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Behavioral Sensing and Care Technology in Dementia Facilities: An Analytical Review of Implementation Barriers, Enablers, and Organizational Implications

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Abstract

The integration of behavioral sensing and care technology in dementia care facilities represents a growing operational and strategic priority for care system managers, health system planners, and policymakers confronting the escalating global burden of dementia. Despite substantial and increasing investment in sensing technologies — including motion detection, wearable biosensors, ambient acoustic monitoring, and integrated smart environment platforms — the gap between technology deployment and effective operational integration remains wide, persistent, and insufficiently understood from an organizational and systems analytics perspective (Pappadà et al., 2021). This paper presents an integrative analytical review of the scholarly literature on behavioral sensing and care technology integration in dementia care facilities, organized across five thematic domains: functional architecture and care-relevant capabilities of sensing systems; technology adoption frameworks and evidence patterns in care facility settings; caregiver workflow integration and human factors in technology deployment; organizational readiness, governance, and institutional enablers; and care quality outcomes and decision support implications. The synthesis develops an analytical framework organized around four interdependent implementation dimensions — implementation readiness, workflow alignment, governance and data utilization, and outcome realization — and identifies the conditions under which technology deployment produces sustained operational value and decision-relevant intelligence for care system managers. Principal findings establish that technology integration failure is predominantly organizational rather than technical in origin; that the gap between deployment and deep integration is the most consequential diagnostic distinction in the implementation landscape; and that the decision support function of sensing data — its translation into improved care planning and clinical governance — represents the primary unrealized potential of current technology investment in the dementia care sector. Structured recommendations are advanced for care facility management, health system policy, and future empirical research. The paper is addressed to the health systems and organizational analytics community and contributes a consolidated, decision-relevant framework for understanding and improving technology integration in dementia care contexts.

Keywords: *behavioral sensing technology; dementia care integration; care technology adoption; organizational readiness; caregiver workflow alignment; decision support systems; health systems analytics*

1. Introduction

The global burden of dementia represents one of the most consequential challenges confronting contemporary health systems. According to the World Health Organization, dementia currently affects more than 55 million people worldwide, with projections indicating that this figure will nearly triple to approximately 139 million by 2050 (Lipaj, 2024), driven primarily by aging population demographics across high-, middle-, and low-income countries alike. Alzheimer's disease accounts for the majority of dementia diagnoses and is characterized by progressive cognitive decline, behavioral disruption, functional dependency, and, in advanced stages, near-total reliance on structured care provision. The organizational and resource implications for care facilities — nursing homes, memory care units, residential aged care services,

and specialist dementia wards — are considerable and intensifying. Demand for skilled care labor is outpacing supply in many health systems, cost pressures on long-term care budgets are escalating, and the complexity of managing behavioral and safety risks associated with moderate-to-severe dementia is increasing the operational burden on care institutions.

In this context, behavioral sensing systems and care technology have attracted significant and growing attention as instruments through which care facilities can extend monitoring capacity, support caregiver decision-making, improve resident safety, and enhance the operational efficiency of care delivery. Behavioral sensing encompasses a broad and expanding range of technologies — including passive infrared motion detection, wearable biosensors, ambient acoustic monitoring, video analytics, sleep monitoring platforms, GPS and location-tracking systems, and integrated smart home environments (Lai et al., 2025) — all designed to generate continuous or near-continuous data on resident behavior, physical state, and environmental conditions. When integrated effectively into care workflows, these systems have the demonstrated potential to detect early behavioral changes indicative of clinical deterioration, reduce response times to safety incidents such as falls or nocturnal wandering, and provide structured data inputs to support care planning and clinical governance decisions.

Yet the trajectory from technology deployment to effective care system integration has proven consistently more complex than its technical architecture alone would suggest. The research literature reveals a persistent and analytically significant gap between the deployment of behavioral sensing and care technology in dementia facilities and its effective operational integration into caregiver workflows, institutional governance structures, and care quality improvement processes (Kadem et al., 2026). Technologies are adopted incompletely, used inconsistently, or abandoned following initial installation (Freiesleben et al., 2021). Alert fatigue reduces caregiver responsiveness to system outputs. Workflow misalignment between technology design logic and actual care practices generates friction rather than support (Moore et al., 2025). Institutional readiness — in terms of infrastructure, training, leadership commitment, and data governance — varies substantially across facility types and health system contexts, producing uneven implementation outcomes that cannot be explained by reference to device capability alone (Grigorovich et al., 2021).

These patterns point to a fundamental analytical reorientation that the scholarly and professional literature has been slow to consolidate. The problem of behavioral sensing and care technology in dementia facilities is not primarily a problem of technological adequacy. The dominant questions are organizational, systemic, and decision-relevant: Under what conditions are these technologies successfully integrated into care delivery? What organizational and governance factors determine whether implementation produces measurable improvement in care quality and operational performance? How does technology interact with caregiver workflow, institutional culture, and care system design to either enable or constrain effective use? And what can the existing evidence base, taken analytically, reveal about the decisions that care facility managers, clinical governance bodies, health system planners, and policymakers need to make in order to realize the potential of these technologies at scale?

This paper addresses these questions through an integrative analytical review of the scholarly literature on behavioral sensing and care technology integration in dementia care facilities. It approaches the subject from a health systems and organizational analytics perspective, treating technology integration as a complex implementation phenomenon with identifiable structural determinants, measurable performance implications, and actionable decision relevance for care system stakeholders. The paper does not evaluate specific devices or commercial platforms on their technical merits, nor does it report primary empirical data. Its contribution is analytical: it synthesizes and organizes the existing evidence base across five thematically structured domains, identifies the conditions and dynamics that shape implementation success and failure, and generates a framework of implications relevant to care delivery governance, organizational decision-making, and future empirical inquiry.

The paper is organized around five specific analytical objectives. First, to characterize the functional architecture and care-relevant capabilities of behavioral sensing systems deployed in dementia care contexts, establishing a grounded understanding of what these technologies are designed to do and what data they generate. Second, to examine the theoretical frameworks and empirical evidence that describe technology adoption dynamics in care facility settings, identifying the factors that predict adoption depth, breadth, and sustainability. Third, to analyze the relationship between care technology deployment and caregiver workflow, with particular attention to the human factors, task alignment challenges, and frontline implementation conditions that determine whether technology functions as a support or a burden in practice. Fourth, to assess the organizational readiness conditions, governance structures, and institutional enablers

that distinguish facilities where technology integration produces sustained operational and care quality improvement from those where it does not. Fifth, to evaluate what the evidence suggests about the relationship between technology integration and measurable care quality and decision support outcomes, identifying where the evidence base is robust, where it is contested, and where it remains analytically thin.

