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# Humanising Digital Healthcare: A Conceptual Framework of Algorithmic Governance, Professional Autonomy, and Nurse Well-Being

**Abd Rahman Ahmad*[1], Hairul Rizad Md Sapry[2], Alaa S Jameel[3], Mohamud M. Hassan[4]**

[1] *Johor Business School, Universiti Tun Hussein Onn Malaysia, 86400 Batu Pahat, Johor, MALAYSIA*
[2] *Universiti Kuala Lumpur (UNIKL) Kampus Cawangan Malaysian Institute of Industrial Technology, Jalan Persiaran Sinaran Ilmu, Bandar Seri Alam, 81750 Masai, Johor, MALAYSIA*
[3] *Department of Business Administration, Al- Idrisi University College, Ramadi, Al-Anbar, IRAQ*
[4] *Zamzam University of Science and Technology, SOMALIA*

*Corresponding Author: arahman@uthm.edu.my
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**Abstract**

This study presents a conceptual paper that illustrates the influence of algorithmic governance on nurse wellbeing, mediated by professional autonomy. Although A.I. and algorithmic management systems are widely used in nursing, the existing ethical approaches are mostly concerned with data privacy and the incidence of algorithmic bias, leaving a theoretical gap in the area of relations between governance systems, professional autonomy, and psychological wellbeing. The framework draws on ideas from nursing ethics, critical algorithm research, and organisational behaviour theory, and categorises two archetypal algorithm-driven forms of governance: augmenting governance (strengthening clinical judgement) and automating governance (substituting or strictly governing decisions). The framework states that automation of governance reduces perceived professional autonomy, leading to an increased risk of emotional exhaustion, depersonalisation and intention to leave, while transparent and co-designed governance can help maintain or even enhance nurse wellbeing. Four propositions have been stated that can be tested. Finally, the framework reflects a shift from the efficiency-focused to autonomy-focused algorithmic governance, providing a solid theoretical foundation for subsequent empirical studies and practical auditing of AI systems in nursing.

## 1. Introduction

The incorporation of artificial intelligence (AI) and algorithmic systems into nursing practice is progressing significantly (Topol, 2019). Predictive analytics currently inform staffing choices, clinical decision support systems propose interventions, and automated documentation tools oversee workflows (Wachter, 2015). Advocates contend that these technologies alleviate administrative burdens and improve efficiency. Nonetheless,

increasing apprehensions indicate that algorithmic management could jeopardise nurses' professional autonomy and exacerbate burnout (Kellogg et al., 2020).

Current governance frameworks for digital health primarily emphasise technical safety, data privacy, and algorithmic bias (World Health Organization [WHO], 2021; European Commission, 2022). Few models explicitly theorise the connections between algorithmic governance and nurse well-being. This theoretical gap is especially significant in light of the global nursing shortage and the ongoing high rates of burnout within the profession (Aiken et al., 2023).

The conceptual paper identifies a gap by proposing an innovative framework that situates professional autonomy as the primary mediating factor between algorithmic governance and nurse well-being. Utilising nursing ethics, critical algorithm studies, and organisational behaviour theory, the framework differentiates between augmenting and automating modes of algorithmic governance, formulates four testable propositions, and examines implications for research and practice.

## 2. Literature Review

### 2.1 Theoretical Foundations

Algorithmic governance denotes the implementation of data-driven regulations, predictive models, and automated decision-making systems to organise, oversee, and assess operations (Kellogg et al., 2020). This type of governance has become increasingly prevalent in modern healthcare organisations. It encompasses applications such as automated patient acuity scoring systems that prioritise care requirements, artificial intelligence-generated care recommendations that propose specific nursing interventions, real-time performance dashboards that monitor productivity and compliance, and dynamic staffing algorithms that modify nurse allocations based on anticipated patient demand.

In contrast to conventional clinical protocols and organisational policies, which are typically formulated through professional consensus and maintain a degree of transparency, algorithmic governance functions at scale and often depends on intricate, obscure decision-making processes. The foundational algorithms analyse extensive amounts of historical and real-time data to generate outputs that nurses may receive as recommendations or instructions. In numerous instances, the precise rationale for a specific output is not readily comprehensible or identifiable by frontline personnel. This attribute of opacity can establish a disconnect between the nurse and the decision-making process. Thus, algorithmic governance transcends mere technological assistance and serves as a potent mechanism of organisational control that impacts daily clinical decisions, workload allocation, professional accountability, and the overarching framework of nursing practice.

