

Algorithmic Management and Acquiescent Silence: The Mediating Role of Perceived Voice Futility in Malaysian Manufacturing SMEs

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Abstract

Algorithmic management systems are increasingly deployed in manufacturing small and medium- enterprises (SMEs) in Malaysia under the Industry 4.0 agenda, yet their behavioural consequences for workers in conventional *non-platform* employment settings remain theoretically unspecified. To the best of our knowledge, no prior study has examined the psychological mechanism through which algorithmic management shapes employee voice and silence behaviour outside of gig economy and platform work contexts. This paper addresses that gap by developing a conceptual framework that proposes perceived *voice futility* as the mediating mechanism connecting algorithmic management to acquiescent silence in conventional manufacturing workplaces. Drawing on self-determination theory and organisational silence theory, the framework argues that algorithmic management frustrates needs for autonomy, competence, and relatedness of employees, generating a cognitive appraisal of futility that drives resignation-based *acquiescent silence*, a form of silence motivationally distinct from fear-driven defensive silence. Three formal propositions are advanced, alongside a theoretically grounded institutional argument explaining why the specific conditions of manufacturing SMEs in Malaysia like HRM informality, digital capability gaps, and technology-governance decoupling structurally amplify the proposed mechanism. Three HRM intervention pathways are also derived from the framework. This paper contributes a theoretically specified mediating mechanism in the algorithmic management and employee silence literature, and advances the conceptual framework addressing this relationship in conventional non-platform manufacturing in an emerging economy context.

Keywords: Algorithmic Management, Acquiescent Silence, Perceived Voice Futility, Malaysian Manufacturing SMES

Introduction

Algorithmic management, i.e. the use of data-driven software to automate or assist managerial functions such as task allocation, performance monitoring, and employee evaluation, is rapidly transforming work in conventional employment settings. For workers, this transformation is consequential: it reshapes who or what governs their daily tasks, evaluates their performance, and determines their outcomes. Understanding how this transformation affects workers, specifically their willingness to speak up about problems, inefficiencies, and concerns, is a question of both scholarly and practical urgency. Once associated primarily with gig economy platforms such as Uber, Deliveroo, and Amazon Mechanical Turk, algorithmic management has now become a mainstream feature of conventional employment relationships. An employer survey across six countries finds that an average of 79% of conventional workplaces already deploy some form of algorithmic management (OECD, 2025). Eurofound (2024) reports that 37% of manufacturing workers in non-platform settings are subject to algorithmic task direction, performance tracking, or automated evaluation, making manufacturing the second highest-prevalence sector after logistics and warehousing. In Malaysia, this diffusion is intensifying under the national Industry4WRD agenda, which has channelled substantial government investment in smart automation grants for manufacturing companies towards AI and algorithmic systems in labour-intensive industries including plastics, wood, furniture, and textiles (MIDA, 2024). While the diffusion of algorithmic management into conventional manufacturing is empirically documented, its implications for employee voice behaviour in these settings have been under theorised.

This paper suggests that when algorithmic systems direct, monitor, and evaluate workers, they create a specific and consequential psychological condition. When workers come to believe that speaking up cannot change algorithmically determined outcomes, they withdraw from voice behaviour entirely. This is not fear-based silence as workers do not stay quiet because they fear punishment. It is acquiescent silence (Van Dyne et al., 2003), a resignation-based withdrawal rooted in the belief that speaking up is futile rather than dangerous. Workers conclude that voice is pointless because the system that governs their work does not respond to human argument, suggestion, or concern. The suppression of employee voice is not merely a wellbeing problem; it is an operational one. Manufacturing SMEs depend critically on frontline workers to flag quality failures, report process inefficiencies, identify equipment faults, and communicate safety concerns. When workers withdraw from these voice behaviours, organisations lose the informational flow on which operational effectiveness and safety depend (Morrison, 2023). Research shows that approximately 6.7 million workers in Malaysia, constituting about 45% of total employment, face notably elevated exposure to generative AI (Cheng et al., 2025). Moreover, automation and AI had already displaced 293,639 workers nationally since 2020, with manufacturing recording the highest sectoral impact at 75,615 layoffs by September 2024 (Ministry of Human Resources Malaysia, 2024). In this context, the worker who remains within the organisation but stays silent is not a peripheral concern but a strategic one.

Despite the evident practical urgency, research on algorithmic management and employee voice remains confined to platform and gig economy settings, representing a platform bias. Research on algorithmic management in conventional non-platform manufacturing remains limited (Keegan and Meijerink, 2025; Lamers et al., 2024; Zhang et al., 2025). Jarrahi et al.

(2021) further argue that platform findings are not translatable to standard employment contexts. Moreover, within the organisational silence literature, *perceived voice futility* has been established as a key driver of acquiescent silence since Morrison and Milliken (2000), yet it has never been connected to algorithmic management as an antecedent in any setting. The mechanism through which algorithmic management yields silence in conventional manufacturing workplaces is understudied.

This paper bridges these gaps by developing a conceptual framework that draws on self-determination theory (SDT) (Deci and Ryan, 2000; Gagné et al., 2022) and organisational silence theory (Morrison and Milliken, 2000; Van Dyne et al., 2003) to propose perceived voice futility as the theoretically grounded mediating mechanism connecting algorithmic management to employee silence in conventional manufacturing settings. The framework demonstrates that algorithmic management systematically thwarts employees' basic psychological needs for autonomy and competence. These needs, when satisfied, form the cognitive foundation for believing that their actions, including speaking up, can produce meaningful outcomes (Gagné et al., 2022). When these needs are frustrated, employees develop a generalised belief that voice is non-instrumental: raising concerns is not dangerous, but structurally pointless. This condition is motivationally distinct from fear-driven defensive silence (Van Dyne et al., 2003). This futility belief drives acquiescent silence: a progressive, resignation-based withdrawal from voice behaviours (Morrison and Milliken, 2000; Pinder and Harlos, 2001). An institutional argument further demonstrates why manufacturing SMEs in Malaysia represent a structurally amplified context for this mechanism: HRM informality and resource poverty create conditions under which perceived voice futility is likely to be particularly severe and persistent (Harney and Alkhalaf, 2021; Meurs et al., 2025), compounded by documented digital skill gaps that prevent workers from assessing whether their voice could influence algorithmic systems (Ahmad et al., 2022).