Taken together, these objectives position the paper as a decision-relevant analytical resource for care facility administrators, clinical governance leads, health system planners, and policymakers engaged with the challenge of making behavioral sensing and care technology work effectively within the complex organizational environment of dementia care. The paper contributes to the health systems and organizational analytics literature by consolidating a dispersed evidence base, surfacing underanalyzed implementation dynamics, and articulating a structured set of implications for care system decision-making at both facility and system levels.

2. Review of Related Literature

2.1 Behavioral Sensing Systems in Dementia Care: Capabilities and Functional Architecture

Behavioral sensing systems deployed in dementia care environments represent a diverse and technically heterogeneous category of technology, unified by their shared function of generating continuous or near-continuous observational data on resident behavior, physiological state, movement, and environmental interaction. The primary modalities documented in the literature include passive infrared motion detection, wearable accelerometry and biosensor devices, ambient acoustic monitoring, video-based activity recognition, sleep monitoring platforms, GPS and radio-frequency identification tracking systems, and integrated smart environment platforms that combine multiple sensor types within a single data architecture (Lai et al., 2025). Each modality presents a distinct profile of care-relevant capability, data output complexity, infrastructure requirement, and workflow implication — distinctions that the adoption and implementation literature has not always adequately preserved.

The functional case for behavioral sensing in dementia care rests on several well-documented capabilities. Motion and location sensing systems have demonstrated reliable performance in detecting wandering behavior, monitoring nocturnal restlessness, and reducing response times to safety-critical events such as falls and unauthorized egress (Jabbar et al., 2026). Wearable biosensors capable of capturing heart rate variability, galvanic skin response, and sleep architecture have shown promise in detecting agitation episodes before they escalate to observable behavioral crisis, offering a potential early warning function that conventional caregiver observation alone cannot provide at scale (Deters et al., 2024). Acoustic monitoring systems have been evaluated for their capacity to detect vocalizations associated with distress, pain, or disorientation in residents who cannot reliably self-report — a population-specific capability of considerable care relevance given the communication impairments characteristic of moderate-to-severe dementia.

The literature is broadly convergent in affirming that these systems are technically capable of generating care-relevant data in controlled or semi-controlled research conditions. However, a consistent and analytically important tension runs through this evidence base: demonstrated technical capability in research or pilot settings does not reliably translate into operational utility in routine care environments. Studies evaluating sensor performance in laboratory or purpose-built research facilities frequently report accuracy and sensitivity metrics that prove difficult to replicate in the physical, social, and operational complexity of working care facilities, where environmental noise, irregular resident behavior, staff movement patterns, and infrastructure variability all affect system performance (Jabbar et al., 2026). This gap between controlled capability and operational performance is a recurrent finding that carries direct implications for how technology specifications are interpreted by facility procurement decision-makers (Kadem et al., 2026).

A further tension in the literature concerns the relationship between data generation and data use. Systems that generate high-frequency behavioral data streams require not only technical infrastructure to capture and store that data, but analytical and interpretive capacity within care teams to translate data outputs into care-relevant decisions. The literature documenting sensor capability rarely addresses this translation challenge with equivalent analytical depth, tending to treat data generation as functionally equivalent to decision support. This represents a structural gap between the engineering literature on sensing system performance and the care systems literature on decision-making in complex organizational environments — a gap that subsequent themes in this review address directly. In an adjacent behavioral-monitoring context, a Philippine pilot found that a digital sleep diary was feasible for short-term self-monitoring but did not produce a statistically superior improvement over control, while persistent stressors constrained behavioral change (San Juan, Elardo, Atento, & Valderama, 2026).

2.2 Technology Adoption in Care Facilities: Theoretical Frameworks and Evidence Patterns

The scholarly literature on technology adoption in care settings is theoretically well-developed but empirically uneven in its application to dementia and aged care facility contexts specifically. The Technology Acceptance Model, originally developed to explain individual-level adoption behavior in organizational information systems contexts, has been widely applied to healthcare technology adoption and retains explanatory purchase at the level of individual caregiver attitudes — particularly in relation to perceived usefulness and perceived ease of use as predictors of adoption intention. The Unified Theory of Acceptance and Use of Technology extends this individual-level framework by incorporating social influence, facilitating conditions, and hedonic motivation as adoption determinants, offering a more organizationally situated account of adoption behavior (Dingel et al., 2024). Rogers' Diffusion of Innovations framework contributes a system-level perspective, emphasizing the role of relative advantage, compatibility, complexity, trialability, and observability in determining the rate and breadth of technology diffusion across adopter populations (Liu et al., 2023).

Applied to dementia care facility settings, these frameworks collectively illuminate several consistent adoption patterns. First, perceived usefulness remains a powerful predictor of caregiver adoption intention, but perceptions of usefulness are strongly shaped by prior experience with technology, professional role identity, and the degree to which technology outputs are seen as congruent with existing care responsibilities. Caregivers who perceive sensing technology as an extension of their observational and protective function tend to report higher adoption readiness than those who perceive it as surveillance, administrative burden, or a challenge to professional judgment (AboJabel et al., 2024). This finding has been replicated across multiple study contexts and represents one of the more robust behavioral patterns in the adoption literature (Bastoni et al., 2021). A comparable adoption pattern appears in AI-enabled education, where broad exposure to digital tools coexisted with shallower use of advanced adaptive systems and where cost, privacy, bias, support, and institutional readiness shaped adoption conditions (Rao et al., 2025).

Second, the literature indicates that individual-level adoption models, applied in isolation, may be insufficient to explain adoption outcomes in care facility settings (Elavsky et al., 2024). Organizational conditions — including management support, peer behavior, training provision, and infrastructure adequacy — exert independent and often dominant effects on adoption depth and sustainability, effects that TAM-derived models do not fully capture. Studies applying multilevel analytical approaches that incorporate both individual and organizational variables are better positioned to explain technology use behavior among care facility staff (Iseni et al., 2025). This finding has significant implications for intervention design: adoption support programs focused exclusively on individual caregiver attitudes, without addressing the organizational conditions that constrain or enable use, are unlikely to produce sustained integration. Cross-sector evidence from Philippine SMEs similarly suggests that usability and workflow compatibility can be rated strongly while organizational cost and security concerns remain important boundary conditions for technology adoption (Carandang et al., 2026).

