

Comparative Analysis of OHS Professional Certification Systems: A Scoping Review

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ABSTRACT

As Occupational Health and Safety (OHS) evolves into a sophisticated discipline, standardizing professional recognition is critical. This scoping review maps certification mechanisms and governance models to identify effective system components. A scoping review following Arksey and O'Malley's framework was conducted. Three databases (Scopus, Web of Science, CINAHL) and grey literature sources were searched in March 2026. Data were extracted and synthesized using narrative thematic analysis. Analyzing 30 sources from 1976 to 2024, we identify four governance models and a shift toward capability-based frameworks. Results indicate that effective systems utilize independent examinations and two-tier structures, whereas reliance on short-duration training or portfolio assessment risks limited professional capability. The review suggests that robust professionalization requires aligning education, examination, and governance, suggesting developing nations adopt rigorous, standardized assessment to ensure workforce capability.

I. Introduction

Occupational health and safety (OHS) have evolved from a compliance-driven function into a discipline requiring specialized knowledge, skills, and professional judgment. Over the past half-century, the number of people working in advisory and regulatory OHS roles has increased dramatically across government, industry, healthcare, and transportation sectors (A. R. Hale et al., 2020). The International Labour Organization estimates that approximately 2.78 million work-related deaths occur annually globally, with the majority attributable to occupational diseases (International Labour Organization, 2019). This burden has driven demand for qualified OHS professionals capable of preventing harm through systematic approaches to risk management.

Despite this global need, the professional recognition of OHS practitioners remains uneven. The concept of "professional status" carries specific criteria: a defined knowledge base, a formal ethical code, an organized professional association, accredited education programs, certification or formal recognition mechanisms, legal recognition, societal recognition, and continuing professional development (CPD) systems (A. R. Hale et al., 2020; Paul et al., 2016; Pryor, 2019). Certification, the formal validation of competence is a central pillar, yet its implementation varies dramatically across jurisdictions (Bohalteanu, 2019; Paul et al., 2016; Pryor, 2019).

Substantial variation exists in how countries approach OHS certification. In China, the state-administered Certified Safety Engineer system, established in 2002, mandates examination for legal practice (B. Wang et al., 2019). The Netherlands requires Higher-level safety expert (HVK) certification by law since 1999 (Swuste et al., 2019). In contrast, the United States' Certified Safety Professional (CSP) certification, administered by the Board of Certified Safety Professionals since 1969, operates as a voluntary market-driven credential (Hudson & Ramsay, 2019), as does Canada's on Canadian Registered Safety Professional (CRSP) certification (Wright et al., 2019). A significant milestone was the 2017 Singapore Accord, where 53 organizations from 10 countries endorsed the INSHPO Global Framework for OHS Professional Practice, articulating two distinct roles, the OHS Professional and the OHS



Practitioner representing the first international consensus on OHS roles and capabilities (INSHPO (International Network of Safety and Health Practitioner Organisations), 2017).

However, a knowledge gap persists: while the literature extensively documents the transition of developed nations toward capability-based certification, it has not systematically evaluated how these models apply to countries with fragmented or training-dependent systems. This gap is particularly acute for nations such as Indonesia, where the "Ahli K3 Umum" system relies on condensed, two-week training cycles, a model that fundamentally distinguishes itself from the psychometrically validated examination systems in the USA, UK, Australia, and Canada. The urgency of this inquiry is compounded by the rapid industrialization of Southeast Asia and the corresponding need for competent OHS professionals to manage increasingly complex workplace risks. In the absence of evidence-based guidance, developing nations risk consolidating certification models that prioritize accessibility over the demonstration of competence. Consequently, this study aims to address: How are safety professionals certified and recognized across different countries, and what are the key components of their certification processes, professional development pathways, and governance structures?

II. Methods

Since the goal of this review is to map the existing literature regarding the certification, recognition, and professional evolution of safety professionals across different global contexts, a scoping review was conducted. The scoping review method is distinct from systematic reviews in that it gathers, summarizes, and contextualizes significant concepts and research types to identify knowledge gaps and clarify key definitions. As a review that maps qualitative and conceptual literature across regulatory, educational, and professional domains, this study uses a qualitative narrative synthesis approach. This study followed the five-stage framework for scoping reviews established by Arksey & O'Malley (2005): (1) identifying the research question; (2) identifying relevant studies; (3) study selection; (4) charting the data; and (5) collating, summarizing, and reporting the results.