This paper makes three contributions. First, it introduces perceived voice futility as the mediating mechanism connecting algorithmic management to acquiescent silence, extending an established construct into a novel technological context. Second, it provides the conceptual framework addressing algorithmic management effects on employee voice in conventional non-platform manufacturing, directly addressing the platform bias documented by Keegan and Meijerink (2025) and Zhang et al. (2025). Third, it advances a theoretically grounded institutional argument explaining why manufacturing SMEs in Malaysia represent a structurally amplified context for this mechanism. The findings are directly relevant to multiple audiences: owner-managers and managers of Malaysian manufacturing SMEs seeking to understand why AI adoption may be producing worker disengagement rather than operational gains; HR practitioners designing voice mechanisms, reskilling programmes, and wellbeing governance frameworks for algorithmically managed workplaces; and Malaysian policymakers responsible for ensuring that digital infrastructure investment is matched by commensurate workforce governance. When managers, HR practitioners, and policymakers understand the mechanism driving this silence, they are better positioned to design governance frameworks, reskilling programmes, and oversight structures that preserve the human judgment which algorithmic systems cannot replace. The structure of the paper is as follows: Section 2 establishes the contextual background; Section 3 develops the theoretical foundations; Section 4 presents the conceptual framework and propositions; Section 5

discusses HRM intervention pathways; and Section 6 concludes with implications, limitations, and future research directions.

Contextual Background

The Spread of Algorithmic Management Beyond the Gig Economy

Algorithmic management refers to the use of machine-readable data and software algorithms to automate or support managerial functions directing workers' tasks, monitoring their performance, and evaluating their outputs that have traditionally been performed by human managers (Kellogg et al., 2020; Parent-Rocheleau & Parker, 2022). In its original and most-studied form, algorithmic management organises the work of platform-based gig workers: Uber drivers receive algorithmically assigned rides; Amazon warehouse workers receive algorithmically generated pick lists; Deliveroo riders are routed and evaluated by algorithmic systems. The defining characteristic of platform algorithmic management is that the algorithm is the primary governance mechanism without any human managerial layer between the worker and the system.

The adoption of algorithmic management in non-platform settings is now empirically established but theoretically underexplored. Research confirms that 42.3% of EU workers in conventional employment are affected by algorithmic task allocation, scheduling, monitoring, or evaluation. Manufacturing is the second highest-prevalence sector at 37%, behind logistics and warehousing at 44% (Eurofound, 2024). Keegan and Meijerink (2025) characterise this as a shift in which algorithmic oversight now shapes conventional workplaces including warehouses, call centres, and banks, with data-driven supervision extending decisively from the platform economy into mainstream management. Zhang et al. (2025) document comparable patterns across retail, healthcare administration, and financial services confirming that governance by algorithm is no longer a gig economy novelty but an emergent mainstream managerial practice.

Algorithmic management in manufacturing SMEs manifests through predictive maintenance systems that direct operators' attention to anomalies flagged by machine learning models, AI-powered quality control systems that evaluate production outputs and generate performance scores, automated scheduling systems that assign shifts and tasks based on algorithmic optimisation, and real-time productivity monitoring systems that track output rates and flag underperformance (Eurofound, 2024; OECD, 2025). The critical feature of all these systems in the manufacturing context is that they shift the locus of managerial authority from human supervisors to algorithmic processes reducing human discretion, compressing the space for negotiation, and creating a governance architecture in which the algorithm decides and the worker executes. This paper addresses the theoretical challenge of understanding the behavioural consequences of this shift specifically for employee voice in non-platform setting of manufacturing SMEs in Malaysia.

Algorithmic Management in Malaysian Manufacturing SMEs

Manufacturing sector in Malaysia accounts for approximately 23% of GDP and employs around 17% of the workforce (Economic Planning Unit, 2022), with SMEs contributing 38% of GDP and nearly 70% of the total employment (Department of Statistics Malaysia, 2023). The sector has been a primary target of the national Industry4WRD agenda, which aims to accelerate the adoption of Industry 4.0 technologies including artificial

intelligence, the internet of things, robotics, and data analytics across manufacturing operations. Government investment has been substantial: the Smart Automation Grant has approved RM138.5 million for 238 manufacturing companies in labour-intensive industries, with AI and algorithmic systems positioned as key enablers of predictive maintenance, quality control, and process optimisation (MIDA, 2024).

The technology adoption has dramatically outpaced workforce readiness. Ahmad et al. (2022) found that over 60% of Malaysian manufacturing SMEs are unaware of the advantages AI can bring to their businesses. Moreover, the insufficient digital infrastructure and inexperienced workers remain the primary barriers creating a knowledge gap that coexists with government-driven adoption pressure. The HRM context of manufacturing SMEs in Malaysia compounds these challenges in theoretically significant ways. Au et al. (2024) confirm that HRM in Malaysian SMEs is characterised by relational, informal, and ad hoc practices driven by owner-manager discretion rather than formal HR policy. Harney and Alkhalaf (2021) establish that resource poverty and owner/managers influence produce HRM informality that systematically excludes formal voice mechanisms. When algorithmic management is deployed into these environments with no formal grievance channels or structured feedback systems, the stage is set for systematic silence. The mechanism through which that silence operates, however, has not been theorised.

Employee Voice and Silence Under Algorithmic Management: Mapping the Literature Gap

Employee voice refers to employees' discretionary communication of ideas, suggestions, concerns, or information about work-related issues with the intention of facilitating improvement or change (Morrison, 2014; Van Dyne and LePine, 1998). Employee voice encompasses both promotive voice suggestions for improvement and prohibitive voice warnings about risks, failures, or problems (Liang et al., 2012). Employee silence, its counterpart, refers to the withholding of such information despite having it and having the opportunity to share it (Morrison and Milliken, 2000; Morrison, 2023). The relationship between these constructs is not simply one of logical opposites: Morrison (2023) and Van Dyne et al. (2003), distinguish three motivationally distinct forms of silence acquiescent (futility-driven), defensive (fear-driven), and prosocial (other-protecting) each with different antecedents and different managerial implications.

