

Human Resource Strategies for an Ageing Workforce and Knowledge Transfer in Ghanaian Public Sector Organisations: Evidence from CSIR-FRI

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Abstract

Population ageing is reshaping public-sector workforces and increasing the risk that organisations lose knowledge when experienced employees retire. This study examines how human resource strategies support an ageing workforce and institutional knowledge continuity at the Council for Scientific and Industrial Research–Food Research Institute (CSIR–FRI), Ghana. Guided by Nonaka and Takeuchi’s SECI knowledge-creation model and Human Capital Theory, the study addresses three objectives: assessing the contribution of knowledge-transfer mechanisms to institutional knowledge preservation, identifying HR strategies used to support an ageing workforce, and examining the workforce-ageing challenges confronting the institute. A quantitative descriptive case-study design was employed. From a population of 71 employees, 60 were randomly selected and 43 questionnaires were returned, representing a 71.7% response rate. Data were analysed using descriptive statistics and the Relative Importance Index. Knowledge-transfer mechanisms were perceived to preserve institutional knowledge to a moderate extent by 53.5% of respondents. Training and development were the highest-ranked HR strategy (RII = 0.781), followed by succession planning (RII = 0.771), whereas health and wellness programmes received the lowest emphasis (RII = 0.702). Ageism and skills gaps were the highest-ranked challenges (RII = 0.762 each). The study shows that HR practices and knowledge-transfer arrangements exist but are not yet sufficiently integrated to secure knowledge continuity. It contributes context-specific evidence from a Ghanaian public research institution and demonstrates the value of combining age-inclusive HR practices with knowledge-conversion processes before experienced employees exit the organisation. The findings identify priorities for policy, succession planning, intergenerational learning, and knowledge repositories in Ghana.

Keywords: ageing workforce; knowledge transfer; human resource strategies; public sector; CSIR-FRI; Ghana

1. Introduction

Population and workforce ageing have become important organisational concerns because longer life expectancy and declining fertility are changing the age composition of labour markets (Kpessa-Whyte, 2018; Pu et al., 2023). The World Health Organization (2022) projects continued growth in the global population aged 60 years and older, while comparable demographic transitions are

increasingly evident in emerging economies. For organisations, the issue is not simply that employees are becoming older. The more immediate managerial question is how to sustain productivity, retain scarce expertise, support employees across the life course, and prevent the loss of institutional knowledge when experienced workers leave or retire (Fasbender et al., 2022; Finsel et al., 2023).

Three related concepts are central to this study. Population ageing refers to an increasing proportion of older people within a national population. Workforce ageing describes an organisational shift toward a higher average employee age and a larger share of workers approaching retirement. Organisational knowledge loss occurs when institutional memory, technical expertise, professional networks, and tacit know-how leave the organisation without adequate transfer or codification. These processes are connected but not identical. Population ageing creates a demographic context; workforce ageing creates an HR management challenge; and knowledge loss becomes an organisational consequence when succession and knowledge-transfer arrangements are weak (Finsel et al., 2023; Kolade et al., 2022).

The challenge is especially important in knowledge-intensive public institutions. Public research organisations depend on cumulative scientific experience, laboratory routines, technical judgement, research networks, and context-specific understanding that often reside in the tacit knowledge of senior employees. Such knowledge cannot always be replaced quickly through recruitment or manuals because it is built through years of practice and social interaction (Nonaka & Takeuchi, 1995). As experienced staff approach retirement, organisations therefore need HR strategies that both respond to age-related workforce needs and deliberately convert individual expertise into knowledge that can be accessed, shared, and reused by others.

Ghana provides an important setting for examining these issues. Demographic ageing is occurring alongside continuing demands for public-sector efficiency, institutional renewal, and improved service delivery (Brimah & Rosenberg, 2021; Kpessa-Whyte, 2018). Studies of ageing in Ghana indicate increasing policy pressure to support older people and adapt institutions to demographic change, while public organisations also face succession, capability, and continuity challenges (Bortei-Doku, 2019; Nortey et al., 2017). Yet the organisational implications of workforce ageing remain less developed in the Ghanaian HR literature than broader demographic or social-policy discussions. The problem is particularly salient for research institutions whose performance depends heavily on accumulated expertise.

The Council for Scientific and Industrial Research-Food Research Institute (CSIR-FRI) provides a useful case. Its scientific and technical mandate requires continuity of research knowledge, laboratory procedures, project experience, and institutional relationships. When senior researchers and technical personnel exit without structured knowledge capture, the organisation risks losing both labour capacity and the accumulated human capital embedded in employees' experience. Conversely, age-inclusive HR practices, succession planning, mentoring, documentation, training, and intergenerational learning may reduce this risk by creating mechanisms through which knowledge is retained and renewed.

Existing studies provide important but fragmented evidence. Research from developed-country settings has examined age-diverse work groups, age-inclusive HR practices, knowledge sharing, bridge employment, and the retention of older employees (Boehm et al., 2021; Fasbender et al., 2021; Froidevaux et al., 2020; Jonsson et al., 2020). Knowledge-management studies have separately demonstrated the value of mentoring, documentation, job shadowing, and structured

learning for institutional continuity (Dimma, 2020; Pfrombeck et al., 2023; Yeboah, 2023). In Ghana, available work has considered ageing policy or human resource development in specific sectors, but there is limited institution-level evidence integrating ageing-workforce challenges, HR responses, and knowledge transfer within public research organisations (Bortei-Doku, 2019; Obiri et al., 2021). This leaves a contextual and empirical gap: it is unclear which HR responses are most visible in such institutions, how employees perceive the contribution of existing knowledge-transfer mechanisms, and which ageing-workforce challenges are most pressing.