Identifying the research question

This scoping review aims to answer the following primary research question:

How are safety professionals certified and recognized in different countries, and what are the key components of their certification processes, professional development, and evolution?

Identifying relevant studies

To identify relevant sources of information, a comprehensive search strategy was adopted involving electronic databases and grey literature sources. The search strategy was constructed using a Population-Concept-Context (PCC) framework to ensure the capture of all pertinent literature regarding the professionalization of Occupational Safety and Health (OSH).

Electronic databases

A systematic search of three electronic databases—Scopus, Web of Science (WOS), and CINAHL was conducted in March 2026. The search syntax combined terms for the target population (e.g., "Safety Professional," "OHS Practitioner") with concepts of certification and professional evolution (e.g., "certification," "accreditation," "licensure," "professionalization"). Boolean operators (AND, OR) were used to refine the results. The detailed search equations employed for this review are available in Supplementary Material – Appendix 1. The initial search yielded 242 records. Duplicates were removed, leaving 222 records for screening.

Grey literature and supplementary sources

Recognizing that regulatory frameworks and certification standards are often disseminated outside academic journals, grey literature was sought. This included policy documents, white papers, and reports from recognized professional bodies such as the Board of Certified Safety Professionals (BCSP), the Institution of Occupational Safety and Health (IOSH), and the International Labour Organization

(ILO). Additionally, reference lists of selected articles were hand-searched to identify relevant studies missed by the database queries.

The selection of studies

Inclusion and exclusion criteria were established a priori to guide the selection process. Studies were included if they addressed the certification, recognition, or professional evolution of generalist OHS professionals (e.g., Safety Engineers, Health and Safety Officers) within a specific country or through a comparative lens. Both empirical studies and theoretical or conceptual papers were considered. To capture the historical evolution of the profession, no temporal restriction was applied to the publication date; however, the review prioritized English-language sources due to resource constraints. Documents were excluded if they focused solely on medical professionals (e.g., occupational physicians), non-OHS generalists, or technical safety training without a link to professional certification or statutory recognition. Additionally, opinion pieces and news articles lacking empirical or theoretical data were excluded.

The screening process followed the PRISMA flow diagram (Fig. 1). From the 222 records screened, 185 were excluded based on title and abstract relevance. The full texts of the remaining 37 articles were assessed for eligibility. Of these, 11 were excluded (4 due to unavailability of full text and 7 for not meeting inclusion criteria), resulting in a final yield of 26 studies. Additionally, 4 grey literature documents were included based on identification thorough other sources, bringing the total number of sources to 30.