Third, the diffusion literature applied to care settings reveals a pattern of adoption breadth without adoption depth — facilities acquire and install care technologies, but deep integration, defined as consistent use of technology outputs in care planning and clinical decision-making, remains less prevalent than surface-level installation metrics suggest. The distinction between adoption as procurement and adoption as operational integration is analytically critical and should be maintained when assessing technology maturity, which includes capabilities, use, and integration in resident care (Alexander et al., 2022). This measurement conflation produces an overly optimistic picture of care technology diffusion that does not correspond to the implementation challenges documented in facility-level studies. A related institutional pattern is visible in Philippine higher education, where widespread digitalization did not necessarily imply deep strategic integration, underscoring the distinction between technological presence and organizational embedding (Atento, 2025).

A notable methodological tension in this literature concerns the unit of analysis. Studies framing adoption as an individual behavioral outcome and studies framing it as an organizational performance outcome reach substantially different conclusions about the determinants of adoption success and the appropriate levers for intervention. This tension reflects differences in emphasis across the literature: technology-acceptance research often focuses on individual users, while healthcare innovation research also emphasizes organizational complexity and context (Bell et al., 2023; Cobelli & Blasioli, 2023). The paper's analytical framework draws on both bodies of work while maintaining primacy for the organizational and systems perspective.

2.3 Caregiver Workflow Integration and Human Factors in Technology Deployment

The interface between care technology and caregiver workflow represents one of the most practically consequential and analytically underserved dimensions of the implementation literature. Workflow, in the care facility context, refers not only to the formal sequencing of care tasks but to the embedded practices, adaptive routines, tacit knowledge, and relational dynamics through which caregivers manage the complex and often unpredictable demands of dementia care delivery. Technologies that are designed without adequate attention to this lived operational reality — or that are implemented without structured workflow redesign — tend to generate friction, workarounds, and ultimately disuse, regardless of their technical capability (Kadem et al., 2026). These technological demands are introduced into caregiving environments already characterized by substantial psychosocial and occupational pressures, including chronic stress, emotional exhaustion, compassion fatigue, and role strain among geriatric and dementia caregivers (Quinto, Bermido, & Atento, 2026). Also, this socio-technical logic is echoed in a Philippine quality-management study, where local tailoring, training sufficiency, digital system availability, leadership support, and human factors differentiated implementation quality and operational efficiency (Gamasan & Atento, 2026).

Alert fatigue is among the most extensively documented workflow problems in the care technology literature and warrants particular analytical attention (Nahid et al., 2025). Behavioral sensing systems that generate high volumes of automated alerts — particularly systems with suboptimal sensitivity-specificity calibration in real care environments — place additional cognitive and attentional demands on caregivers already operating under significant workload pressure. When alert volume exceeds the capacity of care teams to respond meaningfully, caregivers develop adaptive strategies including alert silencing, selective response prioritization, and informal alert triage that are rarely sanctioned by technology governance protocols and that fundamentally compromise the decision support function the technology is designed to provide. The literature on alert fatigue in acute clinical settings, most extensively developed in the intensive care and emergency medicine contexts, has informed but not fully transferred to dementia care facility research, where staffing ratios, skill mix, and workflow structure present distinct characteristics. In another professional setting, AI adoption introduced verification overhead when outputs lacked traceability, illustrating how technology intended to improve efficiency can instead add cognitive work when validation and accountability are weak (Bendal et al., 2026).

Beyond alert management, the literature identifies technology-task fit as a critical determinant of workflow integration quality. Technologies whose interface design, alert logic, and data presentation are congruent with the cognitive structure and temporal rhythm of caregiver task sequences are more consistently used than those that require caregivers to interrupt, reorient, or restructure their workflow to interact with system outputs. Studies applying cognitive task analysis and workflow mapping methodologies to care technology deployment have demonstrated that even modestly redesigned interfaces — incorporating care-task-aligned alert timing, simplified data visualization, and role-specific output filtering — can produce meaningful improvements in caregiver technology engagement without requiring changes to the underlying sensing architecture (Staras et al., 2021).

Training emerges in the literature as a necessary but insufficient condition for workflow integration (Jeyakumar et al., 2021). Studies consistently show that one-time or installation-period training programs produce initial competency gains that decay rapidly in the absence of embedded, practice-based reinforcement (Sharma et al., 2025). Sustained workflow integration is more reliably associated with ongoing, role-specific training supported by clinical leadership, peer mentoring structures, and feedback mechanisms that connect technology use to visible care quality improvements. The quality and duration of training provision varies substantially across care facility types and sizes, with smaller, independently operated facilities consistently reporting lower training capacity than larger institutional or chain-operated providers — a structural inequality with direct implications for technology integration equity across the care sector. The limits of training-only approaches are also consistent with Philippine public-health evidence showing that awareness alone had only weak associations with preventive practice, whereas attitudes and enabling supports were more strongly connected to action (Temporada et al., 2025).

The human factors literature also highlights the role of professional identity and occupational values in shaping technology reception at the frontline (Ackerhans et al., 2024). Caregivers in dementia care settings frequently articulate strong relational and person-centered care values that can generate ambivalence or resistance toward monitoring technologies perceived as depersonalizing, surveillant, or substitutive of human judgment and presence (Wrede et al., 2022). This value-technology tension is not merely attitudinal but reflects genuine questions about the appropriate role of automated sensing in an inherently relational care

context — questions that implementation frameworks need to address explicitly rather than treating as obstacles to be managed through training or communication. Likewise, organizational support has been associated with collaboration, communication, and productivity in Philippine workplaces, reinforcing the broader principle that frontline performance is partly conditioned by the support environment in which tasks are performed (Espelita & Atento, 2026).

2.4 Organizational Readiness, Governance, and Institutional Enablers

The implementation science literature has established organizational readiness as a robust predictor of technology integration outcomes across a wide range of healthcare settings (Taganoviq et al., 2023). In dementia care facility contexts, organizational readiness encompasses a constellation of institutional conditions including leadership commitment and visible championship of technology integration, infrastructure adequacy in terms of network connectivity, device compatibility, and data storage capacity, staff training capacity and learning culture, alignment between technology governance protocols and regulatory compliance requirements, and the degree to which technology integration is positioned within a coherent institutional strategy for care quality improvement rather than as a discrete procurement decision. Within healthcare administration, middle managers implementing PhilHealth Benchbook II reported positive engagement alongside concrete staffing, budget, equipment, and documentation constraints, illustrating how organizational conditions can bound implementation even when attitudes are favorable (Garcia & Atento, 2026).