Research on voice and silence under AI-related conditions is now emerging but remains fragmented and contextually limited. Zhang et al. (2025) confirm that the algorithmic management literature has predominantly focused on gig economy and platform settings, with limited attention to conventional employment. Kadolkar et al. (2025) also confirm that algorithmic management research has grown substantially in the gig economy context and that voice behaviour specifically has been studied in platform settings, but conventional manufacturing settings are largely underexplored. There are only handful of studies that examine voice under AI conditions in conventional settings covering narrow or non-comparable populations. Buzás et al. (2025) examine technostress and voice among digitalized office workers in Hungary. Zhou and Lyu (2025) examine how leadership AI awareness shapes voice behaviour through challenge and hindrance stressors. Crucially, none of these studies examine the algorithmic management to voice pathway specifically, and none is set in context of manufacturing SMEs in emerging economies. Moreover, research on algorithmic management remains geographically concentrated in European and North

American contexts with emerging economy manufacturing settings underrepresented (European Parliament Research Service, 2025; OECD, 2025). Thus, there is dearth of research examining the algorithmic management to voice pathway specifically, and in the context of manufacturing SMEs in emerging economies.

The organisational silence literature, meanwhile, has a complementary gap. Morrison (2023) calls for research examining how emerging technological contexts shape voice decisions. Similarly, Andrieu et al. (2024) and Zou et al. (2025) confirm that acquiescent silence rooted in perceived futility is a growing concern in hierarchical organisations experiencing technological change, yet no study has examined algorithmic management as a specific antecedent of the futility belief that drives acquiescent silence. The intersection of algorithmic management, perceived voice futility, and acquiescent silence in conventional manufacturing settings remains untheorized, and this paper addresses that gap directly.

Theoretical Foundations

Self-Determination Theory

Self-determination theory (SDT) is a broad motivational framework that proposes three basic psychological needs: autonomy, competence, and relatedness, as universal requirements for human motivation, well-being, and volitional functioning (Deci & Ryan, 2000; Gagné et al., 2022). Need satisfaction occurs when the work environment actively supports employees' needs for autonomy, competence, and relatedness, fostering intrinsic motivation, sustained engagement, and positive work outcomes. Conversely, need frustration, occurs when environmental conditions hinder these needs resulting in controlled motivation, disengagement, psychological ill-being, and maladaptive work behaviours (Gagné et al., 2022; Ryan and Deci, 2017).

Autonomy, defined as volitional control over one's actions; competence, defined as the belief that one's actions produce intended outcomes; and, relatedness, defined as the need for meaningful connection and responsive engagement with others are particularly consequential for voice behaviour. When workers believe they have no autonomy and competence, their intrinsic motivation to engage in discretionary behaviours including speaking up collapses (Gagné et al., 2022; Ryan and Deci, 2017). Similarly, when algorithmic system displaces human manager as the primary governing authority, workers lose the interpersonal channel through which voice previously formed acknowledgement, dialogue, and action. Thus, in the absence of a responsive human interlocutor, voice loses not only its instrumental value but also its relational meaning.

The application of SDT to the algorithmic management context has been developed primarily by Gagné et al. (2022). They found that algorithmic management systematically thwarts autonomy by removing workers' discretion over task selection, pacing, and execution. It prevents competence by replacing workers' professional judgement with algorithmic evaluation, devaluing their expertise and creating a situation where the machine assesses rather than the worker performs. Furthermore, it undermines relatedness by replacing human manager mediation with machine logic, reducing the interpersonal quality of the supervisor-subordinate relationship.

Critically for the present framework, SDT explains why algorithmic management generates the cognitive appraisal of futility that drives acquiescent silence through all three need frustration pathways. Competence thwarting, professional judgement repeatedly overridden by algorithmic evaluation, produces the belief that voice cannot generate meaningful outcomes. Autonomy thwarting, decisions made by systems rather than negotiated with people, removes the sense that input is part of a responsive governance process. Relatedness thwarting, the human manager displaced from responsive authority and repositioned as an enforcer of algorithmic outputs, removes the interpersonal channel through which voice previously produced acknowledgement and action. Together, these three mechanisms converge on a single appraisal that speaking up is not merely risky but structurally pointless. This multi-dimensional futility appraisal is the mediating mechanism at the heart of this framework.

Organisational Silence Theory

The organisational silence theory propagated by Morrison and Milliken's (2000) proposes that organisations frequently develop climates of silence conditions in which employees routinely withhold potentially useful information, ideas, and concerns. Moreover, these climates represent a significant barrier to organisational learning, change, and performance improvement. The theory identifies two primary drivers of silence: the belief that speaking up is risky (fear-based silence) and the belief that speaking up is futile (futility-based silence). Morrison and Milliken (2000) argued that futility beliefs are particularly consequential because they produce not episodic silence, i.e. workers staying quiet in specific high-risk moments, but systematic withdrawal: the progressive elimination of voice as a default behaviour.

Van Dyne et al. (2003), refined this framework by distinguishing three motivationally distinct types of silence. Acquiescent silence occurs when employees withhold opinions and information as a passive response rooted in resignation, a belief that speaking up will not make a difference. This type of silence is driven by futility rather than fear, and it represents a state of psychological withdrawal in which employees have effectively concluded that their voice has no instrumental value (Pinder & Harlos, 2001; Van Dyne et al., 2003). Defensive silence is fear-driven, i.e. employees stay quiet to protect themselves from negative consequences. Prosocial silence is other-directed, i.e. employees withhold information to protect colleagues or the organisation. Each type has different drivers and consequences. The present framework focuses specifically on acquiescent silence because it is the type that algorithmic management is theoretically predicted to generate through the perceived voice futility mechanism.

Morrison (2023) confirms that the acquiescent silence pathway through perceived futility is theoretically well-established and empirically documented. Repeated experiences of unacknowledged voice lead to acquiescent silence, a passive withdrawal rooted in perceived futility. When such experiences accumulate, they foster a generalised belief that speaking up is futile, leading to a gradual withdrawal from voice engagement due to resignation rather than to fear or self-interest (Andrieu et al., 2024). Morrison (2023) calls for research examining how new technological contexts generate futility experiences among employees. This paper exploring the implications of algorithmic management on workers in conventional manufacturing setting directly instantiates this gap.