### 2.2 Professional Autonomy in Nursing

Professional autonomy refers to the ability of nurses to utilise independent clinical judgement based on their expertise and contextual knowledge (Skår, 2010; Papastavrou et al., 2012). It represents a crucial element of professional nursing identity and is vital for providing safe, responsive, and patient-centered care. Professional autonomy encompasses two critical dimensions: decisional autonomy and operational autonomy. Decisional autonomy pertains to the liberty to select suitable actions based on a professional evaluation of patient requirements, whereas operational autonomy relates to the nurse's authority over the organization, tempo, and execution of work processes.

Nurses consistently operate in dynamic and unpredictable clinical settings, utilising formal education, accrued clinical experience, and contextual knowledge to make prompt decisions. When professional autonomy is maintained, nurses can tailor care plans to specific patient situations, advocate effectively, and incorporate diverse information sources beyond strict protocols. Research demonstrates that increased professional autonomy correlates with enhanced job satisfaction, reduced burnout, and improved workforce retention (Weston, 2010). Nurses who encounter significant autonomy frequently indicate enhanced professional satisfaction, a more defined sense of purpose, and an improved capacity to handle the emotional challenges of caregiving.

Conversely, when nurses feel that their autonomy is constrained or compromised, various adverse consequences typically arise. The perceived loss of autonomy is consistently associated with increased emotional exhaustion and heightened turnover intention. Under such circumstances, nurses may perceive themselves as mere implementers of externally imposed decisions rather than as autonomous practitioners. This experience may induce frustration, moral distress, and a deterioration of professional identity. In algorithmic systems, autonomy may be compromised when nurses must adhere to AI-generated recommendations that contradict their clinical judgement, or when systems limit their capacity to diverge from standardised protocols in response to individual patient circumstances.

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## 2.3 Nurse Well-Being

Nurse well-being is defined as a multifaceted construct that transcends mere absence of distress. It encompasses adverse dimensions like emotional exhaustion and depersonalisation, alongside favourable dimensions such as job satisfaction and resilience. Emotional exhaustion entails a state of feeling drained and overwhelmed due to persistent work demands. Depersonalisation denotes the emergence of cynical, detached, or impersonal attitudes towards patients and colleagues. Job satisfaction signifies the fulfilment and reward obtained from nursing practice, whereas resilience indicates the ability to rebound from setbacks and maintain professional involvement despite persistent challenges.

The Job Demands–Resources model (Bakker & Demerouti, 2017) offers a pertinent theoretical framework for this comprehension. The model asserts that job demands encompass physical, cognitive, or emotional facets of work that necessitate continuous effort, resulting in psychological and physiological costs. Job resources are elements of work that facilitate goal attainment, alleviate demands, or foster personal development. This perspective, when applied to algorithmic governance, indicates that such systems possess no intrinsic positive or negative qualities. They can serve as either job demands that elevate strain or as job resources that enhance performance and engagement, contingent upon their design and implementation. When algorithmic tools exacerbate workload, diminish autonomy, or impose continuous performance monitoring, they predominantly function as demands that can undermine well-being. When meticulously crafted to facilitate clinical reasoning, minimise superfluous administrative duties, and uphold professional confidentiality, they can function as instruments that safeguard or improve well-being. This dual possibility underscores the pivotal significance of design decisions in shaping the final effect on nurses.

## 2.4 Digital Taylorism as a Critical Lens

Digital Taylorism (Moore & Robinson, 2016) provides a critical framework for examining the impact of algorithmic governance on professional labour. Digital Taylorism represents the contemporary implementation of classical scientific management principles via digital technologies. It entails the disaggregation, standardisation, and meticulous oversight of work processes through systems that gather comprehensive data on performance, decision-making patterns, and time utilisation. This method methodically shifts authority from proficient practitioners to managers and technical system designers who may possess minimal direct experience with frontline clinical realities.