Accordingly, this study examines HR strategies for an ageing workforce and knowledge transfer at CSIR-FRI. It pursues three objectives: (1) to assess the extent to which knowledge-transfer mechanisms contribute to the preservation and dissemination of critical institutional knowledge; (2) to identify the HR strategies employed to address the needs and potential of an ageing workforce; and (3) to examine the challenges associated with workforce ageing. Rather than testing causal relationships, the study offers a descriptive institutional diagnosis. Its value lies in bringing together three issues that are often treated separately and situating them in a Ghanaian public-sector research context. Integrating these domains, the study provides a context-specific account of ageing-workforce management and knowledge continuity in Ghana.

2. Literature Review

2.1 Theoretical foundations: knowledge conversion and human capital

The study is anchored in Nonaka and Takeuchi's (1995) knowledge-creation perspective and Human Capital Theory (Becker, 1964). These lenses are complementary because the first explains how organisational knowledge moves between tacit and explicit forms, while the second explains why organisations have an economic and strategic interest in preserving the expertise accumulated by employees.

Nonaka and Takeuchi (1995) distinguish tacit knowledge from explicit knowledge. Tacit knowledge is personal, experience based, and difficult to formalise; it includes professional judgement, laboratory routines, problem-solving heuristics, relationships, and practical know-how. Explicit knowledge can be articulated, documented, stored, and communicated through manuals, reports, databases, standard operating procedures, or formal training materials. The Socialisation, Externalisation, Combination, and Internalisation (SECI) model describes four knowledge-conversion processes. Socialisation transfers tacit knowledge through shared experience, observation, mentoring, and job shadowing. Externalisation converts tacit knowledge into articulated and documented forms. Combination integrates explicit knowledge from different sources into organised repositories, procedures, or training resources. Internalisation occurs when employees absorb explicit knowledge through practice and convert it into individual capability (Nonaka et al., 2001).

The SECI framework is particularly relevant to workforce ageing because retirement can interrupt any of these conversion processes. If senior employees possess important tacit knowledge but the organisation relies only on informal interaction, their departure may remove knowledge that has never been externalised. If documentation exists but is dispersed or poorly maintained, combination is weakened. If younger employees have limited opportunities for supervised practice, internalisation may be incomplete. HR practices such as mentoring, succession planning, job rotation, documentation, intergenerational teams, and structured training can therefore be interpreted as institutional mechanisms that sustain knowledge conversion across generations.

Human Capital Theory provides the strategic rationale for these mechanisms. Becker (1964) conceptualises employees' education, skills, experience, and capabilities as productive assets in which organisations and individuals invest. In a public research institution, experienced scientists, administrators, and technical employees represent a stock of human capital accumulated over long careers. Retirement without knowledge transfer can therefore create a form of organisational depreciation: expertise exits faster than the institution can reproduce it. Training, development, succession planning, and structured knowledge sharing are not merely administrative activities; they are investments in retaining, transferring, and renewing human capital.

Bringing the two perspectives together improves the theoretical logic of the study. The SECI model explains the process through which knowledge can be preserved and transferred, while Human Capital Theory explains the value at risk when that process is weak. The integration is appropriate for CSIR-FRI because the institution depends on both codified scientific knowledge and experience-based expertise. It also enables the findings to be interpreted beyond simple rankings: stronger HR strategies should ideally create conditions for socialisation, externalisation, combination, and internalisation while preserving the productive value embedded in experienced employees.

2.2 HR strategies for an ageing workforce

Ageing-workforce management requires HR practices that recognise employees' changing needs without treating chronological age as a deficit. Research increasingly favours age-inclusive approaches that combine development opportunities, flexibility, fair treatment, wellbeing support, and intergenerational collaboration (Boehm et al., 2021; Fasbender et al., 2022). Such practices matter because older employees are heterogeneous in health, motivation, capability, career intentions, and technology use; policies based on stereotypes may therefore undermine engagement and knowledge sharing.

Training and development remain central. Technological and procedural change can create skills gaps for employees at any career stage, but older workers may face particular barriers when training systems are designed around assumptions that learning is concentrated early in the career. Continuous development can help employees update digital, technical, and managerial skills while signalling that the organisation continues to value their contribution (Fasbender et al., 2022; Wilckens et al., 2021). For knowledge-intensive institutions, training should also be reciprocal: experienced employees may require support with new technologies, while younger employees require access to accumulated scientific and institutional knowledge.

Succession planning is a second critical strategy because it links workforce planning with knowledge continuity. Effective succession is more than identifying replacements for senior positions. It requires early identification of critical roles and knowledge, deliberate development of potential successors, opportunities for overlap, and structured handover before retirement. Froidevaux et al. (2020) show that retirement and bridge-employment arrangements are shaped by organisational practices, while knowledge-transfer research highlights mentoring, job shadowing, documentation, and cross-training as mechanisms for retaining expertise (Dimma, 2020; Yeboah, 2023). In this sense, succession planning is both a staffing process and a knowledge-management process.