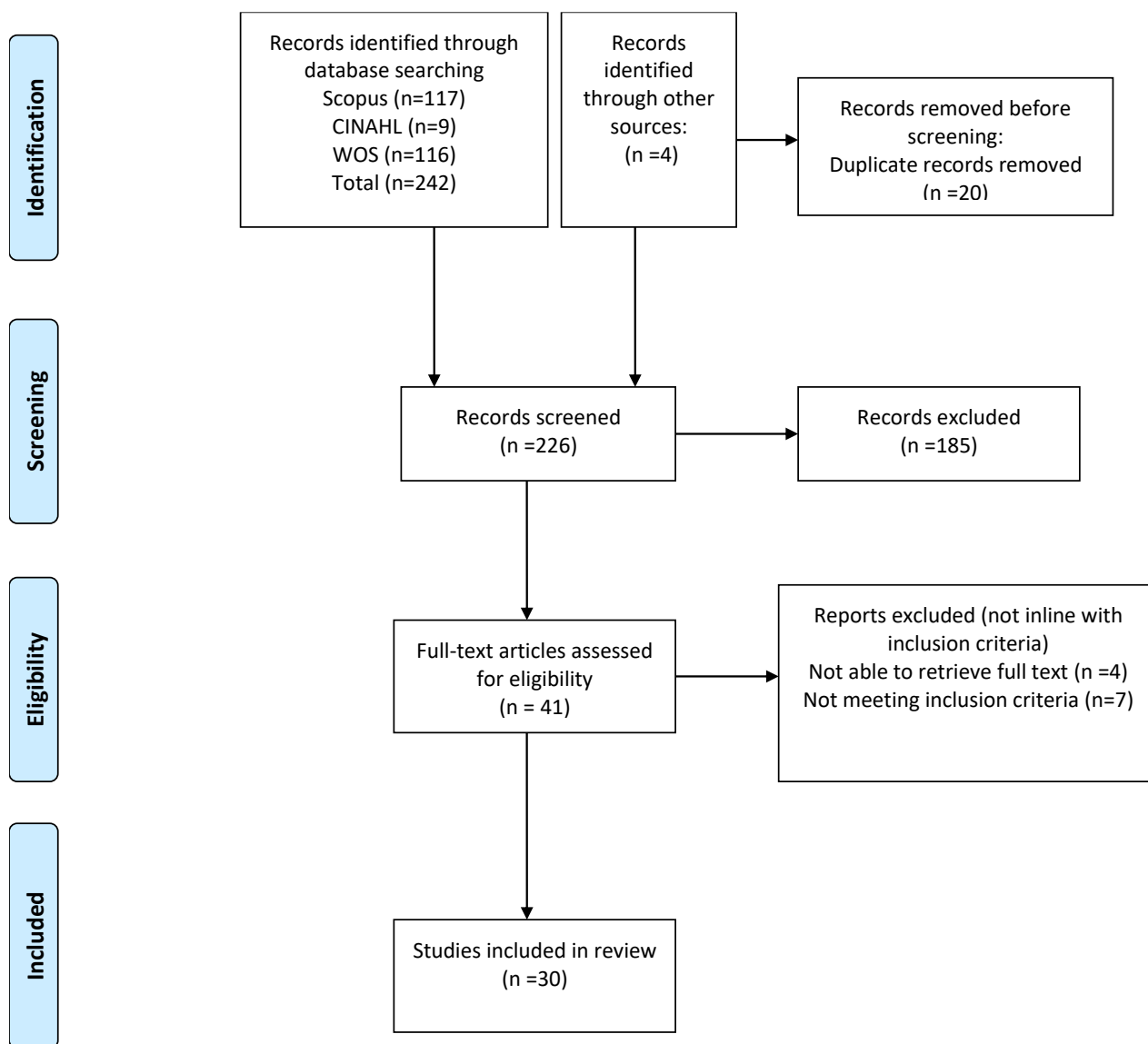


Figure 1. The PRISMA Flow Diagram

Charting the data

A data charting form was developed to extract consistent data from the 30 included sources. The extraction variables were aligned with the study’s objectives and included: (1) study citation and year, (2) country of context, (3) specific certification or regulatory mechanism discussed, and (4) findings related to professional evolution or competency frameworks.

Collating, summarizing, and reporting the results

Data were synthesized narratively and thematically. The results are categorized into subheadings reflecting the research questions: the mechanisms of certification and licensure; the evolution of the profession’s status; comparative analyses of international frameworks; and the key components of professional development (e.g., Body of Knowledge, ethics). This synthesis provides a comprehensive overview of how the OSH profession is governed and recognized globally.

III. Results

The research regarding the certification and recognition of safety professionals is extensive and geographically diverse. The search resulted in a total of 30 sources that matched the inclusion criteria, comprising 26 peer-reviewed articles and 4 grey literature documents. These documents span 48 years of literature (1976–2024) and cover over 20 countries, providing a comprehensive view of the professionalization trajectory of the Occupational Health and Safety (OHS) sector. The majority of the literature focuses on established systems in the United States, United Kingdom, Australia, Canada, and China, alongside emerging frameworks in South Africa, New Zealand, and Romania. The thematic analysis identified eight key themes related to system governance, professional capability, and quality assurance. See Table 1 for the summary of sources.