In nursing, Digital Taylorism manifests when algorithmic systems fragment comprehensive caregiving into distinct, quantifiable tasks, dictate standardised sequences of actions, and oversee compliance in real time. Although this rationalisation may enhance specific efficiency metrics, it poses the risk of undermining the relational, contextual, and judgemental aspects that define high-quality nursing care. Nurses may increasingly be regarded as implementers of technology-driven directives rather than as autonomous professionals exercising expert judgement. This transition may diminish the inherent significance of nursing, undermine professional identity, and lessen the sense of moral agency derived from autonomous clinical decision-making.

These theoretical foundations collectively constitute the conceptual framework of the proposed framework. Algorithmic governance serves as the principal influence, professional autonomy functions as the primary mediating mechanism, and nurse well-being is identified as the crucial outcome. The integration of these perspectives facilitates a nuanced comprehension of how various modes of algorithmic implementation can either bolster or weaken the nursing workforce as healthcare becomes progressively digital.

## 3. Conceptual Framework

This conceptual paper presents a theoretical framework elucidating the connection between algorithmic governance and nurse wellbeing, with perceived professional autonomy acting as the primary mediating factor (Adapa, 2026; Fernandes, 2026). The fundamental assertion is that the nature of algorithmic governance, rather than the mere existence of technology, predominantly influences its effect on nurses. Various configurations of algorithmic systems affect nurses' perception of professional autonomy, which subsequently influences critical aspects of their wellbeing, including emotional exhaustion, depersonalisation, job satisfaction, and resilience. The framework synthesises insights from algorithmic governance, professional autonomy, nurse wellbeing, and Digital Taylorism to provide a cohesive framework for comprehending these dynamics (Rony et al., 2023; Kwon, 2026).

***Two Exemplary Categories of Algorithmic Governance***

The framework differentiates between two archetypal modes of algorithmic governance: augmenting governance and automating governance. These archetypes exemplify divergent methodologies in the design and execution of algorithmic systems within nursing practice. In actuality, most systems exist on a continuum between these two extremes rather than as pure forms (Lukkien, 2024).

***Enhancing Governance***

Augmenting governance transpires when AI systems are engineered to assist and elevate nurses' clinical judgement instead of supplanting it. In this mode, algorithms operate chiefly as intelligent instruments that offer supplementary information, insights, or alternatives to facilitate decision-making. Examples encompass decision support systems that provide optional intervention recommendations, predictive risk scores that identify potential patient deterioration while deferring final actions and interpretations to the nurse's judgement, and documentation tools that propose phrasing yet permit comprehensive editing and contextualisation by the nurse (Cato, 2024).

The algorithm remains subordinate to professional expertise in enhancing governance. It manages routine data processing and pattern recognition tasks, thereby alleviating the cognitive burden linked to repetitive activities. This approach maintains the nurse's role as the ultimate decision-maker and active participant in care delivery. By optimising administrative and repetitive tasks, augmenting systems can liberate time and cognitive resources for intricate clinical reasoning, comprehensive patient assessment, and significant nurse-patient interactions. This approach has the capacity to enhance rather than undermine professional autonomy (Cordeiro, 2021; Bouderhem, 2024).

***Automating Oversight***

Conversely, automating governance pertains to systems that dictate, restrict, or directly implement decisions with minimal scope for professional intervention. The algorithm assumes a managerial function. Examples encompass automated nurse-to-patient ratio calculators that strictly enforce assignments without allowance for clinical discretion, AI-driven discharge planning tools that formulate care pathways excluding nursing input, or closed-loop systems that autonomously modify medication dosages or care protocols with limited human involvement (Kellogg et al., 2020).

Automated governance algorithms frequently exert significant prescriptive influence, compelling nurses to adhere to their directives, even when such outputs contradict their professional evaluations of patient requirements. This mode reallocates significant decision-making power from nurses to the algorithmic system and its creators. It encapsulates aspects of Digital Taylorism by standardising work processes, diminishing autonomy, and relegating nurses to the role of implementers of system directives rather than independent professionals. Such configurations can engender a perception of surveillance, control, and diminished competence, thereby compromising the fundamental aspects of nursing practice (Cao, 2025; Olawade et al., 2026).