Inclusive HR policies and age-sensitive practices also influence whether employees are willing and able to participate in knowledge exchange. An organisational climate that values workers across age groups can improve collaboration, reduce exclusion, and create conditions for

reciprocal learning (Boehm et al., 2021; Fasbender et al., 2021). Health and wellness programmes, flexible work arrangements, and appropriately designed work can further sustain participation by employees whose health or caregiving circumstances change over time. These practices are particularly relevant in the public sector, where formal retirement structures may coexist with limited flexibility in job design.

2.3 Knowledge transfer and intergenerational continuity

Knowledge transfer refers to the processes through which knowledge held by one person, group, or organisational unit becomes available and usable by others. In ageing workforces, the direction of transfer should not be understood as exclusively older-to-younger. Experienced employees often transmit tacit, relational, and institutional knowledge, while younger employees may contribute newer technological knowledge and digital practices. Pfrombeck et al. (2023) demonstrate the importance of knowledge seeking by older employees from younger colleagues, while Burmeister et al. (2018) show that age can shape whether employees are perceived as knowledge senders or receivers. These findings support a reciprocal view of intergenerational learning.

The practical mechanisms are diverse. Mentoring and job shadowing support socialisation by allowing employees to observe judgement and practice in context. Documentation and standard operating procedures support externalisation by converting individual know-how into accessible organisational memory. Training programmes, repositories, meetings, and cross-functional platforms support combination by organising explicit knowledge. Job rotation, supervised practice, and project participation support internalisation by enabling employees to apply what has been documented or explained. Dimma (2020) identified documentation, cross-training, job shadowing, presentations, and meetings as important retention mechanisms, while Yeboah (2023) emphasised the organisational value of deliberate knowledge-retention strategies.

The effectiveness of these mechanisms depends on more than their formal existence. Knowledge transfer can fail when employees do not trust one another, when time for mentoring is not protected, when documentation is not updated, when repositories are difficult to access, or when expertise is concentrated in individuals whose roles have no identified successors. The intergenerational climate is also important. Fasbender et al. (2021) and Pfrombeck et al. (2023) suggest that supportive age-diverse relationships can facilitate learning, whereas humiliation, status differences, and negative age perceptions can inhibit it. Consequently, the study treats knowledge transfer as an organisational capability supported by HR arrangements rather than as an isolated communication activity.

2.4 Challenges associated with workforce ageing

Workforce ageing can expose organisations to several interconnected challenges. Ageism is particularly important because negative assumptions about adaptability, motivation, technology use, or productivity can affect recruitment, development opportunities, task allocation, and interpersonal respect. Such stereotypes may also weaken knowledge transfer if experienced employees perceive that their expertise is undervalued or if younger colleagues are reluctant to seek their knowledge (Francis-Pettway, 2019; Jonsson et al., 2020).

Skills gaps represent a second challenge, especially where technological change is rapid. The issue is not that older employees are inherently less capable of learning, but that cumulative differences in exposure to emerging tools can create capability gaps if organisations underinvest in continuing

development. In research institutions, digital data management, laboratory technologies, and collaborative platforms make continuous upskilling essential. An ageing-workforce strategy therefore needs to combine retention of legacy expertise with active renewal of contemporary skills.

Succession difficulties arise when organisations identify replacement needs too late, when potential successors have inadequate development opportunities, or when there is little overlap between outgoing and incoming role holders. Absenteeism, health constraints, and retirement timing can also complicate workforce planning, although their effects vary across jobs and individuals (Froidevaux et al., 2020; White & Lockett, 2018). The relevant managerial response is therefore not to frame older employees as a problem but to design systems that anticipate changing workforce composition and maintain capacity.

2.5 Public-sector and Ghanaian context

Public-sector organisations face knowledge-continuity conditions that can differ from those of private firms. Career structures are often shaped by formal grades, statutory retirement rules, budget cycles, and centralised HR procedures, while knowledge may be distributed across long-serving employees whose expertise has developed through repeated engagement with public mandates. These features can make replacement slower and increase the value of planned handover. In research institutions, the risk is intensified because technical knowledge is frequently linked to specialised equipment, long-running projects, scientific networks, and locally developed procedures that are not fully represented in formal job descriptions.

Ghanaian evidence also suggests that ageing and human resource development need to be interpreted within institutional constraints rather than transferred uncritically from developed-country settings. Kpessa-Whyte (2018) and Braimah and Rosenberg (2021) show that demographic ageing is becoming increasingly relevant to Ghanaian policy, while Obiri et al. (2021) identify coordination and sustainable capability development as important HR concerns in a strategic Ghanaian sector. These studies do not directly examine ageing-workforce knowledge transfer in public research institutions, but they underline the importance of context-specific organisational evidence.

For CSIR-FRI, the key issue is therefore not merely retention of older employees. It is whether the organisation can convert individual experience into collective capability while continuing to renew skills. This requires attention to both directions of intergenerational exchange: senior employees may hold tacit research and institutional knowledge, whereas younger employees may contribute newer digital skills, recently acquired technical knowledge, and alternative work practices. A framework that treats one generation exclusively as the sender and another exclusively as the receiver would overlook this reciprocity. The present study accordingly interprets ageing-workforce management as an organisational system involving preservation, renewal, inclusion, and transfer.