Integrating SDT and Organisational Silence Theory: The Explanatory Gap

The combination of SDT and organisational silence theory provides the full explanatory architecture that neither theory alone can deliver for the present research problem. SDT explains the antecedent-to-mediator relationship: algorithmic management frustrates workers' basic psychological needs for autonomy, competence, and relatedness. This generates a multi-dimensional futility appraisal through the convergence of agency loss, efficacy erosion, and relational displacement in an algorithmically governed environment. Organisational silence theory explains the mediator-to-outcome relationship: perceived voice futility, once established as a generalised belief, drives acquiescent silence. This acquiescent silence denotes the systematic withdrawal from voice behaviours across organisational contexts, including the instances where speaking up would be operationally consequential.

Neither theory alone provides the complete chain. SDT does not theorise voice or silence, specifically; Gagné et al. (2022) noted that need frustration reduces discretionary behaviours, but the pathway to silence through futility is undeveloped within SDT. Organisational silence theory identifies futility as an antecedent of acquiescent silence but does not theorise how futility develops under specific workplace conditions. The integration is therefore complementary and necessary: SDT explains how algorithmic management generates futility; organisational silence theory explains how futility generates systematic silence.

The existing literature confirms that this integration has not previously been developed. A systematic search of the algorithmic management, employee voice, and employee silence literatures confirms that perceived voice futility has not been used as a mediating construct in any algorithmic management study in platform or non-platform settings (Andrieu et al., 2024; Keegan & Meijerink, 2025; Kadolkar et al., 2025; Morrison, 2023; Zhang et al., 2025). The integration of SDT and organisational silence theory proposed here is the first to connect algorithmic management to acquiescent silence through a theoretically specified psychological mechanism.

Conceptual Framework and Propositions

Before advancing the propositions, the theoretical scope of this framework requires clarification. The core mediation chain, algorithmic management generating perceived voice futility, which in turn produces acquiescent silence, is proposed as a general mechanism applicable to any conventional non-platform manufacturing setting where algorithmic management is deployed. The need frustration logic of SDT and the acquiescent silence pathway of organisational silence theory are both grounded in fundamental psychological processes that are not culturally or institutionally contingent. A worker in a German automotive plant or a South Korea electronics manufacturer who is subject to equivalent algorithmic monitoring and evaluation is theoretically predicted to experience equivalent need frustration and equivalent voice futility development through the same mechanism. The core propositions that follow are, therefore, offered as generalisable theoretical claims about the algorithmic management and employee voice relationship in conventional non-platform manufacturing.

The manufacturing SMEs in Malaysia function as an amplification argument, not a boundary condition. A boundary condition specifies where a mechanism ceases to operate; an amplification argument specifies where it operates with greater severity. The claim in Section 4.4 is not that perceived voice futility only develops in manufacturing SMEs in Malaysia, but that three structural characteristics: HRM informality, digital capability gaps, and technology-governance decoupling, make the mechanism particularly severe here. Three contextual conditions determine the severity of the proposed futility mechanism: formal voice infrastructure, mature AI governance, and workforce digital capability. Where these conditions are well developed, as in European workplaces governed by works council systems (Eurofound, 2024), jurisdictions operating under the EU AI Act (European Parliament, 2024), or Singapore's Model AI Governance Framework (Personal Data Protection Commission, 2020), workers possess both the institutional channels and the technical capability to engage meaningfully with algorithmic systems, attenuating the futility mechanism. Malaysian manufacturing SMEs lack all three conditions simultaneously, making them not merely a convenient research context but a theoretically consequential one in which the silencing mechanism is structurally amplified.

Algorithmic Management and Perceived Voice Futility

Perceived voice futility is defined here as an employee's generalised cognitive appraisal that speaking up cannot influence the outcomes that govern their work because those outcomes are determined by algorithmic systems that do not respond to human input in the manner of human managers. This definition adapts the core construct from the organisational silence literature (Morrison & Milliken, 2000; Pinder & Harlos, 2001) for the algorithmic management context by specifying the distinctive mechanism through which futility is generated: not a manager who disregards, but a system that is structurally indifferent.

This structural indifference is the theoretically critical distinction. Under human management, voice futility arises from repeated experiences of managers ignoring or dismissing contributions of workers, a social and relational process that is in principle reversible through changes in manager behaviour, relationship quality, or organisational climate. Under algorithmic management, voice futility arises from a qualitatively different source: the architecture of the governance system itself. Workers meet a management system that processes data rather than dialogue, debate, or suggestion. The algorithm does not receive voice like a human manager does; it responds to measurable inputs and generates outputs according to programmed rules. Workers who recognise this architecture whether explicitly or through accumulated experience develop the futility belief not through relational disappointment but through cognitive recognition of structural non-contingency: their voice has no pathway to influence the system that governs their work.

SDT explains why this architectural characteristic generates futility through the mechanism of need frustration. The experience that one's work decisions are made by algorithmic systems rather than through volitional choice thwarts autonomy. This autonomy thwarting removes the sense of agency that forms the belief that one's actions, including voice, can matter. The repeated experience of professional judgement being superseded by algorithmic evaluation thwarts competency. This competency thwarting progressively erodes the sense of self-efficacy, that motivates discretionary behaviours including speaking up.

Gagné et al. (2022), document empirically that algorithmic management reduces workers' sense of autonomous motivation and competence satisfaction in non-platform work settings.

Perceived voice futility can be operationalizable as a distinct construct. Pinder and Harlos (2001), together with Van Dyne et al. (2003), include futility belief items in their silence instruments that provide a validated conceptual foundation. The algorithm-specific dimension attributing non-contingency to an automated governance system rather than to a human manager is theoretically distinct from generic helplessness or low voice efficacy. It should be captured through adapted items that assess whether workers believe their ineffectiveness stems specifically from algorithmic decision-making. This distinction is practically important: the intervention for algorithmic futility differs from the intervention for manager-driven futility. The direction of this relationship is clear and theoretically grounded:

Proposition 1: In conventional non-platform manufacturing workplaces, employees' perceptions of voice futility are positively correlated with algorithmic management intensity. Higher levels of algorithmic direction, monitoring, and evaluation lead to stronger beliefs that speaking up cannot affect work-governing outcomes through the convergent thwarting of autonomy, competence, and relatedness.