Leadership behavior consistently emerges as among the most powerful organizational determinants of technology integration success in the care facility literature (Sriharan et al., 2024). Facilities in which senior management actively participates in technology governance, visibly models engagement with technology outputs, and embeds technology performance metrics within care quality accountability frameworks demonstrate substantially higher rates of sustained integration than those in which technology deployment is delegated entirely to operational or IT functions without clinical and strategic leadership involvement. This finding is consistent with the broader organizational change literature and carries specific implications for how care facility boards and management teams conceptualize technology governance as a strategic rather than administrative function. Systems-oriented work in Philippine health professions education similarly argues that leadership, workforce capacity, resource constraints, and institutional viability operate as interdependent rather than isolated implementation conditions (Bermido et al., 2025).

Infrastructure readiness presents a structural challenge that is particularly acute in the aged care sector (Koh et al., 2021), where facility age, building design constraints, variable network infrastructure, and limited capital investment capacity create significant heterogeneity in the baseline conditions available for technology deployment. The literature documents frequent instances of technology implementation failure attributable not to adoption resistance or workflow misalignment but to inadequate physical and digital infrastructure — unreliable wireless connectivity, incompatible legacy systems, insufficient device maintenance capacity, and the absence of data integration architecture capable of connecting sensing system outputs to electronic care record systems. These infrastructure failures are preventable in principle but require pre-implementation readiness assessment protocols that are not consistently applied across the sector. At the health-system level, workforce planning research further highlights long-term-care demand, caregiver supply fragility, competency alignment, and digital documentation capability as structural capacity issues relevant to technology-enabled care systems (Atento, Quinto, & Espelita, 2025).

Data governance — encompassing privacy protection, data ownership, consent frameworks, access control, and the ethical use of continuous behavioral monitoring data — represents an increasingly prominent organizational challenge as sensing systems become more pervasive and data-intensive (Wang et al., 2024). The literature reveals significant variation in how care facilities approach data governance for behavioral sensing systems, ranging from comprehensive institutional frameworks aligned with national privacy legislation and clinical ethics standards to informal and inconsistent practices that expose facilities to regulatory risk and erode the trust of residents, families, and caregivers in technology systems. Governance inadequacy is particularly problematic for video-based sensing modalities, where the intrusiveness of continuous visual monitoring raises resident dignity and consent issues that have not been uniformly resolved across regulatory jurisdictions.

The concept of implementation climate — the shared perception among organizational members that technology integration is expected, supported, and rewarded within the facility — has received growing attention in the health services implementation literature and shows strong relevance to care technology

contexts (Zhang et al., 2024). Facilities characterized by positive implementation climate are more likely to demonstrate skillful, enthusiastic, and committed use of the implemented technology (Williams et al., 2022). Implementation climate is shaped by leadership behavior, peer norms, and organizational communication — conditions that are amenable to deliberate organizational development intervention and require sustained support across implementation and sustainment phases (Ackerhans et al., 2024). A strategic case from Philippine healthcare retail likewise frames digital transformation as a capability-development problem requiring adaptation across organizational systems rather than a stand-alone technology acquisition decision (Atento & Atento, 2025).

2.5 Care Quality Outcomes and Decision Support Implications of Technology Integration

The question of whether behavioral sensing and care technology integration produces demonstrable improvements in care quality and resident outcomes is the ultimate analytical test of the implementation enterprise and the dimension of the literature that carries the most direct decision relevance for care system managers, policymakers, and funders. The evidence base on this question is growing but remains methodologically heterogeneous, with significant variation in outcome measurement, study design rigor, follow-up duration, and the degree to which observed outcomes can be attributed specifically to technology integration rather than to concurrent organizational changes (Deters et al., 2024).

The most consistently documented outcome benefit in the literature concerns resident safety, particularly in relation to fall detection, fall prevention, and response time to safety-critical incidents. Studies evaluating motion sensing and wearable monitoring systems in dementia care facilities report reductions in undetected fall incidents and improvements in post-fall response times, with effect sizes that are clinically meaningful in the context of dementia care, where falls carry elevated injury risk and delayed response compounds harm (Bayen et al., 2021; Ganga et al., 2023). However, methodological limitations — including small sample sizes, absence of randomized designs, short observation periods, and inconsistent control of concurrent care improvement initiatives — constrain the strength of causal inference that can be drawn from this evidence. The literature supports the conclusion that effective technology integration is associated with safety outcome improvements, while remaining appropriately cautious about attributing causality from non-experimental evidence (Bayen et al., 2021; Ganga et al., 2023).

Evidence on the relationship between technology integration and behavioral symptom management in dementia is more mixed. Behavioral and psychological symptoms of dementia — including agitation, wandering, sleep disturbance, and vocalizations — represent both the primary targets of behavioral sensing monitoring and the most complex and variable outcomes to measure and interpret. Several studies report that early detection of behavioral change through continuous monitoring enables earlier care intervention and, in some cases, reduction in pharmacological management of behavioral symptoms (Hatano & Han, 2025; Yuan et al., 2024). However, these findings are sensitive to implementation quality: the decision support benefit of early behavioral detection is contingent on care teams having the capacity, protocols, and clinical guidance to act on early warning signals in a therapeutically appropriate and timely manner. Technology that detects behavioral change but does not trigger a structured clinical response produces data without decision support value (Köhler et al., 2024).

The decision support dimension of technology integration — the degree to which sensor-generated data is systematically used to inform care planning, clinical reviews, and resource allocation decisions — is among the least developed areas of the outcome literature (Andargoli et al., 2024). Most studies that document technology integration in care settings focus on safety outcomes or adoption behavior without examining how, and how effectively, technology data enters care decision-making processes. The relatively sparse literature that does address this dimension suggests that data utilization for decision support is strongly mediated by the analytical capacity of care teams, the quality of data presentation interfaces, the existence of structured data review protocols, and the degree to which technology data is integrated with electronic care record systems rather than existing as a parallel and disconnected information stream (Köhler et al., 2024; Nap et al., 2024). These mediating conditions are organizational and governance issues as much as technical ones, reinforcing the paper's analytical positioning of technology integration as primarily a systems and management challenge. This decision-support logic closely parallels an integrated health and business analytics framework in which data integration and analytics capability create value only insofar as they improve decision quality and are supported by organizational alignment (Atento, Quinto, Espelita, & Castaneda, 2025).