2.6 Empirical gap and conceptual organisation

The literature establishes that age-inclusive HR practices, succession planning, and intergenerational knowledge processes are important, but three gaps remain relevant. First, much of the evidence is drawn from developed economies and sectors such as healthcare or private business, leaving public research organisations in Sub-Saharan Africa comparatively underexamined. Second, Ghanaian studies have more often addressed demographic ageing, ageing

policy, or broader human resource development than the organisational intersection of ageing-workforce management and knowledge continuity (Bortei-Doku, 2019; Obiri et al., 2021). Third, the existing streams are frequently studied separately even though HR strategies, knowledge-transfer mechanisms, and ageing-related challenges are institutionally interdependent.

The conceptual framework therefore uses HR strategies for an ageing workforce, knowledge-transfer mechanisms, and ageing-workforce challenges as three connected descriptive domains. HR strategies include training and development, succession planning, inclusive HR practices, health and wellness programmes, and age-sensitive practices. Knowledge-transfer mechanisms include mentoring, documentation, job rotation, and intergenerational learning. Ageing-workforce challenges include ageism, skills gaps, absenteeism, retirement-related issues, and succession difficulties. The framework is not presented as a causal model because the research design is descriptive. Instead, it organises the questionnaire and analysis and provides a theory-informed basis for interpreting whether existing HR arrangements appear adequate for sustaining institutional knowledge.

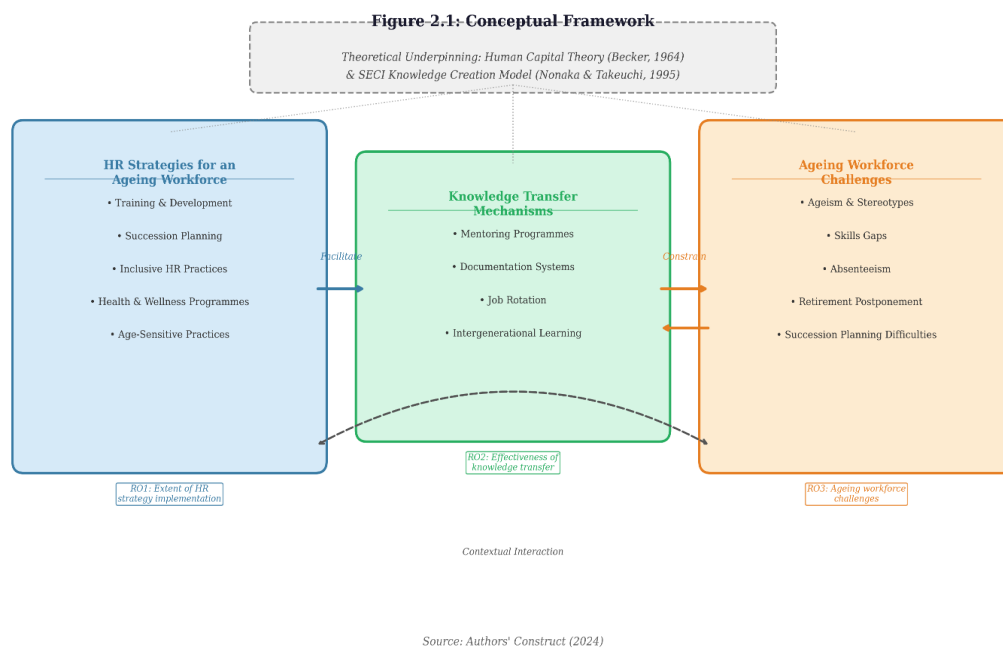


Figure 1. Conceptual framework
Source: Authors' construct (2024).

3. Methodology

3.1 Research design and study setting

The study adopted a quantitative descriptive case-study design. A quantitative approach was appropriate because the objectives required numerical summaries of employees' perceptions of knowledge-transfer mechanisms, HR strategies, and ageing-workforce challenges (Saunders et al., 2016). The design was descriptive rather than explanatory: the study did not manipulate variables

or test causal relationships. Instead, it sought to assess the extent of existing practices, rank their relative prominence, and describe the challenges perceived by employees at CSIR-FRI.

CSIR-FRI was selected as the institutional setting because it is a public research organisation whose mandate depends on scientific, technical, and administrative knowledge accumulated over time. The case therefore provides a relevant setting in which to examine workforce ageing and knowledge continuity. The study used primary survey data, supported by literature and institutional context drawn from secondary sources.

The institutional context also shaped the choice of a single-case descriptive design. CSIR-FRI is not treated as statistically representative of the Ghanaian public sector; rather, it is examined as an information-rich setting in which scientific work, technical specialisation, and public-service employment intersect. This distinction is important for interpretation. The study can identify patterns that merit managerial attention and future comparative testing, but it cannot estimate national prevalence. The unit of analysis is the organisation, while individual employees provide the perceptual data used to describe the three study domains.

3.2 Population, sample, and sampling

The target population comprised 71 CSIR-FRI employees identified as having relevant knowledge of the organisation and its HR and knowledge-sharing practices. A planned sample of 60 employees was derived from the known finite population using Slovin's formula at a 5% margin of error. Although the formula produced a sample of approximately 60, the small population means that a census would also have been feasible; this issue is acknowledged in the limitations.