Table 1. Summary of Findings

No	Author, Year	Country/Context	Specific Regulatory Mechanism	Certification / Findings
1	Lerner Sidney (1976)	USA	OHSPAC (Occupational Health/Safety Accreditation Commission). Multi-professional body formed under NIOSH contract. Used Standards, Interpretations and Audit Criteria document for on-site peer review.	Established the first systematic accreditation criteria for occupational health programs. This framework facilitated a shift from minimal compliance to optimal performance standards across multi-disciplinary teams.
2	Booth et al. (1991)	UK	IOSH Register of Safety Practitioners (formally opened 1 April 1989). Two-tier: RSP (Registered Safety Practitioner) and ASP (Associate Safety Practitioner).	Defined a framework distinguishing problem-solving roles from rule-following roles. The analysis indicated that registration should assess predicted capability rather than current job tasks.
3	Marshall & MacKey (1995)	Australia	No formal certification at time of study. Worksafe Australia developing course guidelines (1983 policy, 1990 guidelines).	Analysis revealed high core content coverage (96% generalist) but identified a lack of proactive strategy instruction (<10%). The study highlighted a need for outcome competencies to facilitate course comparison.

No	Author, Year	Country/Context	Specific Certification Regulatory Mechanism	Findings
4	Bradish et al., (2008)	Global (Oil & Gas industry)	Industry-driven certification (not government). BCSP, ASSE, NSC mentioned.	Argued for HS&E professionals trained in diverse regulatory contexts to manage "export of hazards." The findings suggested that localized safety knowledge is insufficient for global industry relocation.
5	Olson et al. (2005)	USA	Discipline-specific certifications: ACPM/ACOEM (occ. medicine), AAOHN (occ. health nursing), ABET (industrial hygiene).	Identified 29 crosscutting competencies across six domains. Survey data showed a proficiency gap in leadership and financial management despite high perceived value, indicating a shift toward interdisciplinary frameworks.
6	Qiu et al., (2013)	China	CSE (Certified Safety Engineer) — state-administered (2002). Four examination subjects.	Found significant overlap in examination subjects, suggesting a lack of scientific precision compared to university curricula. The authors proposed aligning exams with four core undergraduate courses to improve validity.
7	Mroszczyk (2009)	USA	BCSP CSP certification available. No licensure for safety engineers.	Noted an "identity crisis" within the field, observing that the "safety engineer" title is frequently used without requisite engineering training. The analysis suggested a need for clearer professional boundaries.
8	Pearse et al. (2015)	Australia	SIA professionalisation strategy. OHS Body of Knowledge (BoK) published 2012.	Described an exclusionary strategy using the BoK to differentiate professionals. The analysis raised concerns that tight prescription might exclude experienced non-graduates and create unnecessary hierarchy.
9	Paul & Pearse (2016)	Australia (with international benchmarking)	SIA OHS BoK benchmarked against German Ergonomic Society, IEEE, and ASPH models.	Benchmarking ranked the Australian OHS BoK lowest among the four compared. Criticisms focused on decontextualized knowledge and a lack of explicit underlying theory.

No	Author, Year	Country/Context	Specific Certification Regulatory Mechanism	Findings
10	Pryor (2016)	Australia	AOHSEB (Australian OHS Education Accreditation Board). Outcome-based criteria mapped to OHS BoK.	Implemented capability-based accreditation criteria to distinguish university graduates from VET practitioners. This led to curriculum revisions, such as the inclusion of broader research methods.
11	Chen et al. (2016)	Taiwan	No formal national certification described. Context: ISHTSE and LSHMST examinations.	Consensus study identified three key curriculum domains: Safety Engineering, Health Engineering, and Safety & Health Management. Results emphasized the need for industry-academia collaboration.
12	Awolusi et al. (2017)	USA	Industry-driven qualifications (CSP, CHST, OHST). OSHA training (OSHA 500).	Survey data indicated an inverse relationship between qualified safety personnel and TRIR ($r = -0.183$). Firms employed more safety personnel than staffing guides suggested, averaging one per 75 workers.
13	Bohalteanu (2019)	Romania	Order No. 236/1998 and Law No. 319/2006. Two levels: OHS technician and OHS expert.	Documented a regression in quality assurance following the removal of exams and interviews in 2006. This change led to a significant influx of practitioners with unverified competence.
14	Wang et al. (2019)	China	CSE (Certified Safety Engineer) — state-administered (2002). Two levels: Junior and Senior.	Traced rapid state-led professionalisation from the 1990s to the 2010s. The analysis established the CSE as the primary OHS qualification in China, based on a mandatory examination system.
15	Swuste et al. (2019)	Netherlands	Legally required certification under Arbo law (1999). Two levels: HVK-A and HVK-B.	Observed a reliance on "standards and recipes" based on frozen experience, noting a gap between theoretical academic developments and practical application in the mandatory certification system.