The literature also raises a broader evaluative question about the appropriate outcome framework for assessing technology integration in dementia care. Narrowly clinical outcome measures — fall rates, incident

counts, pharmacological prescription volumes — capture important but incomplete dimensions of care quality (Pappadà et al., 2021). Person-centered care values, which are central to contemporary dementia care philosophy and practice standards, require evaluation frameworks that also attend to resident dignity, autonomy, relational quality, and the experience of care as perceived by residents and families (Ang et al., 2022). The evidence base on these dimensions of technology impact is thin and methodologically challenging (Hoel et al., 2021), but its absence from most technology integration outcome studies represents an analytical gap with significant implications for how care facilities, regulators, and policymakers evaluate the overall value of behavioral sensing investment. The evaluative boundary is also reinforced by Narrative Health Analytics, which argues that computational indicators should complement rather than displace meaning-rich patient experience and should remain subject to interpretive, ethical, and cultural safeguards (Atento, Quinto, Espelita, & San Juan, 2025).

2.6 Synthesis of Literature

The five thematic domains reviewed in this paper converge on a set of analytically coherent patterns that collectively reframe the problem of behavioral sensing and care technology in dementia facilities from a question of technological adequacy to a question of organizational and systems capability. Taken together, the literature presents a picture in which the technical performance of sensing systems is a necessary but structurally insufficient condition for effective care technology integration. The determinative factors are organizational, relational, and governance-related — and they operate across multiple levels simultaneously, from the individual caregiver's workflow experience to the facility's strategic leadership orientation to the broader regulatory and infrastructure environment within which care organizations operate.

Several convergent findings cut across the five themes with sufficient consistency to be treated as analytically robust. First, the distinction between technology installation and technology integration — between procurement and operational embedding — is the single most important analytical boundary in this literature. Studies that conflate these two states consistently overestimate the penetration and impact of care technology in dementia facilities (Berridge et al., 2021). The literature is clear that installation rates have increased substantially, while deep integration — defined as consistent use of technology outputs in clinical decision-making, care planning, and quality improvement — remains considerably less prevalent (Gillam et al., 2021; Pappadà et al., 2021). This gap is not primarily a technology problem; it is a systems implementation and organizational governance problem.

Second, the literature converges on the centrality of workflow alignment as a determinant of integration quality. Technologies that are designed, deployed, and configured in congruence with the cognitive structure, temporal rhythm, and task priorities of dementia care workflows consistently achieve higher and more sustained utilization than those implemented without workflow analysis and redesign (Kadem et al., 2026). Alert fatigue, task interruption, and technology-task misfit are not incidental implementation challenges but predictable consequences of deploying technically capable systems into complex care environments without adequate attention to the human operational context.

Third, organizational readiness — particularly leadership commitment, training capacity, and implementation climate — emerges across multiple themes as the most powerful modifiable determinant of technology integration success at the facility level (Boltz et al., 2024). Individual caregiver attitudes, while relevant, are substantially shaped by organizational conditions and do not constitute an independent or primary explanatory variable when organizational factors are adequately controlled. This convergence has direct implications for where intervention effort should be concentrated in care technology deployment programs.

Fourth, the outcome evidence, while methodologically uneven, is sufficiently consistent in the domain of resident safety to support the conclusion that effective technology integration is associated with meaningful safety improvements (Pappadà et al., 2021). The evidence base is weaker and more contested in the domains of behavioral symptom management, pharmacological reduction, and person-centered care quality — and notably thin in relation to the decision support function of technology data, which remains the least analytically developed dimension of the implementation literature despite being arguably the most strategically significant for care system performance (Watt et al., 2026).

A fifth and cross-cutting pattern concerns equity and structural heterogeneity across the care sector. The conditions that enable successful technology integration — strong leadership, adequate infrastructure, robust training capacity, and coherent governance frameworks — are unequally distributed across facility types, ownership models, and geographic contexts. Smaller, independently operated, and rurally located facilities consistently emerge in the literature as structurally disadvantaged in their capacity to achieve deep technology

integration (Alexander et al., 2022), producing a pattern in which the benefits of care technology are most accessible to facilities already better resourced — an equity dynamic with significant policy implications.

2.7 Gaps in the Literature

Despite the breadth of scholarship reviewed across the five themes, the literature contains several analytically significant gaps that constrain both the strength of available evidence and the applicability of existing findings to care system decision-making.

The most consequential gap concerns the decision support function of behavioral sensing data. Across the literature reviewed, the question of how sensor-generated data is translated into care decisions — and with what quality, consistency, and clinical impact — is addressed only peripherally. The majority of implementation studies treat data generation as the terminal outcome of interest, without following the data through the analytical and interpretive processes by which it does or does not become decision-relevant intelligence for care teams and managers. This gap is particularly significant given that the strategic case for care technology investment rests substantially on its decision support potential, and yet the evidence base for this potential is the weakest and most methodologically underdeveloped strand in the literature.

A second significant gap concerns longitudinal implementation dynamics. The literature is dominated by cross-sectional studies and short-duration evaluations that capture adoption states and outcomes at a single point in time or over periods insufficient to observe the full arc of technology integration — from initial deployment through stabilization, adaptation, and either sustained embedding or gradual disuse. The relative scarcity of longitudinal designs means that the literature has limited capacity to explain how and why integration trajectories diverge over time, what organizational events or conditions trigger adoption reversal, and what sustains deep integration beyond the initial enthusiasm of deployment phases.

Third, the literature exhibits a marked imbalance between studies conducted in high-income, English-speaking health system contexts — primarily the United Kingdom, Australia, the United States, Scandinavia, and the Netherlands — and evidence from middle-income, lower-resourced, or non-Western care system contexts. Given the global distribution of the dementia burden and the growing relevance of care technology for health systems across a wide range of economic and infrastructure contexts, this geographic concentration represents both an empirical gap and an analytical limitation on the generalizability of the convergent findings identified in this review.

Fourth, the person-centered care dimension of technology integration outcomes remains analytically underserved. The literature's predominant reliance on clinical and safety outcome measures does not adequately capture the impact of continuous behavioral monitoring on resident dignity, autonomy, relational care quality, and the subjective experience of living in a technology-embedded care environment (Kadem et al., 2026). As dementia care philosophy has progressively centered person-centered values as the normative standard for care quality, the absence of robust evidence on the alignment or tension between surveillance-oriented sensing technology and person-centered care principles represents a gap with both ethical and practical significance for care system governance.

Fifth, the governance and data stewardship literature as applied specifically to behavioral sensing in dementia care is comparatively thin and lacks the analytical depth available in adjacent fields such as health informatics, clinical data governance, and digital health ethics (Garcia et al., 2025). Finally, the literature lacks a coherent, validated analytical framework that integrates the technical, organizational, human factors, governance, and outcome dimensions of care technology integration into a single evaluative structure usable by care facility managers and health system planners (Kadem et al., 2026). This absence of an integrative analytical framework constitutes both the primary gap motivating the present paper and the central dimension of its scholarly contribution.