Perceived Voice Futility and Employee Silence

Before developing the relationship between perceived voice futility and employee silence, a theoretical nuance deserves acknowledgement. Not all employee silence is organisationally harmful. Van Dyne et al. (2003), and Morrison (2023), both note that prosocial silence withholding information to protect colleagues or the organisation from harm can be constructive, and that strategic restraint from voice is sometimes rational and relational rather than passive and resigned. The framework does not claim that all silence under algorithmic management is problematic. The specific concern is with acquiescent silence: the withdrawal from promotive and prohibitive voice behaviours that carry operational value in manufacturing settings. It is driven by the futility belief that algorithmic systems cannot receive and respond to human input. This focus is theoretically important as it distinguishes the paper's argument from a blanket claim that workers should always speak up, and directs the intervention logic toward the specific form of silence with demonstrably negative consequences for manufacturing quality, safety, and organisational learning.

Once perceived voice futility is established, it is expected to produce acquiescent silence which is rooted in resignation rather than fear (Pinder & Harlos, 2001; Van Dyne et al., 2003). The distinction between acquiescent and defensive silence matters theoretically and practically. Defensive silence is a calculated response to perceived risk: workers stay quiet because they anticipate negative consequences for speaking up. Acquiescent silence is a resigned response to perceived futility: workers stay quiet because they conclude, through repeated experiences, that speaking up does not change the outcome. This distinction has important implications for intervention strategies as strategies designed to reduce fear such as psychological safety measures or anonymous reporting channels may be ineffective or partially effective for acquiescent silence, because the problem is not fear but the cognitive appraisal of non-instrumentality.

In the context of manufacturing SMEs in Malaysia, acquiescent silence carries specific operational consequences that distinguish it from silence in service or knowledge-work contexts. Manufacturing depends critically on frontline workers' situated knowledge, i.e. their direct observation of quality deviations, process inefficiencies, equipment anomalies, and safety hazards that algorithmic monitoring systems may not capture or may detect only after consequential damage has occurred. Prohibitive voice, the warning voice that flags risks and problems before they escalate, is particularly consequential in manufacturing operations where silence in such a context can produce defective products, equipment breakdown and downtime, and workplace injuries. When perceived voice futility drives acquiescent silence in manufacturing workers, it is not only their promotive voice (suggestions for improvement) that is suppressed, it is the prohibitive voice that functions as an early operational warning system. This makes the futility-driven silence pathway particularly consequential in the manufacturing context.

Organisational silence theory provides the precise theoretical mechanism for this pathway. Acquiescent silence is conceptualised as the intentional withholding of critical ideas, suggestions, or information, rooted in a pervasive sense of resignation and diminished self-efficacy (Morrison, 2023; Van Dyne et al., 2003). Morrison (2023) confirms that this type of silence mirrors the core conditions of learned helplessness: a repeated mismatch between actions and outcomes that eventually results in passivity and disengagement. Andrieu et al. (2024) demonstrate through experimental evidence that individuals exposed to repetitive instances of low voice instrumentality were less likely to use new voice opportunities and felt increasingly helpless. The direction of the voice futility to silence relationship is therefore well-grounded.

Proposition 2: Perceived voice futility is positively associated with acquiescent silence among employees in conventional non-platform manufacturing workplaces, such that stronger futility beliefs produce greater systematic withdrawal from promotive and prohibitive voice behaviours.

The Mediation: Perceived Voice Futility as the Novel Mechanism

The framework proposes that perceived voice futility mediates the relationship between algorithmic management and acquiescent silence. This mediation rests on two premises established in Propositions 1 and 2: algorithmic management generates perceived voice futility through need frustration mechanism of SDT, and that perceived voice futility drives acquiescent silence through the resignation logic of organisational silence theory. Together, these constitute a theoretically complete pathway from algorithmic governance to worker silence in conventional manufacturing settings.

The theoretical contribution of this framework is the identification and theoretical grounding of perceived voice futility as a distinct and previously untheorized mechanism that connects algorithmic management to acquiescent silence, that is qualitatively different from fear-driven defensive silence. It has different antecedents, different temporal dynamics, and critically, different intervention implications. Morrison (2023) and Van Dyne et al. (2003) establish clearly that acquiescent and defensive silence are motivationally distinct: acquiescent silence arises from resignation and the belief that voice is non-instrumental, while defensive silence arises from threat appraisal and the calculation that voice carries

personal risk. These are not merely different intensities of the same response; these are different psychological states requiring different organisational responses. A worker who is acquiescently silent needs evidence that their voice can produce outcomes; a worker who is defensively silent needs evidence that their voice is safe. Conflating the two pathways would obscure the intervention logic that the framework generates.

Perceived voice futility as a mediator is therefore positioned here as the theoretically novel mechanism that the algorithmic management literature has not previously identified. It not only explains the pathway from algorithmic management to acquiescent silence but also generates a specific set of intervention implications grounded in the need satisfaction logic of SDT. The direction of the mediation relationship proposed here is:

Proposition 3: Perceived voice futility mediates the relationship between algorithmic management intensity and acquiescent silence, such that the effect of algorithmic management on acquiescent silence operates through the progressive development of futility beliefs generated by the convergent thwarting of autonomy, competence, and relatedness needs.

Figure 1 presents the full conceptual model. The core mediation chain represented by Propositions 1, 2, and 3 is shown in the upper register, with the three need frustration pathways (autonomy, competence, and relatedness thwarting) of SDT illustrated as the mechanism generating perceived voice futility from algorithmic management. The lower register depicts the three institutional amplifying conditions specific to Malaysian manufacturing SMEs, grounded in the empirical sources identified in Section 4.4. These conditions are theorised as amplifiers rather than boundary conditions; the core mechanism operates across non-platform manufacturing contexts but is expected to be most severe where all three amplifying conditions co-exist.