No	Author, Year	Country/Context	Specific Certification / Regulatory Mechanism	Findings
16	Uhrenholdt Madsen et al. (2019)	Denmark	No unified certification or professional recognition. Multidisciplinary backgrounds accepted.	Attributed weak professionalisation to the Danish flexicurity model, where OHS is mainstreamed into management and HR. Consequently, roles are often filled by individuals without specific OHS backgrounds.
17	A. Hale & Booth (2019)	UK	IOSH-led professionalisation. IOSH Register (1989). Chartered status achieved post-2010.	Outlined the evolution from factory inspectors to Chartered status, marking the longest continuous professionalisation process globally. This development was supported by a NEBOSH examination partnership.
18	Hudson & Ramsay (2019)	USA	BCSP certification leadership. CSP since 1969. ISO/IEC 17024 accredited (2005).	Detailed the evolution of BCSP certification, noting the shift to ISO/IEC 17024 accreditation and the implementation of regular job task analyses to maintain exam validity.
19	Provan & Pryor (2019)	Australia	SIA-led professionalisation. OHS BoK (2012). AOHSEB accreditation (2012).	Charted a rapid professionalisation timeline (2007–2015), resulting in a three-tier certification system that differentiates university graduates from VET-qualified practitioners.
20	Pryor et al. (2019)	Global (INSHPO)	INSHPO Global Capability Framework (2015). Singapore Accord (2017).	Established the first global consensus on OHS roles, defining the OHS Professional as a strategic diagnostician, analogous to a General Practitioner in public health.
21	Wright et al. (2019)	Canada	BCRSP (CRSP 1976; CRST 2018) and CSSE (CHSC). ISO/IEC 17024 accredited.	Described a certification model similar to the US but with a separate body, highlighting early adoption of ISO standards and the 2018 introduction of a technician-level certification.
22	(A. R. Hale et al., 2020)	Global	INSHPO Framework and Singapore Accord as reference points.	Synthesized data from 10 countries, finding consensus on two distinct roles (Professional and Practitioner) but noting a lack of a unifying theory across state-mandated and voluntary systems.

No	Author, Year	Country/Context	Specific Regulatory Mechanism	Certification	Findings
23	Swuste et al. (2019)	Europe (10 postgraduate courses)	Varied requirements. mandatory HVK.	certification Netherlands:	Found variation in assessment methods and duration across European postgraduate courses. The analysis concluded that while the Bologna Process encourages harmonization, a unified certification approach is absent.
24	Karakhan & Al-Bayati (2023)	USA	No specific legal requirements. Industry-driven (CSP, CHST).	qualifications	Delphi results indicated that full-time safety personnel presence improves safety performance probability by 2.29 times. However, no standardized selection criteria currently exist in the US construction industry.
25	Abikenova et al. (2023)	Kazakhstan	State-led training system under Concept of Safe Work (2030).		Proposed a risk-based training model founded on occupational risk assessment, contrasting employer-funded training in Kazakhstan with insurance-funded models in Germany.
26	S. Wang & Huang (2024)	China	Two state-administered systems: CSE and CFPE (Certified Fire Protection Engineer).		Linked the evolution of fire safety education to economic development phases, culminating in a current focus on human-oriented public safety and a dual certification system.
27	NEBOSH	UK / International	NEBOSH qualification-based certification. 400,000+ qualified since 1979.		Reported qualification delivery to over 400,000 individuals, noting a shift from technical focus to strategic leadership to support career progression to Chartered membership.
28	IOSH	UK / International	IOSH — only Chartered body for OSH professionals.		Detailed a competency framework underpinned by mandatory CPD, focusing on business-oriented understanding of OSH and management competencies such as engagement and sustainable business practice.
29	HASANZ (2021)	New Zealand	Voluntary professional system with HASANZ Register (launched 2018).		Implemented a voluntary register aligned with the INSHPO Capability Framework, identifying a projected need for 2,100 additional professionals over a