2.8 Contribution of the Present Paper

This paper makes several analytically distinct contributions to the literature on behavioral sensing and care technology integration in dementia care facilities. The primary contribution is analytical consolidation. By synthesizing evidence across five thematically structured domains, the paper assembles a coherent and cross-referenced account of the implementation landscape that is not available from any single-theme or single-discipline strand of the existing literature. This consolidation is analytically organized around the central question of what conditions determine whether behavioral sensing and care technology integration produces operational value for care facilities and decision-relevant intelligence for care system managers.

The second contribution is the identification and articulation of the decision support gap as the analytically critical underdeveloped dimension of the implementation literature. The third contribution is a structured framework of organizational and governance conditions — derived from the synthesis across Themes 2, 3, and 4 — that positions care facility leadership, workforce development, infrastructure investment, and data governance as the primary modifiable determinants of technology integration success. The fourth contribution is a candid mapping of the equity dimension of technology integration, surfacing the structural disadvantage of smaller, less-resourced, and geographically peripheral care facilities as a system-level policy concern not previously consolidated in analytical reviews. Collectively, these contributions position the paper as a decision-relevant analytical resource for the health systems and organizational analytics community.

3. Methodology

3.1 Research Design

This paper adopts an integrative literature review design, a methodological approach appropriate for synthesizing knowledge across a body of scholarship that is thematically related but disciplinarily heterogeneous, methodologically varied, and distributed across research traditions that do not converge on a single analytical framework. The integrative review design, as distinguished from systematic review and meta-analytic approaches, permits the inclusion of diverse evidence types — empirical studies, theoretical and conceptual papers, framework development work, evaluation reports, and policy-oriented analyses — and prioritizes analytical synthesis over exhaustive enumeration. This design choice reflects the nature of the problem under examination: the literature on behavioral sensing and care technology integration in dementia care facilities spans health informatics, implementation science, organizational behavior, human factors engineering, clinical gerontology, and health policy, and its analytical value lies not in any single disciplinary strand but in the patterns and tensions that emerge across strands when the evidence is examined through a coherent organizational and systems analytics lens.

The paper does not report primary data. No surveys, interviews, field observations, experimental procedures, or participant data collection were conducted. All analytical conclusions are derived from the synthesis and interpretive analysis of the existing published literature, and are presented as evidence-informed analytical arguments rather than empirical findings. This orientation is transparently maintained throughout the paper and is consistent with the standards applicable to conceptual and integrative review scholarship in health systems and organizational analytics.

3.2 Source Orientation and Database Selection

The literature informing this review was oriented toward peer-reviewed scholarly sources accessible through major academic databases including PubMed, Scopus, CINAHL, PsycINFO, and Google Scholar, with supplementary reference to grey literature sources including World Health Organization technical reports, national aged care regulatory publications, and policy documents from major health systems with established dementia care technology programs. The thematic scope of the review required cross-database searching given the interdisciplinary nature of the subject matter: biomedical and clinical literature was primarily located through PubMed and CINAHL; organizational, management, and implementation science literature through Scopus and PsycINFO; and technology-specific and human factors literature through Scopus and targeted grey literature sources.

3.3 Inclusion and Exclusion Logic

Inclusion criteria were applied to ensure that reviewed literature was relevant to the paper's central analytical question. Sources were included where they addressed one or more of the following: the functional capabilities or operational characteristics of behavioral sensing systems in care environments; technology adoption behavior or adoption determinants in aged or dementia care facility settings; caregiver workflow, human factors, or training in relation to care technology deployment; organizational readiness, governance, or leadership in care technology implementation; or care quality, safety, and decision support outcomes associated with technology integration in dementia or aged care contexts.

Sources were excluded where they addressed care technology in acute hospital or ambulatory clinical settings without relevance to the long-term care facility context; where they addressed dementia care interventions without a technology integration dimension; or where publication quality indicators were

insufficient to support analytical use. No formal date restriction was applied, though empirical studies from 2010 to the present were prioritized to reflect the current generation of sensing technologies. Non-English language sources were excluded on practical grounds, a limitation acknowledged in the gaps analysis.

3.4 Thematic Grouping Logic

Literature was organized into five thematic clusters corresponding to the analytical framework established prior to the review. Thematic assignment was guided by the primary analytical focus of each source, with recognition that several sources carried relevance across multiple themes. The five themes were sequenced to move logically from the technical and functional foundation of the subject matter through adoption dynamics, workflow and human factors considerations, organizational and governance conditions, and finally to outcome and decision support implications — a sequence that mirrors the analytical progression required to address the paper's central research question coherently.

3.5 Analytical Framework and Evaluative Criteria

The analytical synthesis presented in Section 4 is organized around an evaluative framework that assesses the implementation literature against four criteria derived from the review's convergent findings: the presence and quality of evidence for each implementation dimension; the degree of convergence or tension across disciplinary and methodological perspectives; the practical decision relevance of the evidence for care facility managers and health system planners; and the identification of conditions — organizational, governance-related, or systemic — that modify the relationship between technology deployment and care integration outcomes.

3.6 Limitations of the Approach

Several limitations of the integrative review design warrant explicit acknowledgment. The absence of a formal systematic review protocol means that the review cannot claim completeness or replicability to the standard required of systematic reviews. The synthesis reflects the analytical judgment of the authors in source selection, thematic assignment, and interpretive weighting, and should be read as an evidence-informed analytical argument rather than a definitive audit of the literature. The geographic concentration of the available literature in high-income, English-speaking health system contexts constrains the generalizability of the paper's analytical framework and its practical recommendations. Finally, the pace of technological development in behavioral sensing means that specific empirical content should be interpreted in light of the publication timeline of the sources reviewed.

4. Analytical Synthesis

4.1 Overview of the Analytical Framework

The synthesis presented in this section organizes the convergent and divergent findings from the five thematic literature domains into a structured analytical framework addressing the central question of this paper: what conditions determine whether behavioral sensing and care technology integration in dementia care facilities produces operational value and decision-relevant intelligence for care system managers? The framework is organized around four analytically interdependent dimensions — implementation readiness, workflow alignment, governance and data utilization, and outcome realization — each of which represents a necessary condition for effective integration and each of which is susceptible to identifiable failure modes documented in the literature (Wrede et al., 2022).

The framework is grounded in a foundational distinction, established across multiple themes in the literature review, between deployment and integration (Boyle et al., 2022). Deployment — the procurement, installation, and initial activation of behavioral sensing systems — is a necessary precondition for integration but is not equivalent to it. Integration, as defined analytically in this paper, requires that technology-generated data enters and influences care workflows, clinical decision-making processes, and organizational performance management on a sustained and systematic basis. The gap between deployment and integration is the primary explanatory challenge this framework addresses, and it is a gap whose determinants are predominantly organizational rather than technical.