Simple random sampling was used to select the 60 potential respondents from the staff register provided by the CSIR-FRI Human Resources unit. This procedure was intended to give each employee in the sampling frame an equal opportunity for selection (Creswell & Creswell, 2017). Forty-three usable questionnaires were returned, yielding a 71.7% response rate. Because respondents were drawn from different age groups, the data represent organisation-wide perceptions of ageing-workforce and knowledge-transfer practices rather than the experiences of older employees alone.

3.3 Instrument and measurement

Data were collected with a structured questionnaire consisting of demographic items and three substantive sections aligned with the study objectives. The first substantive section contained five items assessing the extent to which knowledge-transfer mechanisms contribute to institutional knowledge preservation. Responses were recorded on a five-point scale ranging from 1 = to no extent to 5 = to a very high extent. The second section contained five items on HR strategies for an ageing workforce, and the third contained six items on ageing-workforce challenges. These items were rated on five-point significance scales.

Questionnaire items were developed from the constructs identified in the literature and adapted from prior work on age and knowledge transfer, age-inclusive HR practices, and intergenerational learning (Burmeister et al., 2018; Pfrombeck et al., 2023; Wilckens et al., 2021). The instrument therefore operationalised the three descriptive domains represented in the conceptual framework: knowledge-transfer mechanisms, HR strategies, and ageing-workforce challenges.

3.4 Validity, reliability, data collection, and ethics

Content validity was assessed by two senior academics with expertise in human resource management, who reviewed the questionnaire for relevance, clarity, and coverage. Face validity was examined through a pilot test involving five CSIR-FRI employees who were excluded from the final sample. Feedback from the pilot informed refinements to item wording and presentation. Internal consistency was assessed using Cronbach's alpha. The coefficients were .78 for knowledge-transfer mechanisms, .81 for HR strategies, and .76 for ageing-workforce challenges, exceeding the commonly used .70 criterion (Nunnally, 1978).

The questionnaire was administered personally across functional units of CSIR-FRI, and selected employees were given two weeks to respond. Participation was voluntary. The source manuscript reports that ethical clearance was obtained from the Institutional Research and Ethics Committee and that informed consent was obtained before participation. Respondents were assured that the information supplied would be used only for the stated research purpose and that individual identities would not be disclosed.

3.5 Data Analysis

Data screening preceded analysis to identify incomplete or unusable responses. Descriptive statistics were then used to summarise the respondent profile and the distribution of responses. Frequencies and percentages were used for categorical information, while mean values and the Relative Importance Index (RII) were used to rank HR strategies and ageing-workforce challenges. Analyses were conducted using SPSS Version 27 and Microsoft Excel.

The RII was calculated as $RII = \Sigma(an)/(5N)$, where a is the weight assigned to a response category, n is the frequency of that response, 5 is the maximum scale weight, and N is the number of valid respondents. RII values approach 1 as perceived importance increases (Holt, 2014). The technique was appropriate because Objectives 2 and 3 sought to identify and rank the relative prominence of strategies and challenges rather than estimate causal effects. Objective 1 was reported primarily through the observed response distribution because it asked about perceived extent of contribution.

No inferential statistical tests were used. This decision is consistent with the descriptive objectives, the single-organisation case design, and the effective sample of 43 respondents. Consequently, the findings should not be interpreted as evidence that one construct causes or statistically predicts another. The conceptual framework provides an organising logic for interpretation, not a tested structural model.

4. Results

4.1 Response and respondent profile

Of the 60 questionnaires distributed, 43 were completed and returned, producing a response rate of 71.7%. Table 1 summarises the response pattern and demographic profile. Men represented 53.5% of respondents and women 46.5%. The largest age category was 36–41 years (30.3%), followed by 24–29 years (25.6%). Only 13.9% of respondents were in the 41+ category. The profile therefore reflects a predominantly early- to mid-career respondent group, an important consideration when interpreting perceptions of workforce ageing.

Most respondents had worked at CSIR-FRI for 1–7 years (39.5%) or 8–14 years (37.2%), while 23.3% reported 15 or more years of service. Educational attainment was high: 55.8% held bachelor's degrees, 30.2% master's degrees, 9.3% Diploma/HND qualifications, and 4.7%

doctorates. The data therefore capture perceptions from a relatively well-educated workforce with varying organisational tenure.

Table 1. Response and respondent profile

Profile	Category	n	%
Survey response	Completed and returned	43	71.7
Gender	Male	23	53.5
Gender	Female	20	46.5
Age	18–23	6	13.9
Age	24–29	11	25.6
Age	30–35	7	16.3
Age	36–41	13	30.3
Age	41+	6	13.9
Marital status	Single	19	44.2
Marital status	Married	24	55.8
Tenure	1–7 years	17	39.5
Tenure	8–14 years	16	37.2
Tenure	15–21 years	6	13.9
Tenure	21+ years	4	9.4
Education	Diploma/HND	4	9.3
Education	Bachelor's degree	24	55.8
Education	Master's degree	13	30.2
Education	Doctorate degree	2	4.7

Note. n = 43 except the response-rate row. Source: Authors' field data (2024).

