability in fulfilling workers' compensation rights.

Looking ahead, a holistic approach that combines regulatory compliance, technological innovation, and a commitment to worker welfare must be the foundation of national industrial policy. The government needs to proactively formulate adaptive technical guidelines and operational standards that can accommodate the complexity of automation systems without eroding workers' basic rights. On the other hand, companies are required to view automation not only as a tool for efficiency but also as a social responsibility to create a safe and equitable working environment. Collaboration between stakeholders, ranging from policy makers, industry players, labor unions, to academics, will be key in shaping a responsive legal and technical ecosystem. Thus, industrial transformation can go hand in hand with social protection, ensuring that technological advances bring inclusive benefits to all parties, especially workers as the most important asset in the production process.

CONCLUSION

The settlement of compensation claims for victims of workplace accidents in highly automated companies requires an adaptive and integrated legal response. The national legal framework provides workers with protection rights and compensation mechanisms based on the principle of no-fault liability, supported by occupational health and safety governance that keeps pace with developments in industrial technology. However, the practice of settling claims in technologically advanced work environments faces administrative, technical, digital evidence, and internal function synchronization challenges that require simultaneous normative and operational solutions. The balance between workers' compensation rights and the application of technological innovation can only be maintained if all actors, from regulators and companies to workers, are committed to disciplined enforcement of regulations and priorities certainty and fairness. The dynamics of the law on the settlement of work accident compensation claims in highly automated companies have strategic implications for the development of national labor law. Regulatory adaptation is a must to close various gaps in evidence and procedures amid the penetration of digital technology and industrial automation. The success of claim settlements is not only measured by administrative smoothness, but also by the existence of electronic evidence governance standards, the strengthening of technology-based OSH management systems, and remediation procedures that guarantee legal certainty and fairness. Another implication is that companies need to actively support legal and technological literacy in the workplace so that the convergence between digital transformation and the fulfilment of workers' rights can be realized harmoniously. Companies are advised to continuously update their claim

registration, reporting, and management systems by integrating digital innovations, risk-based internal audits, and continuous training in technological safety. The government and relevant institutions should accelerate the process of regulatory harmonization to be more responsive to the automation environment, while strengthening supervision of implementation in the field. Workers need to be continuously empowered through technology-based compensation education, so that a culture of rights awareness, reporting discipline, and active participation is built to support workplace safety in the new era. Cross-sector collaboration is essential to ensure that worker protection remains a top priority amid the transition to the industry of the future.

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