4.2 Implementation Readiness: The Organizational Preconditions for Integration

The literature synthesis across Themes 2 and 4 establishes implementation readiness as the foundational dimension of the analytical framework. Readiness, in this context, is a multi-component organizational condition that encompasses leadership commitment, infrastructure adequacy, training capacity, and implementation climate — and that must be assessed and developed prior to technology deployment rather than treated as a problem to be resolved reactively when integration difficulties emerge post-installation.

The analytical evidence supports a clear typology of readiness states with distinct integration trajectory implications. Facilities characterized by high readiness demonstrate significantly more consistent integration trajectories than those characterized by partial or low readiness. Partial readiness, in which some but not all readiness components are present, produces the most analytically interesting and practically consequential pattern: technology is deployed, achieves initial use, but fails to sustain deep integration as implementation challenges accumulate without the organizational capacity to address them systematically. This partial adoption pattern is, by inference from the literature, the modal implementation outcome across the care sector (Offenbeek et al., 2023).

The leadership dimension of readiness warrants particular analytical emphasis. The evidence is consistent and strong that technology integration does not sustain itself organizationally without visible, active, and ongoing leadership engagement. The pattern of leadership withdrawal following initial deployment — in which senior management treats installation as the completion of an organizational change process rather than its beginning — is a recurrent implementation failure mode documented across multiple study contexts (Grossi et al., 2021). Infrastructure heterogeneity across the care sector represents a structural readiness constraint that organizational intervention alone cannot resolve, producing a structural inequality in integration capacity that has policy implications extending beyond the remit of individual facility management.

4.3 Workflow Alignment: The Operational Interface Between Technology and Care

The synthesis of Theme 3, reinforced by convergent evidence from Themes 1 and 2, establishes workflow alignment as the primary operational determinant of whether technology deployment translates into effective caregiver use. The analytical framework treats workflow alignment not as a static fit between technology design and existing care practice, but as a dynamic and iterative process of mutual adaptation that requires ongoing management attention and organizational support.

Alert management emerges from the synthesis as the most analytically critical and practically immediate workflow challenge. The evidence establishes a direct and dose-dependent relationship between alert volume and alert fatigue (Wangzhen et al., 2026): as alert frequency increases relative to caregiver response capacity, the proportion of alerts that receive timely and appropriate responses declines, and adaptive alert management behaviors emerge as caregiver coping strategies that fundamentally compromise the decision support logic of the sensing system. Alert design is therefore not a secondary technical parameter but a primary organizational design challenge that must be addressed as part of implementation planning and continuously managed as operational conditions evolve.

The evidence also supports the analytical conclusion that technology-task fit is a more powerful predictor of sustained caregiver technology engagement than training provision alone (Bastoni et al., 2021). Workflow analysis and technology configuration — particularly interface design, alert timing, data visualization structure, and role-specific output filtering — should be treated as primary implementation investments rather than post-deployment refinements. The human factors dimension extends beyond task structure to encompass professional identity and occupational values, requiring an organizational communication strategy that explicitly frames sensing technology as an instrument that enhances rather than diminishes the relational and dignitary dimensions of dementia care.

4.4 Governance and Data Utilization: Closing the Gap Between Data Generation and Decision Support

The synthesis across Themes 4 and 5 identifies the governance and data utilization dimension as the most analytically underdeveloped and practically consequential gap in the current implementation landscape. Technologies that generate behavioral data but do not connect that data to structured, systematic, and accountable care decision processes are, from a care systems analytics perspective, underperforming relative to their investment rationale regardless of their technical performance or caregiver adoption levels.

The analytical evidence identifies three interconnected governance conditions that determine whether technology-generated data achieves decision support value (Kadem et al., 2026). The first is data integration

architecture: the degree to which sensing system outputs are technically connected to electronic care record systems rather than existing as parallel, siloed data streams. The second is analytical capacity within care teams: the ability of care staff and clinical leads to read, contextualize, and act on data outputs in relation to individual resident care profiles. The third is accountability structure: the existence of defined roles, protocols, and review processes that assign responsibility for monitoring and acting on technology-generated data within care team governance frameworks.

The data governance dimension also carries a resident rights and ethical compliance dimension that is analytically inseparable from the operational governance question. Facilities that engage residents and families in explicit, ongoing, and meaningful consent processes report higher levels of resident and family trust in technology systems and lower rates of technology-related complaint and conflict — establishing trust as a foundational condition for the sustained, ethically grounded use of behavioral sensing data in care decision-making.

4.5 Outcome Realization: Evidence, Boundaries, and Decision Relevance

The outcome evidence synthesized from Theme 5 supports a differentiated conclusion about the relationship between technology integration and care quality improvement. The evidence is strongest and most consistent in the domain of resident safety, where the combination of continuous monitoring, improved incident detection, and reduced response times produces measurable and clinically meaningful safety benefits (Lahr et al., 2025) in facilities where integration has achieved operational depth. This evidence is sufficient to support care facility decision-making in favor of behavioral sensing investment where safety improvement is a primary operational priority and where the organizational readiness and workflow alignment conditions are present or developable.

The evidence is more qualified in the domains of behavioral symptom management and pharmacological reduction. The analytical synthesis supports the conclusion that technology integration can contribute to improved behavioral symptom monitoring and earlier clinical intervention, but that this contribution is contingent on the decision support governance conditions being in place (Gillam et al., 2021). Technology that detects behavioral change without triggering structured clinical response does not produce behavioral management benefit; the outcome value is conditional on the quality of the organizational response to data signals, not on the quality of the data signals themselves.

The decision support outcome remains the least evidenced but analytically most significant dimension of the outcome framework. The paper's synthesis supports the conclusion that this outcome is achievable under conditions of strong governance, integrated data architecture, adequate analytical capacity, and explicit accountability structures, but that these conditions are not the current norm across the care sector. Realizing the decision support potential of behavioral sensing technology at scale requires a systematic and sector-wide investment in the organizational and governance infrastructure of care decision-making that extends well beyond individual facility technology deployment programs (Wrede et al., 2022).

5. Discussion of Findings and Implications

5.1 Reframing the Technology Integration Problem

The analytical framework developed in this paper carries a foundational implication that extends beyond any specific finding or recommendation: the persistent underperformance of behavioral sensing and care technology in dementia facilities is not primarily a technology problem and cannot be resolved by technology-focused solutions alone (Kadem et al., 2026). The evidence synthesized across five thematic domains consistently points to organizational capability, governance design, workforce alignment, and systems architecture as the determinative variables in integration outcomes — variables that lie within the remit of care system management and health policy rather than technology development.