No	Author, Year	Country/Context	Specific Regulatory Mechanism	Certification	Findings
					decade to meet government targets.
30	SAIOSH	South Africa	Legally recognised professional registration under NQF Act 67 of 2008.		Documented a transition from training-based to capability-based recognition, achieving SAQA professional body status and mandating CPD across three graded designations.

IV. Discussion

Certification system models

This scoping review identifies four distinct governance models for OHS professional certification, representing a spectrum from state control to professional autonomy. The State-Mandated System, observed in China, the Netherlands, Romania, and South Africa, requires certification as a legal prerequisite for practice. In China, the Certified Safety Engineer (CSE) system mandates a state-administered examination (B. Wang et al., 2019), whereas South Africa integrates professional registration into the National Qualifications Framework. These structures confer statutory recognition and universal coverage, thereby establishing a baseline of competency standards for all practicing professionals. Conversely, such mandates may restrict professional flexibility and adaptability compared to voluntary schemes; furthermore, as evidenced by the Romanian context, state oversight alone does not inherently ensure the rigor of competency assessments.

A second model, the Voluntary Professional System, is prevalent in the USA, Canada, UK, and New Zealand. Here, certification is managed by professional bodies such as the Board of Certified Safety Professionals (BCSP) and the Institution of Occupational Safety and Health (IOSH). These market-driven systems are characterized by psychometrically rigorous examinations and ISO/IEC 17024 accreditation (Hudson & Ramsay, 2019; Wright et al., 2019). A primary strength of this professional autonomy is the capacity for rapid content updating via regular job task analyses, which ensures continued alignment with evolving practice standards. Conversely, the absence of statutory mandates may limit coverage rates, and credential validity remains contingent upon the rigor of the individual certifying body.

Third, Qualification-Based Systems, such as those offered by NEBOSH, utilize examinations to confer professional membership and ensure global portability. The primary strengths of this model are its high international recognition and a standardized curriculum that ensures consistency across jurisdictions. Conversely, an examination-focused approach may fail to adequately assess practical competence or the context-specific knowledge required by distinct local regulatory environments. Finally, the review identifies a No Unified System model, notably in Denmark and pre-2012 Australia, where the profession is defined by fragmented qualifications and multidisciplinary backgrounds rather than a standardized pathway (Uhrenholdt Madsen et al., 2019). The primary strength of this approach is the adaptability of the workforce and openness to diverse professional backgrounds. Conversely, the absence of standardized criteria may jeopardize consistency in professional competence and weaken professional recognition.

The evolution from competency to capability

The literature indicates a shift in OHS professional frameworks from competency-based to capability-based models. Historically, frameworks prioritized task performance and routine procedures, described as "delivering the present based on the past" (Pryor, 2016; SAIOSH, 2024). This approach persists in entry-level certifications and short-course training programs.

In contrast, systems in Australia, South Africa, and New Zealand are adopting capability-based frameworks. These define capability as applied theoretical knowledge that transcends specific workplaces

(Pryor, 2016; SAIOSH, 2024). The Australian OHS Body of Knowledge (OHS BoK) and the South African SAIOSH framework distinguish the operational focus of practitioners from the strategic focus of senior professionals, illustrating this evolution.