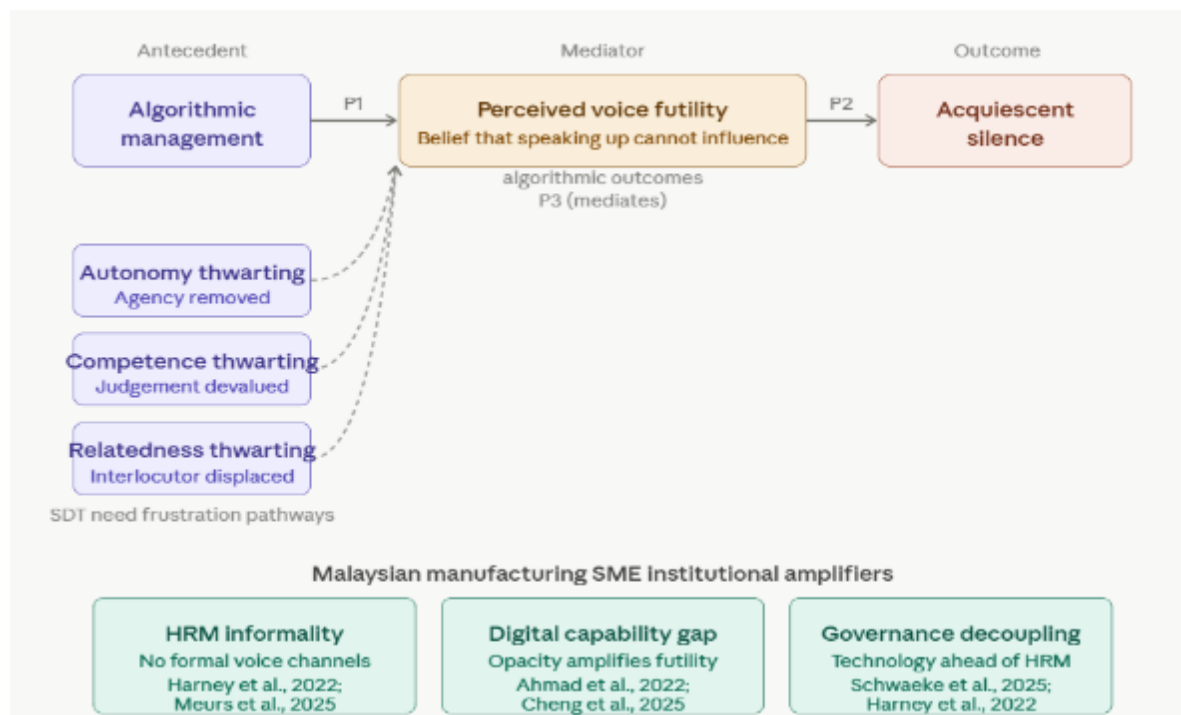


Figure 1: Conceptual framework: Algorithmic management, perceived voice futility, and acquiescent silence.

The Malaysian Manufacturing SME Institutional Context as a Structural Amplifier

The three propositions above specify the core mediating mechanism that is expected to operate in any conventional non-platform manufacturing setting where algorithmic management is deployed. This section advances an additional theoretical argument: the institutional characteristics of manufacturing SMEs in Malaysia, such as HRM informality, resource poverty, and documented digital capability gaps create structural conditions under which the proposed mechanism is expected to be particularly severe and persistent. This is not a claim of theoretical uniqueness; rather, it is a theoretically grounded argument for why this specific context represents a consequential and instructive case for the framework.

The first structural amplifier is HRM informality and resource poverty. Harney and Alkhalaf (2021) and Harney et al. (2022) confirm that SMEs are characterised by inherent resource poverty encompassing not merely financial constraints but the absence of slack, time, and managerial attention for strategic HRM decisions. This resource poverty produces HRM informality: ad hoc, relational, and owner-manager-driven people management practices that substitute for, rather than complement, formal HR systems (Au et al., 2024). Meurs et al. (2025) also confirm that informal HRM practices are a structural characteristic of SMEs driven by resource constraints. These informal HRM practices shape how employees experience need satisfaction in ways that differ fundamentally from formal HRM environments. In the manufacturing context of SMEs in Malaysia, this means that when algorithmic management is deployed, workers have no formal alternative channels through which to voice concerns about how the system affects their work. Voice, in the formal organisational sense, simply does not have an institutional home, making acquiescent silence the structurally default response.

The second structural amplifier is the documented digital capability gap in the Malaysian manufacturing workforce. Khairi et al. (2024) find that a significant gap exists in the availability of skilled personnel within Malaysian manufacturing firms, which hampers the pace and governance of digital transformation. Ahmad et al. (2022) also confirm that over 60% of Malaysian manufacturing SMEs report a lack of skilled workforce as the primary barrier to effective AI deployment. This digital capability gap has a direct theoretical implication for perceived voice futility: workers who do not understand how algorithmic systems make decisions cannot assess whether their voice could influence the system. Opacity breeds futility. When workers cannot even determine whether their concerns about algorithmic decisions are technically articulable, the cognitive appraisal of futility is reinforced by epistemic uncertainty.

The third structural amplifier is the technology-governance decoupling characteristic of manufacturing SMEs in Malaysia. Schwaeke et al. (2025) confirm that resource-constrained SMEs face compounding barriers including inadequate infrastructure, knowledge gaps, cultural resistance, and absent governance frameworks that systematically prevent them from making the complementary investments in reskilling and governance that would enable AI to deliver strategic value. In the manufacturing context of Malaysia, this dynamic is particularly acute. AI and algorithmic management systems are deployed primarily for operational efficiency without corresponding investment in the human governance infrastructure that would create meaningful channels for worker input into the system's operation (Khairi et al., 2024; Schwaeke et al., 2025). Technology arrives ahead of

governance, creating a condition in which workers are subject to algorithmic authority but have no legitimate institutional mechanism for questioning, contesting, or contributing to its decisions. The result is not merely an absence of voice channels; it is a structural condition in which algorithmic management and organisational voice architecture are decoupled, leaving workers with the futility belief as their rational cognitive response to governance by algorithm without governance of algorithm.