4.2 Knowledge-transfer contribution

Objective 1 assessed the perceived extent to which knowledge-transfer mechanisms preserve and disseminate critical institutional knowledge. As shown in Table 2, 53.5% of respondents rated the contribution as moderate. A further 20.9% reported a low extent and 2.3% no contribution, while 16.4% reported a high extent and 6.9% a very high extent. The modal response is therefore moderate rather than high, suggesting that knowledge-transfer practices are present but are not perceived as consistently strong across the institution.

4.3 HR strategies for an ageing workforce

Objective 2 ranked the HR strategies used to support the ageing workforce. Training and development was ranked first (mean = 3.91; RII = .781), followed by succession planning (mean = 3.86; RII = .771). Avoiding stereotypes and workforce familiarisation ranked third (mean = 3.84; RII = .769), while inclusive HR policies ranked fourth (mean = 3.74; RII = .750). Health and wellness programmes received the lowest rating among the five strategies (mean = 3.51; RII = .702). Although all RII values exceeded .70, the pattern indicates that capability development and succession receive more emphasis than employee wellbeing.

4.4 Ageing-workforce challenges

Objective 3 examined the challenges associated with workforce ageing. Ageism and skills gaps jointly ranked first (mean = 3.81; RII = .762 for each). Succession-planning challenges followed (mean = 3.53; RII = .707), then absenteeism (mean = 3.49; RII = .697). Postponed retirement

(mean = 3.14; RII = .628) and general bias (mean = 3.07; RII = .614) were lower-ranked but remained present. Overall, the highest-ranked concerns combine behavioural issues, particularly ageism, with capability and continuity risks, particularly skills gaps and succession planning.

Table 2. Results aligned with the three research objectives

Domain / item	Statistic 1	Statistic 2	Ran k
Knowledge transfer: moderate extent	n = 23	53.5%	1
Knowledge transfer: low extent	n = 9	20.9%	2
Knowledge transfer: high extent	n = 7	16.4%	3
Knowledge transfer: very high extent	n = 3	6.9%	4
Knowledge transfer: no extent	n = 1	2.3%	5
HR strategy: training and development	Mean = 3.91	RII = .781	1
HR strategy: succession planning	Mean = 3.86	RII = .771	2
HR strategy: avoiding stereotypes/workforce familiarisation	Mean = 3.84	RII = .769	3
HR strategy: inclusive HR policies	Mean = 3.74	RII = .750	4
HR strategy: health and wellness programmes	Mean = 3.51	RII = .702	5
Challenge: ageism	Mean = 3.81	RII = .762	1
Challenge: skills gaps	Mean = 3.81	RII = .762	1
Challenge: succession planning difficulties	Mean = 3.53	RII = .707	3
Challenge: absenteeism	Mean = 3.49	RII = .697	4
Challenge: postponed retirement	Mean = 3.14	RII = .628	5
Challenge: bias	Mean = 3.07	RII = .614	6

Note. RII = Relative Importance Index. Source: Authors' field data (2024).

5. Discussion of Results

5.1 Knowledge-transfer mechanisms and institutional continuity

The finding that 53.5% of respondents perceive knowledge-transfer mechanisms as contributing to institutional knowledge preservation only to a moderate extent is important for a research-intensive public institution. It suggests that knowledge sharing occurs at CSIR-FRI but may not yet be embedded strongly enough to guarantee continuity when experienced employees leave. This interpretation is consistent with studies showing that mentoring, documentation, job shadowing, meetings, and cross-training can preserve organisational knowledge, but their effectiveness depends on systematic implementation rather than their informal presence alone (Dimma, 2020; Yeboah, 2023).

The result can be interpreted directly through the SECI model. If knowledge transfer is experienced as moderate, socialisation may be occurring through everyday interaction and informal mentoring while externalisation and combination remain less developed. In other words, employees may share knowledge person to person without consistently converting that knowledge into manuals, protocols, repositories, or other institutional forms that survive individual departure. For CSIR-FRI, this distinction matters because scientific and technical work combines explicit procedures with tacit judgement acquired through repeated practice. Reliance on informal socialisation alone creates vulnerability when the employee who holds the tacit knowledge retires.

Human Capital Theory reinforces the significance of this finding. The experience held by senior researchers and technical staff represents accumulated human capital developed through education, organisational learning, and repeated problem solving (Becker, 1964). When that expertise leaves without sufficient transfer, the institution must recreate capability through recruitment and training. The moderate result therefore represents more than a knowledge-management concern; it signals a potential loss of productive organisational capital. A stronger approach would connect mentoring and handover directly to codification, repositories, and supervised practice so that knowledge moves through multiple SECI modes rather than depending on a single channel.

5.2 HR strategies for the ageing workforce

Training and development emerged as the most prominent HR strategy, followed closely by succession planning. The prominence of training is consistent with age-inclusive HR research, which argues that continuing development helps employees maintain capability as technologies, procedures, and job demands change (Fasbender et al., 2022; Wilckens et al., 2021). In a research institution, where scientific methods and digital tools evolve continuously, this emphasis is understandable. Importantly, training should not be treated only as remediation for older workers. Intergenerational learning implies a reciprocal model in which experienced staff transmit institutional and technical knowledge while younger employees may contribute newer digital or technological competencies (Pfrombeck et al., 2023).