This shift informs the understanding of professional identity. Analysis suggests that professional status relies on eight integrated criteria including a defined knowledge base, ethical codes, unified associations, and accredited education rather than certification alone (A. R. Hale et al., 2020). Consequently, systems lacking these supporting structures, such as those in Romania and Denmark, demonstrate weaker professional recognition. A primary strength of capability frameworks is their ability to produce professionals who can adapt knowledge to novel situations rather than merely executing fixed procedures. Conversely, transitioning from competency to capability necessitates substantial investment in education infrastructure, examination development, and stakeholder alignment—resources often scarce in developing contexts. Golhasany & Harvey (2023) found that capacity development at this level requires multi-level, multi-faceted interventions, which may be financially unviable in resource-constrained settings. Furthermore, Garg (2022) observed that academic institutions' perception of poor financial return from OHS courses limits the availability of tertiary qualification pathways, further compounding investment challenges. These findings align with Kane (1992) framework for assessing professional competence, which prioritizes valid and reliable methods over procedural checklists to evaluate the integration of knowledge, skills, and judgment. The review indicates that contemporary OSH certification systems using independent examinations and capability-based assessments map more closely onto Kane's criteria than systems relying solely on training or portfolios.

The review traces the development of OHS certification from a technical trade to a recognized profession, identifying distinct global typologies. Analysis reveals a trajectory from fragmented, qualification-based approaches toward unified, capability-based frameworks. Evidence suggests the profession is shifting from task-based competency to the application of theoretical knowledge. This transition is evident in Australia and South Africa, where the definition of a professional now includes strategic leadership. Furthermore, most effective systems resolve the tension between accessibility and quality through two-tier structures, distinguishing operational practitioners from strategic professionals.

The results align with earlier work on OSH professional skills. Nord Nilsson & Vänje (2018) noted that OSH engineers require system understanding and advanced risk assessment. These requirements correspond to the higher-order capabilities targeted by the certification frameworks identified in this review. Similarly, the findings support Felknor et al. (2020), who advocated for an expanded OSH paradigm involving systems thinking and transdisciplinary approaches. The two-tier structures identified here provide a mechanism to implement the educational shifts advocated in this earlier work

System integrity: Education and examination alignment

Alignment between university education and certification examinations is a determinant of system effectiveness. Qiu et al. (2013) identified a misalignment in China where the CSE examination emphasized language and logic over safety theory, potentially undermining certification validity. Conversely, systems in Australia, the UK, and Canada demonstrate high integration. In Australia, the OHS Body of Knowledge (OHS BoK) serves as the basis for both university accreditation and professional certification (Pryor, 2016). Similarly, Canada's BCRSP maps university programs to competencies through direct academic collaboration (Wright et al., 2019).

The validity of the examination process is also central. While the USA (BCSP) and Canada (BCRSP) maintain rigor through five-year job task analyses (Hudson & Ramsay, 2019; Wright et al., 2019), Romania removed its written examination in 2006. Bohalteanu (2019) reported that shifting to portfolio-only review increased the number of certified professionals without verifying knowledge, thereby degrading professional standards. These findings suggest that independent, standardized assessment is essential for maintaining system credibility.

These findings align with literature on professional regulation, which posits that professional status depends on jurisdiction over abstract knowledge (A. R. Hale et al., 2020). However, evidence from China and Romania challenges the assumption that state-mandated systems ensure higher quality.

In China, misalignment between university curricula and examinations undermined validity even within a state-controlled system (Qiu et al., 2013). Similarly, Romania's shift to portfolio-only assessment increased the number of certified professionals without verifying competence, indicating that assessment independence is critical regardless of the legal mandate (Bohalteanu, 2019).

Structural frameworks and institutional arrangements

Many nations adopt a two-tier structure to balance accessibility with quality assurance, distinguishing between OHS Practitioners (or Technicians) and OHS Professionals. For instance, South Africa's SAIOSH framework defines three tiers ranging from certificate-level (TechSaiosh) to degree-level Chartered status (CMSaiosh), while New Zealand's HASANZ register differentiates advisory from senior leadership roles. These structures facilitate vocational entry while reserving senior titles for those with higher education and strategic capability.

Governance models vary: association-led systems (USA, UK) prioritize autonomy, whereas government-mandated systems (China, Netherlands) mandate universal coverage. A third model involves collaborative multi-stakeholder governance, observed in Australia and New Zealand. In New Zealand, the career pathway emerged from a partnership between HASANZ, government agencies, and professional bodies. This approach aims to align certification with industry needs while preserving professional independence.