While depicted as ideal types for analytical precision, most actual algorithmic implementations exist along a continuum between augmentation and automation. The placement of a specific system on this continuum is contingent upon design choices, implementation strategies, organisational policies, and the extent of flexibility integrated into the technology (Freeman, 2025).

***Professional Independence as Mediator***

Perceived professional autonomy serves as the principal mediating mechanism in the framework. The nature of algorithmic governance primarily affects the degree of control nurses have over their clinical decisions and work processes. This perception of autonomy directly influences their psychological well-being.

Automating governance often diminishes perceived professional autonomy by constraining decision-making and operational freedom. Nurses compelled to adhere to algorithmic directives that contradict their expertise and situational awareness undermine essential psychological needs for competence and self-determination (Deci & Ryan, 2000). The erosion of autonomy can induce psychological stress, diminished work engagement, feelings of disempowerment, and moral distress. These experiences progressively lead to elevated emotional exhaustion, depersonalisation, and heightened turnover intention (Yuk, 2023; Griffen, 2024).

Conversely, enhancing governance can maintain or even improve perceived professional autonomy. By overseeing routine cognitive tasks and delivering timely, pertinent information, such systems enable nurses to concentrate on higher-order judgement, patient advocacy, and personalised care. This alignment with professional values and expertise enhances nurses' sense of competence and self-determination, resulting in increased job satisfaction, greater resilience, and reduced risk of burnout (Metta et al., 2024; Salloch, 2024).

The mediating function of professional autonomy elucidates the variance in wellbeing outcomes generated by algorithmic tools. It is not the technology itself, but its impact on nurses' capacity to exercise professional judgement that ultimately influences wellbeing (Kiseleva et al., 2022; Sadeghi et al., 2024).

***Factors of Moderation***

The strength and direction of the relationships within the framework are affected by three significant contextual moderating factors: transparency, nurse involvement in design, and human-in-the-loop requirements (WHO, 2021).

When algorithmic systems are transparent and explicable, nurses can more effectively comprehend the rationale, data inputs, and constraints underlying recommendations. Explainable algorithms augment trust,

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diminish uncertainty, and enhance perceived control. Conversely, opaque systems often exacerbate feelings of disempowerment, even within otherwise enhancing designs.

***Nurse Participation in Design***

Co-design processes that actively engage nurses in the development, testing, and refinement of algorithmic tools enhance perceived legitimacy and ownership. When nurses engage substantively in system design, the resultant tools are more likely to correspond with clinical realities and professional values. This engagement enhances the beneficial impacts of improving governance and can alleviate certain adverse effects of feature automation.

***Human-in-the-Loop Specifications***

Organisational policies that require substantial human review and ultimate authority prior to the execution of critical decisions safeguard professional autonomy. Mandating nurses to actively verify or override algorithmic results preserves their status as the primary decision-makers. Robust human-in-the-loop mechanisms can transition an otherwise automated system towards the augmentative end of the spectrum.

The moderating factors indicate that the influence of algorithmic governance is not static but can be influenced by intentional design and implementation choices. Systems with automation tendencies may yield less detrimental outcomes when transparency is elevated, nurses participate in the design process, and human authority is maintained (Olawade et al., 2026; Adapa, 2026; Lukkien, 2024).