HRM Intervention Pathways

The conceptual framework generates three theoretically grounded HRM intervention pathways, each targeting a specific element of the causal chain and designed for the resource constraints of Malaysian manufacturing SMEs.

Algorithmic Transparency and Communicative Voice Channel Design

If perceived voice futility arises from workers' conviction that algorithmic decisions are closed to human influence, the first and most direct intervention is to create visible and meaningful connections between worker voice and algorithmic system behaviour. This requires both algorithmic transparency and the design of voice channels that are explicitly linked to algorithmic governance. Crootof et al. (2023) argue that genuine human oversight of algorithmic systems requires not only formal authority to intervene but the competency, information, and institutional support to make intervention meaningful. Applied to voice, this means workers must be able to see a causal pathway between their observations and the system's operation; otherwise, voice remains cognitively futile regardless of whether formal channels exist.

SDT confirms that competence support, interventions that help workers feel effective in their environment, can partially restore autonomous motivation and discretionary behaviour even under algorithmic conditions (Gagné et al., 2022). For resource-constrained manufacturing SMEs in Malaysia, transparency mechanisms do not need to be elaborate. They can be as simple as regular team meetings at which algorithmic performance data is reviewed with worker input whereby supervisors are explicitly tasked with receiving and recording worker observations about system behaviour (Kellogg et al., 2020). The intervention principle is clear: where voice futility is structural i.e. rooted in the architecture of non-contingency, the response must be structural creating genuine pathways through which worker voice can influence algorithmic governance. However, sequencing also matters: transparency interventions introduced at the point of AI deployment are more effective than retrospective efforts. Once futility beliefs are entrenched through repeated non-contingency, transparency alone is insufficient without accompanying evidence that worker input modifies system behaviour (Andrieu et al., 2024; Morrison, 2023). Managers should treat algorithmic management deployment as a governance event, not merely a technology decision.

Voice Efficacy Development Through Targeted AI Literacy Programmes

The second amplifier of perceived voice futility in Malaysian manufacturing SMEs is the digital capability gap whereby workers who do not understand how algorithmic systems make decisions cannot assess whether or how their voice influences them. This creates a specific form of epistemic futility in which workers lack not only the belief that voice will produce outcomes, but also the basic understanding of how to articulate concerns in ways

that the algorithmic system could meaningfully process or respond to. This suggests a second intervention: targeted AI literacy programmes specifically designed to develop workers' voice efficacy in algorithmically governed environments. Voice efficacy, the belief that one's voice is capable of producing meaningful outcomes, is a well-established predictor of voice behaviour across the organisational behaviour literature (Morrison, 2014; Morrison, 2023). In the algorithmic management context, voice efficacy requires a specific form of digital literacy, not general technology proficiency but algorithmic system literacy: understanding what the system monitors, how it evaluates, where its thresholds lie, and critically, where human judgement remains consequential and cannot be replaced by machine logic.

This distinction between generic digital upskilling and targeted algorithmic literacy is practically significant. Generic digital upskilling programmes, the kind promoted under Malaysia's HRD Corp framework, focus on tool proficiency and software operation. This paper identifies the need for a more targeted approach: developing workers' competency in understanding the human-algorithm interface specifically, where human judgement adds value that algorithms cannot replicate, and how to communicate that value through channels that the system can recognise and respond to. Tee et al. (2024) examining Malaysia's digital skills landscape confirm that the existing national upskilling architecture does not adequately address this human-algorithmic interface gap. Gagné et al. (2022) confirm within SDT that competence support can partially restore intrinsic motivation and discretionary behaviour. Voice efficacy development is, therefore, not merely a training intervention but a need satisfaction strategy targeting the competence thwarting mechanism at the root of perceived voice futility.

In practice, such literacy covers three domains: understanding what the system captures and misses; knowing how to articulate observations in system-legible forms through supervisors or feedback channels; and recognising which aspects of work knowledge remain irreducibly human. Framing this as professional capability development rather than technology training is likely to generate higher engagement particularly where AI is associated with job displacement anxiety.

Repositioning Line Managers as Conduits for Worker Voice

The third intervention addresses the relatedness thwarting mechanism. Algorithmic management reduces the quality of the interpersonal relationship between employee and manager by replacing human discretion with algorithmic determination. The manager becomes an interpreter and enforcer of algorithmic outputs rather than a responsive human authority to whom voice can be directed. Zhang et al. (2025) document this managerial role transformation explicitly, noting that algorithmic oversight alters the managerial authority structure in ways that workers experience as relational and communicative loss. The intervention proposed here is not to reverse this transformation. In resource-constrained SMEs, algorithmic management typically delivers efficiency gains that owner-managers are unlikely to abandon. The intervention proposed here is therefore not to reverse this transformation but to redesign the line manager's role so that it becomes explicitly compensatory by repositioning managers as the human channel through which worker observations about algorithmic system are received, validated, and escalated.

Harney et al. (2022) and Meurs et al. (2025) confirm that in resource-constrained SMEs, owner-manager commitment and the deliberate choices of senior managers are the critical determinants of whether people management practices are enacted; formal HR policy rarely drives behaviour in these settings. This means that voice endorsement as a function of line manager does not require elaborate HR infrastructure; it requires owner-manager deliberate choice to position listening and voice advocacy as part of the supervisor's role definition, and to model this behaviour visibly. Morrison (2014) confirms that managerial openness to voice is among the strongest predictors of voice behaviour, precisely because it directly addresses the futility belief through disconfirming evidence: when managers act on concerns of workers, the belief that speaking up is inconsequential is directly contradicted by experience.

In the algorithmic management context, voice-endorsing managers serve a structurally important function that goes beyond general supportive supervision. They create the human channel through which worker observations about algorithmic system behaviour can re-enter the governance architecture. Without this human channel, the structural non-contingency of algorithmic management produces futility; with it, workers have evidence that their situated knowledge retains value even in an algorithmically governed workplace. This is the relatedness restoration mechanism: the manager acting as a responsive human interlocutor who makes workers' voice feel received, relevant, and acted upon, counteracting the relational displacement that algorithmic management otherwise produces (Gagné et al., 2022; Kellogg et al., 2020).