For care facility managers, the implication is that technology procurement decisions should be preceded and accompanied by organizational readiness assessment and capability development investment of at least equivalent scope and resource commitment. The evidence does not support the assumption that organizational adaptation will follow naturally from technology installation. The causal sequence is closer to the reverse: organizational readiness, workflow design, governance architecture, and leadership commitment are preconditions for integration rather than consequences of it (Garritsen et al., 2025).

5.2 Implications for Health System Planning and Policy

The equity dimension of technology integration carries implications that extend beyond the facility level to the governance responsibilities of health system planners and policymakers. The structural concentration of integration capacity in larger, better-resourced, and institutionally supported care facilities — and the corresponding disadvantage of smaller, independently operated, and geographically peripheral providers — represents a care quality equity concern that market mechanisms and facility-level initiative alone are unlikely to resolve (Zhang et al., 2023).

Health system policy responses might include differentiated technology adoption support programs calibrated to facility size and resource capacity, shared infrastructure investment models, and regulatory frameworks that establish minimum integration standards without imposing disproportionate compliance burdens on smaller providers. The regulatory dimension of behavioral sensing governance also warrants policy attention, with national authorities having a role in clarifying regulatory expectations and providing operationally practical guidance for care facility implementation teams.

5.3 Implications for Care Technology Development and Vendors

The findings carry direct implications for the technology development and vendor community. The consistent evidence that workflow misalignment, alert fatigue, and inadequate data integration architecture are primary drivers of integration failure points to design and implementation support responsibilities that technology developers and vendors are currently not systematically fulfilling (Nascimento et al., 2023). The analytical framework implies that the technology vendor relationship with care facilities should extend well beyond product delivery to encompass pre-deployment readiness consultation, workflow co-design, ongoing alert calibration support, and data utilization capability development.

5.4 Analytical Significance

For the health systems and organizational analytics community, this paper contributes an analytically structured account of a technology integration challenge representative of a broader class of problems confronting health systems as they navigate the deployment of data-generating technologies in complex, human-intensive care environments. The pattern identified here — technically capable technologies achieving deployment without achieving integration, with organizational and governance factors as the primary determinants of the gap — recurs across health information systems implementation, electronic care record adoption, clinical decision support tool deployment, and digital health platform integration more broadly (Olayiwola et al., 2026). The analytical framework offers a transferable evaluative structure for health systems analysts examining technology integration challenges in other care contexts.

5.5 Boundaries of Conclusions from a Conceptual Paper

Intellectual honesty requires explicit acknowledgment of what this paper can and cannot conclude. As an integrative analytical review drawing on secondary literature rather than primary data, the paper's conclusions are evidence-informed analytical arguments rather than empirical findings. The framework and implications presented here are derived from the synthesis of a body of literature that is itself methodologically heterogeneous, geographically concentrated, and, in several analytically critical dimensions, insufficiently developed to support strong causal inference (Proctor et al., 2023). The practical recommendations flowing from the analytical framework should be interpreted as structured, evidence-grounded starting points for care system decision-making rather than as prescriptions with demonstrated efficacy across diverse implementation contexts.

6. Conclusions and Recommendations

6.1 Principal Conclusions

This paper set out to examine the operational and organizational dimensions of behavioral sensing and care technology integration in dementia care facilities, with the analytical objective of identifying the conditions under which these technologies produce operational value and decision-relevant intelligence for care system managers. The integrative review and analytical synthesis support several principal conclusions sufficiently grounded in the evidence base to warrant clear statement.

First, the central implementation challenge of behavioral sensing and care technology in dementia facilities is organizational rather than technical (Adam et al., 2023). The evidence base is consistent and convergent on the finding that technology deployment without adequate organizational readiness, workflow alignment, governance architecture, and leadership commitment produces adoption that is shallow, unstable, and operationally inconsequential regardless of the technical capability of the sensing systems deployed.

Second, the gap between technology deployment and technology integration is the most important diagnostic distinction in the care technology implementation landscape. Deployment rates have increased substantially, but deep integration remains the exception rather than the norm (Kadem et al., 2026). This gap is not self-correcting and will not narrow through technology improvement alone. Third, the decision support function of behavioral sensing technology represents both the primary unrealized potential of current technology integration efforts and the most analytically underdeveloped dimension of the implementation literature (Andargoli et al., 2024). Fourth, structural inequality in technology integration capacity across the care sector constitutes a care quality equity concern requiring policy attention at the health system level (Chen et al., 2025). Fifth, the person-centered care values central to contemporary dementia care practice require an organizational communication and values alignment strategy that explicitly connects technology use to person-centered care quality improvement (Köhler et al., 2022).

6.2 Recommendations for Care Facility Management

Care facility managers and boards should treat technology integration as a strategic organizational development challenge rather than a procurement and installation exercise (Al-Qahtani et al., 2023). Pre-deployment readiness assessment should be a mandatory component of technology investment decision-making. Workflow analysis and technology configuration should be treated as primary implementation investments. Alert management governance should be established as a standing operational management responsibility. Data governance frameworks should be developed and institutionalized before deployment, positioned as a clinical and ethical leadership responsibility rather than exclusively an administrative function.

6.3 Recommendations for Health System Planners and Policymakers

Health system planners and policymakers should develop targeted implementation support programs for smaller, less-resourced, and geographically peripheral care facilities (Kebir & Barczik, 2024). Regulatory authorities should develop operationally practical and behaviorally specific guidance for care facilities implementing continuous behavioral monitoring systems. National and regional health system investment frameworks for care technology should incorporate integration outcome metrics — not merely deployment or installation metrics — as conditions of funding accountability.

6.4 Recommendations for Future Empirical Research

Longitudinal multi-facility studies examining the full arc of technology integration are needed to address the temporal dimension of implementation dynamics that cross-sectional research cannot capture (Elavsky et al., 2024). Empirical research on the decision support function of behavioral sensing data represents the most analytically urgent empirical gap identified in this review (Deters et al., 2024). Studies examining technology integration in middle-income, lower-resourced, and non-Western care system contexts are needed to assess the cross-system generalizability of the implementation framework. Finally, research addressing the relationship between behavioral sensing technology integration and person-centered care quality — developing and validating outcome frameworks that capture dignity, relational quality, and resident autonomy alongside clinical and safety metrics — would substantially advance both the evidence base and the evaluative framework available to care facilities, policymakers, and technology developers.

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