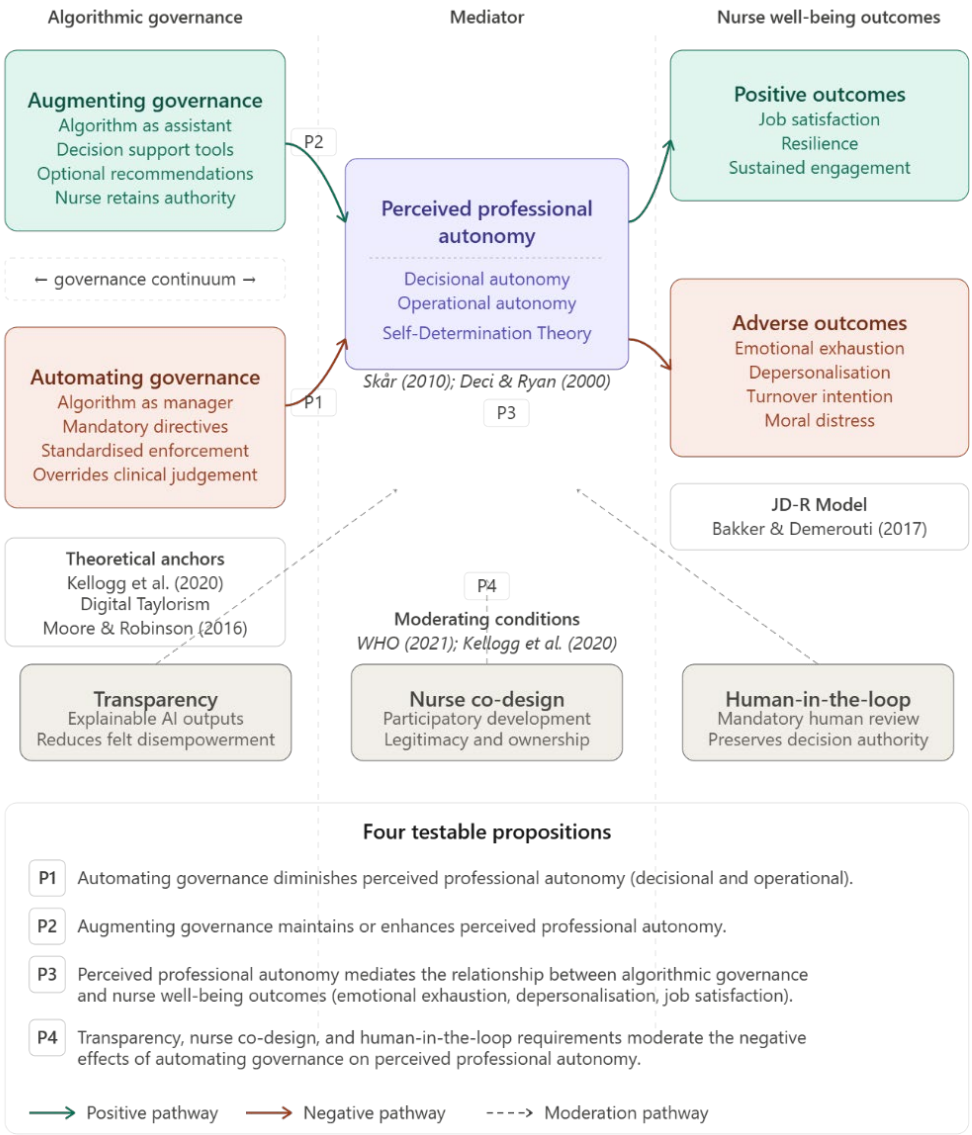
The proposed conceptual framework provides a sophisticated framework for comprehending the intricate relationship between algorithmic governance, professional autonomy, and nurse wellbeing. It transcends binary perspectives of technology as solely advantageous or detrimental, highlighting the significance of design decisions and the context of implementation. The framework delineates professional autonomy as the principal mediator and identifies actionable moderating factors, thereby offering explicit guidance for future empirical research and the ethical advancement of AI systems in nursing (Fernandes, 2026; Kwon, 2026; Freeman, 2025).

Figure 1 illustrates a visual synthesis of the proposed conceptual framework, amalgamating the theoretical relationships detailed in the preceding subsections into a cohesive representation. The framework is structured into three analytical categories: antecedent, mediating, and outcome constructs. The left column delineates algorithmic governance as the principal antecedent, categorised into its two archetypal modes. Augmenting governance entails the use of algorithms as intelligent tools that provide additional information and options to aid decision-making, while ensuring that the nurse remains the primary decision-maker in the care process (Cato, 2024). In contrast, automating governance entails configurations where the algorithm takes on a managerial role, prescribing, limiting, or directly executing decisions with little opportunity for professional involvement (Kellogg et al., 2020). The two modes are not intended as fixed categories but rather as reference points on a governance continuum, as most real-world algorithmic implementations exist along a spectrum influenced by design choices, implementation strategies, and organisational policies (Freeman, 2025; Lukkien, 2024).