The high ranking of succession planning is similarly encouraging because succession creates a formal bridge between workforce planning and knowledge continuity. Froidevaux et al. (2020) emphasise that organisational arrangements shape retirement transitions, while Dimma (2020) and Yeboah (2023) show that structured handover mechanisms are critical for knowledge retention. Yet the moderate rating for knowledge-transfer effectiveness creates an important tension in the results. If succession planning is highly ranked but knowledge transfer remains only moderate, succession may be recognised as important without being sufficiently institutionalised through documentation, overlap periods, mentoring accountability, and explicit knowledge-capture requirements. The descriptive design cannot test this explanation, but the pattern identifies a useful organisational question for management.

Avoiding stereotypes and implementing inclusive HR practices were also rated relatively highly. This result aligns with evidence that a supportive age-diversity climate facilitates collaboration and reduces barriers to knowledge exchange (Boehm et al., 2021; Fasbender et al., 2021). For knowledge transfer, inclusion has a functional value: employees are more likely to participate as knowledge senders and receivers when they feel respected and when competence is not inferred solely from age. Health and wellness programmes were the lowest-ranked HR strategy. The result should not be interpreted as evidence that wellbeing is unimportant. Rather, it indicates that respondents perceive it as less prominent than training, succession, and inclusion within the current HR response. Because the study did not collect budgetary or policy implementation data, explanations such as resource constraints cannot be established empirically. Nevertheless, the finding points to a potential imbalance in ageing-workforce management: capability and continuity are being addressed more visibly than health-related support. Age-inclusive HR systems are stronger when development, wellbeing, flexibility, and career continuity operate together rather than as separate initiatives.

A further contextual implication concerns the relationship between formal public-sector procedures and informal knowledge practices. Public institutions may have established training and succession arrangements while still depending heavily on interpersonal routines for the transfer of specialised know-how. The present pattern—high rankings for training and succession alongside only moderate perceived knowledge-transfer effectiveness—is compatible with such a possibility, although the survey cannot establish the mechanism directly. Future organisational audits could therefore compare formal HR policies with actual handover records, mentoring activity, repository use, and retirement-transition practices. This would help distinguish between policies that exist on paper and practices that produce durable organisational memory.

5.3 Challenges of workforce ageing

Ageism and skills gaps were jointly the highest-ranked challenges. The prominence of ageism is consistent with research showing that negative assumptions about older employees can affect opportunities, social inclusion, and willingness to exchange knowledge (Francis-Pettway, 2019; Jonsson et al., 2020). In SECI terms, an ageist climate can weaken socialisation because tacit knowledge transfer depends on interaction, trust, and recognition. If experienced employees feel marginalised, they may have fewer opportunities or less motivation to share expertise; if younger employees view senior colleagues through stereotypes, they may be less willing to seek knowledge from them.

The high ranking of skills gaps complements this finding. Rapid technological change can create mismatches between existing capabilities and emerging work requirements, particularly where continuing development is uneven. However, the intergenerational literature cautions against equating age with technological inability. Pfrombeck et al. (2023) demonstrates that older employees can benefit from knowledge seeking from younger colleagues, suggesting that skills gaps may be addressed through reciprocal learning rather than one-directional training. For CSIR-FRI, this is especially relevant because digital research tools and institutional knowledge repositories can become both the object and the medium of knowledge transfer.

Succession-planning challenges ranked third despite succession planning being the second-highest HR strategy. This apparent contradiction is analytically useful. It suggests that the existence or perceived importance of succession activity does not necessarily eliminate implementation difficulties. Succession may be constrained by timing, limited role overlap, insufficient documentation, or uncertainty over successors. The data cannot identify which mechanism is responsible, but the coexistence of a highly ranked strategy and a highly ranked challenge indicates that management should assess not only whether succession policies exist but how consistently they operate.

Absenteeism, postponed retirement, and general bias ranked lower than ageism, skills gaps, and succession difficulties. These results suggest that the most salient issues at CSIR-FRI concern knowledge, capability, and workplace climate rather than retirement timing alone. This is an important contextual observation. Workforce ageing in a public research institution should therefore be managed as a knowledge-continuity and inclusion issue, not merely as a headcount or retirement problem. The integrated theoretical view supports this interpretation: Human Capital Theory identifies the value embedded in experienced employees, while the SECI model specifies the mechanisms through which that value can be transferred, combined, and renewed.

6. Research Contributions

The study makes three specific contributions to the literature and practice of ageing-workforce management.

First, it provides a contextual empirical contribution by bringing evidence from a Ghanaian public research institution into a literature that is dominated by developed-economy and private-sector settings. Existing research has established the relevance of age-inclusive HR practices and intergenerational knowledge sharing, but less is known about how these issues are experienced in Sub-Saharan African public organisations. By showing that knowledge transfer is perceived as only moderately effective while training, succession planning, ageism, and skills gaps are highly salient, the study identifies a distinctive institutional configuration that warrants greater attention in African HR research.

Second, the study offers a theoretical integration of the SECI knowledge-conversion model and Human Capital Theory. Rather than treating ageing-workforce management as a set of employee-support practices, the combined lens conceptualises it as a process of preserving and renewing valuable organisational capital. The findings illustrate why training, succession, inclusion, and knowledge transfer should be connected: Human Capital Theory explains the value embedded in experienced employees, while SECI clarifies how that value can move from individual tacit expertise into shared organisational capability. This integration provides a stronger basis for interpreting workforce ageing as both an HR and a knowledge-governance issue.