Maintenance of competence: Continuing Professional Development (CPD)

Established systems in the USA, UK, Canada, and South Africa require Continuing Professional Development (CPD) for recertification (A. Hale & Booth, 2019; Hudson & Ramsay, 2019; Wright et al., 2019). These frameworks utilize CPD points to address evolving regulations and technologies. By contrast, Bohalteanu (2019) observed that the removal of CPD requirements in Romania in 2010 coincided with a decline in overall system quality. To support ongoing development, systems like South Africa's provide free workshops and webinars, aiming to foster professional community and maintain knowledge currency.

Challenges in developing systems: The need for a balanced approach

Nations with developing systems face distinct challenges compared to established high-income models. Pryor (2016) notes that short-duration training courses are frequently treated as equivalent to professional certification in some contexts. This results in a discrepancy between limited educational preparation and the complex capabilities required to manage safety in industrializing economies. Furthermore, reliance on portfolio-based assessment without rigorous examination may undermine professional credibility, as observed in the Romanian case (Bohalteanu, 2019). Analysis suggests that a hybrid approach is appropriate for developing nations: a two-tier structure maintains accessibility for practitioners while requiring rigorous independent assessment and capability-based education for senior professionals (Pryor et al., 2019). This aligns with the INSHPO framework, which balances workforce practical needs with strategic leadership requirements.

These findings have implications for Indonesia. The current landscape, characterized by competency-based approaches and state-mandated training certifications, presents a risk of fragmentation. If professional status relies primarily on short-duration training, Indonesia may replicate a "low-skill" equilibrium where professionals possess procedural knowledge but lack theoretical capability. Analysis suggests that implementing psychometrically validated examinations for senior roles is necessary. Furthermore, a Collaborative Multi-Stakeholder governance model similar to New Zealand or Australia could balance professional autonomy with government oversight, aligning certification with industry needs and national standards. This approach would also address the power and autonomy tensions highlighted by Walters (2024) while supporting the systems-oriented, future-ready competencies emphasized by Felknor et al. (2020) and Nord Nilsson & Vänje (2018).

Strengths and limitations

This review has limitations. Inclusion was restricted to English-language literature, potentially excluding insights from non-English speaking models. The search identified no peer-reviewed studies

specifically addressing OHS certification systems in Southeast Asian countries beyond those captured through the global framework, representing a geographic gap. Additionally, the rapid evolution of workplace risks, such as digitalization and psychosocial safety, suggests that older sources may not fully reflect emerging competencies. Reliance on grey literature introduced variability in methodological quality compared to peer-reviewed studies. Consequently, while the review maps structural components of certification, the operational efficacy of these models in reducing accident rates requires further investigation.

Future research should address the impact of professionalization on workplace safety. A knowledge gap exists regarding the efficacy of certification models in low- and middle-income countries. Longitudinal studies could assess the impact of capability-based frameworks and two-tier structures on incident reduction rates. By adopting a systems approach—aligning education, examination, ethics, and governance, nations may elevate the OHS profession. The study concludes that establishing an independent national authority with a mandate for continuous professional development supports workforce professionalization and worker protection.

V. Conclusion

This scoping review evaluated the evolution of OHS professional certification to identify components of professional recognition. While governance models range from state-mandated licensure to voluntary schemes, results indicate that structural prerequisites for a mature profession are consistent. Professionalization appears to depend on a defined body of knowledge, ethical codes, and mandatory continuing professional development rather than certification alone. Additionally, the review identifies a shift from competency-based training to capability-based assessment, aiming to equip senior professionals with strategic skills for modern workplaces.

To address professionalization challenges, particularly in developing contexts, the analysis supports adopting two-tier professional structures that balance accessibility with quality. Evidence from Romania and China suggests that independent, psychometrically validated examinations are necessary for maintaining credibility. Collaborative governance models that integrate education, practice, and regulation offer a pathway to establishing a clear professional identity. Future efforts should prioritize aligning national frameworks with international best practices to ensure the OHS profession meets evolving workforce safety needs.

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