The central column indicates perceived professional autonomy, which includes both decisional and operational autonomy as theorised by Skår (2010), as the principal mediating mechanism by which governance mode affects nurse well-being. The framework clearly indicates that it is not the technological system itself, but rather its impact on nurses' ability to exercise professional judgement that ultimately influences well-being outcomes (Kiseleva et al., 2022; Sadeghi et al., 2024). Automating governance diminishes this capacity by restricting decision-making autonomy and forcing nurses to follow algorithmic instructions that may conflict with their expertise and situational awareness, thereby undermining critical psychological needs for competence and self-determination (Deci and Ryan, 2000). This erosion leads to negative well-being outcomes indicated in the right column, namely emotional exhaustion, depersonalisation, and increased turnover intention (Yuk, 2023; Griffen, 2024). In contrast, enhancing governance maintains or reinforces perceived professional autonomy by allowing nurses to focus on advanced judgement and individualised care, resulting in favourable well-being outcomes such as enduring job satisfaction and professional resilience (Metta et al., 2024; Salloch, 2024). The well-being construct is anchored in the Job Demands-Resources model by Bakker and Demerouti (2017), which posits that algorithmic systems do not possess intrinsic positive or negative attributes but operate as either job demands or job resources based on their design and implementation.

The lower section of the framework delineates three moderating conditions that either mitigate or enhance the relationship between governance mode and perceived professional autonomy. Transparency, which includes the elucidation of algorithmic results and the accessibility of foundational data inputs, enhances nurses' perception of control, even in systems inclined towards automation (Sadeghi et al., 2024). The involvement of frontline nurses in the co-design of algorithmic tools through development, testing, and refinement augments the perceived legitimacy of these systems and enhances their congruence with clinical realities. Human-in-the-loop requirements necessitate that nurses actively validate or amend algorithmic outputs before implementing significant decisions, thereby protecting professional autonomy and maintaining nurses' role as the principal decision-makers in care processes (Olawade et al., 2026; Adapa, 2026; WHO, 2021). These moderating conditions are posited to function collectively rather than independently, such that their combined presence can shift an

otherwise automating system toward a more autonomy-preserving stance on the governance continuum (Lukkien, 2024).




Note. The framework illustrates two archetypal modes of algorithmic governance as independent antecedents, perceived professional autonomy comprising its decisional and operational dimensions as the primary mediating construct, and nurse well-being outcomes encompassing emotional exhaustion, depersonalisation, job satisfaction, resilience, and turnover intention as the dependent constructs. Three contextual moderating conditions, namely transparency, nurse co-design, and human-in-the-loop requirements, moderate the governance-to-autonomy pathway as specified in Proposition 4. Theoretical anchors include the Job Demands-Resources model (Bakker and Demerouti, 2017), Self-Determination Theory (Deci and Ryan, 2000), Digital Taylorism (Moore and Robinson, 2016), and algorithmic governance theory (Kellogg et al., 2020).

**Fig. 1** *Conceptual framework of algorithmic governance, perceived professional autonomy, and nurse well-being*

## 4. Discussion

This conceptual framework enhances the literature in three significant ways. Initially, it recognises professional autonomy as the principal mediating factor connecting algorithmic governance to nurse wellbeing. By delineating this pathway, the framework transcends general ethical principles in AI healthcare literature and offers a targeted, verifiable elucidation of how technology influences nurses' psychological outcomes. The framework delineates a distinct and pragmatic differentiation between augmenting governance and automating governance. This typology provides a design-oriented framework that assists both researchers and practitioners in assessing algorithmic systems based on their real-world effects on professional practice, rather than solely on technical proficiency.

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The framework connects essential algorithm studies, specifically through the perspective of Digital Taylorism, with recognised nursing workforce research. This integration links macro-level critiques of algorithmic control with micro-level insights into nurse wellbeing, burnout, and retention. It establishes a multidisciplinary basis for examining the organisational and human ramifications of AI implementation in healthcare.