Discussion, Implications, and Future Research

Theoretical Contributions

This paper makes three contributions. The first is the introduction of perceived voice futility as the novel mediating mechanism in the algorithmic management and employee silence relationship. To the best of our knowledge, this mediator has not been connected to algorithmic management as an antecedent in any setting. By combining need frustration mechanism of SDT with acquiescent silence pathway of organisational silence theory, the framework provides the first theoretically specified psychological chain from algorithmic governance to worker silence in traditional manufacturing advancing both literatures simultaneously.

The second contribution is the theoretically integrated framework investigating effects of algorithmic management on employee voice in conventional non-platform manufacturing. Existing literature ignores non-platform settings, and formally documents this platform bias (European Parliament Research Service, 2025; Jarrahi et al., 2021; Kadolkar et al., 2025; Keegan and Meijerink, 2025; Zhang et al., 2025). Jarrahi et al. (2021) establish conventional settings differ from gig contexts in pre-existing power dynamics, regulatory frameworks, and HRM structures, making platform-derived findings non-transferable.

The third contribution is the contextually grounded institutional argument explaining why manufacturing SMEs in Malaysia represent a theoretically consequential case. By demonstrating that the structural conditions, such as HRM informality, resource poverty, and digital capability gaps, amplify the perceived voice futility mechanism, the paper advances a theoretically grounded contextualisation that goes beyond generic assertions about

emerging economy manufacturing. The institutional argument generates specific theoretical predictions rather than merely describing contextual conditions. The amplification is expected to be most severe in two locations within the framework: in the autonomy and competence need frustration pathways, which are intensified by workers' inability to interpret opaque algorithmic systems, and in the futility-to-silence pathway, which is intensified by the absence of alternative voice channels that HRM informality and governance decoupling systematically preclude. This paper, thus, addresses the call for future research on conventional settings in emerging economic context.

Practical Implications

The primary implication for managers in manufacturing SMEs in Malaysia is to reframe worker silence. Under algorithmic management, silence is more likely to be acquiescent i.e. resignation-based rather than satisfaction-based. Organisations that misattribute worker silence to satisfaction or passive compliance risk overlooking the quality failures, safety concerns, and process inefficiencies. Workers stop reporting these instances not because they lack relevant observations, but because they conclude that reporting is structurally futile. Silence, particularly the absence of operational flags from experienced workers, should be treated as a diagnostic signal of futility-driven disengagement.

This paper presents practical implications for policymakers in Malaysia. The Industry4WRD programme and smart automation grants should incorporate requirements for worker voice channel design and algorithmic transparency as conditions of funding to ensure that technology adoption is accompanied by the governance infrastructure to prevent structural silencing. Upskilling frameworks under HRD Corp should also address human-algorithmic interface competency, not merely technology proficiency.

This paper presents three intervention pathways for HRM practitioners. Given the resource constraints of SMEs in Malaysia, the low-cost strategies are proposed: algorithmic transparency through team meetings; AI literacy through targeted HRD Corp modules; and line manager's role redesign through deliberate positioning rather than structural reorganisation. The silencing effects of algorithmic management can be partially attenuated through governance choices rather than infrastructure investment.

Limitations and Future Research Directions

This paper has several limitations that future research should address. First, as a conceptual paper, the framework generates propositions that remain empirically untested. Quantitative empirical validation through survey-based structural equation modelling with employees of manufacturing SMEs in Malaysia represents the most urgent priority for this research agenda. Second, the framework treats perceived voice futility as a between-person variable comparing workers with higher or lower futility beliefs rather than a within-person temporal process. Longitudinal research designs, including experience-sampling studies tracking workers across multiple months following algorithmic management adoption, would test whether futility deepens progressively as the framework's learned helplessness logic predicts, or whether it is episodic and context-dependent. Third, the institutional amplification argument advanced in Section 4.4 is theoretically grounded but empirically untested at the country level. Comparative research examining whether the three amplifying conditions, HRM informality, digital capability gaps, and technology-governance decoupling,

generate stronger perceived voice futility effects in manufacturing SMEs in Malaysia than in otherwise comparable conventional manufacturing settings with more developed HRM infrastructure would test the boundary conditions of the institutional argument advanced in Section 4.4. Fourth, the framework does not distinguish between promotive and prohibitive voice as dependent variables. Theory suggests that algorithmic management may differentially suppress these voice types: workers may retain some promotive voice (suggestions for improvement) while completely withdrawing prohibitive voice (warnings about risks and failures), because the consequences of ignored prohibitive voice (quality failures, safety incidents) are more cognitively salient and discouraging than ignored promotive voice. Future empirical research should examine this distinction, as it has significant implications for manufacturing safety and quality management under algorithmic governance. Fifth, the moderating role of algorithmic transparency deserves explicit empirical attention as a boundary condition of the framework's propositions. The framework predicts that perceived voice futility mediates the algorithmic management to silence relationship, but this mediation may be weaker or stronger depending on the transparency of the algorithmic systems deployed. Organisations that deploy explainable AI may generate weaker futility beliefs and less severe acquiescent silence than organisations deploying opaque systems, even at equivalent levels of algorithmic management intensity. This boundary condition has practical implications for algorithmic system design and procurement decisions in manufacturing SMEs in Malaysia.

Conclusion

Manufacturing SMEs in Malaysia are deploying algorithmic management systems under Industry 4.0 agenda that prioritises operational efficiency over workforce governance. This paper theorises the behavioural consequence of algorithmic management, i.e. systematic suppression of employee voice through a mechanism of perceived futility. Grounded in self-determination theory and organisational silence theory, the framework developed in this paper proposes perceived voice futility as the novel mediating mechanism connecting algorithmic management to acquiescent silence in conventional non-platform manufacturing. It demonstrates why structural characteristics of manufacturing SMEs amplify this silencing mechanism, making this population and context theoretically important rather than merely convenient. It also presents three theoretically grounded intervention pathways that provide actionable guidance for managers, policymakers, and HR practitioners seeking to prevent the operational harm that systematic silence produces.

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