Third, the study provides a practice and policy contribution by translating employee perceptions into priorities for institutional action. The coexistence of highly ranked succession planning with only moderate knowledge-transfer effectiveness suggests that the quality of implementation deserves as much attention as the formal existence of HR programmes. Likewise, the simultaneous prominence of ageism and skills gaps indicates that public-sector responses must combine inclusion with capability renewal. These findings support an integrated age-management approach in which succession planning, mentoring, documentation, intergenerational learning, digital upskilling, and wellbeing are designed as a coordinated knowledge-continuity system rather than as isolated HR interventions.

These contributions are deliberately bounded by the descriptive design. The study does not claim that the identified HR strategies cause stronger knowledge transfer, nor that the CSIR-FRI pattern represents all Ghanaian public organisations. Its contribution is diagnostic and theory-informed: it specifies a context, identifies organisational priorities, and provides a platform for subsequent explanatory research that can test the relationships suggested by the integrated framework.

7. Practical and Policy Implications

For CSIR-FRI, the findings point to the need for a more explicit knowledge-continuity architecture around retirement and career transitions. Structured mentoring should pair experienced researchers and technical staff with identified successors or junior colleagues and specify learning objectives, transfer milestones, and documented outputs. Succession planning should begin well before expected retirement so that role overlap can support observation, guided practice, and handover. These arrangements would strengthen socialisation and internalisation while reducing dependence on last-minute transfer.

Knowledge capture should also be institutionalised. Retirement-transition interviews, standard operating procedures, project close-out notes, research protocols, lessons-learned records, and searchable digital repositories can support externalisation and combination. Such systems should be accompanied by governance arrangements that assign responsibility for updating, validating, and accessing stored knowledge. A repository that is not maintained or used will not by itself solve knowledge-loss problems.

Age inclusion should be embedded in HR policy. Because ageism and skills gaps were the highest-ranked challenges, management should combine anti-age-discrimination practices with continuing digital and technical development. Intergenerational teams can be used deliberately so that knowledge flows in both directions rather than assuming that older employees are only knowledge providers. Health and wellness support also deserves greater visibility, including work-design and occupational-health arrangements that enable experienced employees to remain productive and engaged.

At the wider policy level, Ghanaian public-sector HR frameworks should treat ageing-workforce management and knowledge preservation as connected governance issues. Ministries, agencies, and public research bodies can incorporate knowledge-risk assessment into workforce planning by identifying roles with high retirement exposure, documenting critical expertise, and monitoring succession readiness. Such measures would help protect institutional memory and reduce capability discontinuities across the public service.

8. Conclusion

This study examined HR strategies for an ageing workforce and knowledge transfer at CSIR-FRI in Ghana. The results show that the institution has relevant HR and knowledge-management practices, but their perceived effectiveness is uneven. Knowledge-transfer mechanisms were rated as contributing to institutional knowledge preservation mainly to a moderate extent. Training and development and succession planning were the most prominent HR strategies, whereas health and wellness programmes received comparatively lower emphasis. At the same time, ageism and skills gaps emerged as the most salient workforce-ageing challenges, followed by succession-planning difficulties.

Taken together, the findings suggest that CSIR-FRI's principal challenge is not the absence of HR initiatives but the need to connect them more deliberately to knowledge continuity. The SECI perspective indicates that tacit expertise must be socialised, externalised, combined, and internalised before employee exit, while Human Capital Theory highlights the organisational value at risk when accumulated expertise is lost. An integrated approach to ageing-workforce management should therefore combine training, succession planning, mentoring, documentation, reciprocal intergenerational learning, inclusion, and wellbeing.

The study demonstrates that workforce ageing in knowledge-intensive public organisations should be treated not simply as a demographic or retirement issue but as a strategic HR and knowledge-governance concern. Strengthening these systems before experienced employees leave can help public institutions preserve institutional memory while renewing capability across generations.

For publication and policy debate, this diagnosis offers a grounded starting point for comparative research on how African public institutions manage demographic change and sustainable organisational memory.

9. Limitations and Future Research

The findings should be interpreted within several limitations. First, the study is based on a single public research institution, limiting generalisation to other Ghanaian public organisations, private firms, or sectors with different workforce structures. Second, only 43 usable responses were obtained from a population of 71. Although the response rate was 71.7%, a census would have been feasible and may have reduced sampling uncertainty. Third, the respondent profile was predominantly early to mid-career, with only 13.9% in the 41+ category. The results therefore capture organisation-wide perceptions of workforce ageing rather than a large subsample of employees close to retirement.

Fourth, the cross-sectional and self-reported design may be affected by common perceptual and social-desirability biases. Fifth, the descriptive analysis does not establish statistical associations or causal relationships among HR strategies, knowledge transfer, and ageing-workforce challenges. The conceptual framework should consequently be interpreted as an organising schema rather than a tested causal model.

Future research should extend the study across multiple public institutions and include larger samples that permit inferential analysis. Comparative research could examine whether age-inclusive HR practices predict knowledge-transfer effectiveness and whether organisational climate, digital capability, or succession readiness moderate these relationships. Longitudinal designs would be useful for tracking knowledge continuity before and after retirement events. Mixed-method studies could also combine surveys with interviews, knowledge-mapping exercises, and document audits to reveal how formal policies operate in practice and which forms of tacit knowledge are most vulnerable to loss.

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