## 4.1 Pragmatic Consequences

The framework provides multiple actionable insights for healthcare organisations. Nurse leaders and clinical informatics teams ought to assess any novel algorithmic system by posing four essential enquiries: Does the system predominantly enhance or automate clinical decision-making? Is the algorithmic logic comprehensible and elucidated for frontline users? Were nurses engaged in the design and testing process? Does the system necessitate substantial human evaluation prior to the finalisation of decisions? Systems that excel in these criteria are more likely to enhance rather than detract from nurse wellbeing. The framework underscores the necessity for policymakers and regulators to enhance the governance of healthcare AI. Regulatory frameworks, such as the EU AI Act, should explicitly integrate professional autonomy as a fundamental requirement for high-risk clinical systems. This can be accomplished through obligatory human-in-the-loop protocols, transparency standards, and mandates for clinician co-design in the development of nursing-related technologies.

## 4.2 Limitations

This framework, being a conceptual paper, has not been empirically validated. The differentiation between augmenting and automating governance, although analytically beneficial, may oversimplify the intricacies of real-world systems that frequently embody both characteristics concurrently. The framework inadequately considers individual differences among nurses, including technological self-efficacy, prior experience with digital tools, and personal resilience, which may influence responses to algorithmic governance.

## 4.3 Future Research

Immediate empirical validation of the framework is required. Subsequent research should evaluate the four propositions utilising established instruments, including validated assessments of professional autonomy (Skår, 2010) and burnout (Maslach et al., 1996). Both quantitative and mixed methods designs would be advantageous. Qualitative research ought to investigate nurses lived experiences with various forms of algorithmic governance to reveal contextual subtleties and emotional reactions that are absent in the existing framework. Longitudinal studies could investigate how the impacts of augmenting versus automating systems develop over time and across various healthcare environments. Ultimately, progressing this research agenda will facilitate the advancement of digital technologies that truly augment rather than undermine the nursing profession in an increasingly AI-driven healthcare landscape.

# 5. Conclusion

This theoretical framework provides a relevant and cohesive basis for comprehending the impact of algorithmic governance on nurse wellbeing via the mediating factor of professional autonomy. The framework distinguishes between augmenting and automating modes of algorithmic governance, illustrating that the influence of artificial intelligence on the nursing workforce is contingent upon essential design decisions rather than the technology itself. When executed with consideration, algorithmic systems can function as auxiliary instruments that augment clinical judgement and maintain professional autonomy. Nonetheless, when engineered to automate and supplant human decision-making, they jeopardise autonomy, exacerbate burnout, and hasten turnover in an already beleaguered profession.

The primary assertion of this paper is unequivocal: humanising digital healthcare necessitates a purposeful transition from efficiency-oriented to autonomy-focused algorithmic governance. Transparency, nurse participation in system design, and robust human-in-the-loop mechanisms are indispensable safeguards for ensuring nurse wellbeing and maintaining the quality of patient care. This framework integrates essential viewpoints from algorithm studies with fundamental nursing scholarship, offering both a theoretical basis and practical direction for the ethical incorporation of AI in nursing practice.

As healthcare increasingly adopts artificial intelligence, the decisions made today will influence the future of the nursing profession for many years. This paper urges researchers, nurse leaders, informatics specialists, and policymakers to prioritise professional autonomy as a fundamental design criterion in the development and regulation of algorithmic systems. Placing nurses' professional judgement and wellbeing at the core of digital transformation is essential for establishing a sustainable, humane, and high-quality healthcare system in the algorithmic era.

Subsequent empirical investigations informed by this framework will be crucial to substantiate its assertions and enhance its implementation in various clinical environments. The effective incorporation of AI in nursing

relies on our shared capacity to guarantee that technology supports professionals rather than supplants them, thereby enhancing both workforce welfare and patient outcomes.

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## Conflict of Interest

The entire research process was conducted independently without any influence from any party that could affect the results and objectivity of the research.

## Author Contribution

*Abd Rahman Ahmad* ***formulated the study theme, organised the manuscript's overall design, and participated in the critical synthesis of the literature and final editing;*** *Hairul Rizad Md Sapry* ***offered intellectual contributions in enhancing the theoretical framework, maintained consistency in reasoning throughout the parts, and aided in aligning the text with journal standards;*** *Alaa S. Jameel* ***facilitated the incorporation of findings and contributed to the improvement of narrative clarity and coherence, especially in the segments addressing practical consequences and managerial significance.***

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