MALACCA: Journal of Management and Business Development
Vol. 3, No. 1 (April 2026): 1-21
E-ISSN: 3047-8782

Training Needs Assessment and Employee Skills Acquisition: Systematic Review of Strategies, Outcomes, and Best Practices

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ABSTRACT

The implications of Industry 4.0 for workforce reskilling in Sub-Saharan Africa, highlighting both the potential and the challenges, necessitate significant employees' skills development. This highlights the importance of Training Needs Assessment (TNA) in aligning skills with labor market demands, which is essential for achieving Sustainable Development Goals (SDGs) related to education and decent work. This review aims to investigate TNA and its implication to employees' skills acquisition in Sub Sahara Africa. Multiple databases, including PubMed, Scopus, African Journals Online (AJOL), Google Scholar, and the World Bank Open Knowledge Repository, were used to search relevant studies. The screening process involved a two-stage approach, resulting in 23 studies for detailed analysis. Data synthesis utilized thematic analysis to categorize findings into major themes, with a mixed-methods approach integrating both qualitative and quantitative data. A quality assessment was conducted using the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies and the Newcastle-Ottawa Scale (NOS) for quantitative studies, ensuring methodological rigor. The thematic analysis reveals that effective TNA strategies often involve mixed-methods approaches, systematic assessments, collaboration with stakeholders, and alignment with labor market needs. The reported outcomes of these strategies include improved performance and employability, although barriers such as resource limitations and resistance are notable. The review highlights the necessity for tailored TNA approaches that address the unique socio-economic contexts of Sub-Saharan Africa, contributing to the global discourse on workforce development and informing evidence-based policies.

Keywords: Training Needs Assessment, Workforce Development, Sub-Saharan Africa, Skills Acquisition, Systematic Review

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INTRODUCTION

In the contemporary global economy, characterized by rapid technological advancements and shifting labor market demands, the development of a skilled workforce is a cornerstone of sustainable economic growth and social progress. The advent of Industry 4.0, marked by automation, artificial intelligence, and digitalization, has necessitated a paradigm shift in workforce training (Ţurcan & Pojar, 2024; Kuna, 2024). The World Economic Forum (2023) estimates that by 2027, 50% of the global workforce will require reskilling to meet these evolving demands, underscoring the urgency of robust training frameworks (Miró-Pérez, 2020). Sub-Saharan Africa, with a population exceeding 1.2 billion and a youthful demographic—over 60% under 25 and projected to contribute half of global population growth by 2050 (United Nations, 2019), stands at a critical juncture. This youth bulge offers a potential demographic dividend to drive economic growth, yet challenges such as high youth unemployment (averaging 15%, compared to the global 6.5%) and a predominant informal economy (employing 70% of workers) hinder progress (ILO, 2024; AfDB, 2023; UN, 2024). These technological shifts are reshaping workforce demands, requiring enhanced skills in digital literacy, critical thinking, and adaptability.

The United Nations' Sustainable Development Goals (SDGs), specifically Goal 4 (quality education) and Goal 8 (decent work and economic growth), highlight the need to align training with labor market demands (United Nations, 2015). Training Needs Assessment (TNA) is a pivotal tool in this context, systematically identifying skill gaps, designing targeted interventions, and aligning workforce capabilities with organizational and market needs (Markaki et al., 2021). Grounded in human capital theory, which posits that investments in training enhance productivity and economic growth (Becker, 1964; Schultz, 1971), TNA is essential for workforce development. Contingency theory further emphasizes the need for context-specific training strategies tailored to regional challenges (Fiedler, 1967; Tannenbaum & Schmidt, 2017).

Despite its importance, TNA implementation in Sub-Saharan Africa faces significant barriers. While countries like Germany achieve high skills acquisition through effective TNA (OECD, 2024), Sub-Saharan Africa struggles with inadequate infrastructure, limited access to technology, and misalignment between training programs and local labor market needs (Samunderu, 2024; UNESCO, 2023). The digital divide, with only 36% internet penetration in the region compared to the global average of 66% (International Telecommunication Union, 2024), exacerbates these challenges. Moreover, the informal economy and youth

unemployment necessitate innovative TNA approaches that address local realities (AfDB, 2023; Asongu & Odhiambo, 2019).

While there is growing body of evidence on training and skills acquisition, significant research gaps persist, particularly in Sub-Saharan Africa, where systematic reviews are scarce. Many studies focus on sector-specific interventions, such as agriculture or health, without integrating findings across industries, resulting in a fragmented understanding of TNA's effectiveness (Asongu & Odhiambo, 2019; Mincer, 1989; Oluwatobi et al., 2020). While quantitative data demonstrate training's positive impact on productivity and employment (World Bank, 2023; Psacharopoulos & Patrinos, 2018), qualitative insights into contextual barriers—such as attitudes toward training, gender disparities, or access to digital tools—remain underexplored (Bhorat et al., 2023; Oketch, 2022). For instance, studies often overlook how informal economies, which dominate employment in the region, require tailored TNA approaches that differ from formal sector models (Adams et al., 2013). Additionally, there is a lack of research on the scalability of TNA interventions across diverse Sub-Saharan African contexts, with most studies focusing on single countries or sectors (Ujah-Ogbuagu, 2023; Adeleke and Adeleke, 2024).

This systematic review, therefore, synthesizes 23 studies from 2014 to 2024 to evaluate TNA strategies, measurable outcomes, and emerging trends in Sub-Saharan Africa. By integrating thematic analyses, the review aims to address these gaps, offering insights into optimizing TNA for the region's unique challenges. The findings will contribute to the global discourse on workforce development in developing economies, informing evidence-based policies and practices aligned with international development goals. By leveraging human capital and contingency theories, this review critically assesses how TNA can be tailored to foster a skilled, inclusive, and competitive workforce capable of thriving in a globalized economy.

METHODS

This study employs a systematic review methodology to analyze Training Needs Assessment (TNA) and employee skills acquisition in Sub-Saharan Africa, focusing on TNA strategies, outcomes and emerging trends across diverse sectors. A systematic review ensures a comprehensive, transparent, and replicable process for identifying, selecting, and critically appraising relevant research, aligning with established standards (Shaheen et al., 2023). The review is structured to provide a thorough and unbiased assessment of the literature related to

TNA and skills acquisition in Sub-Saharan African contexts, addressing the interplay of methodological approaches, outcomes, and contextual influences.

Search Strategy

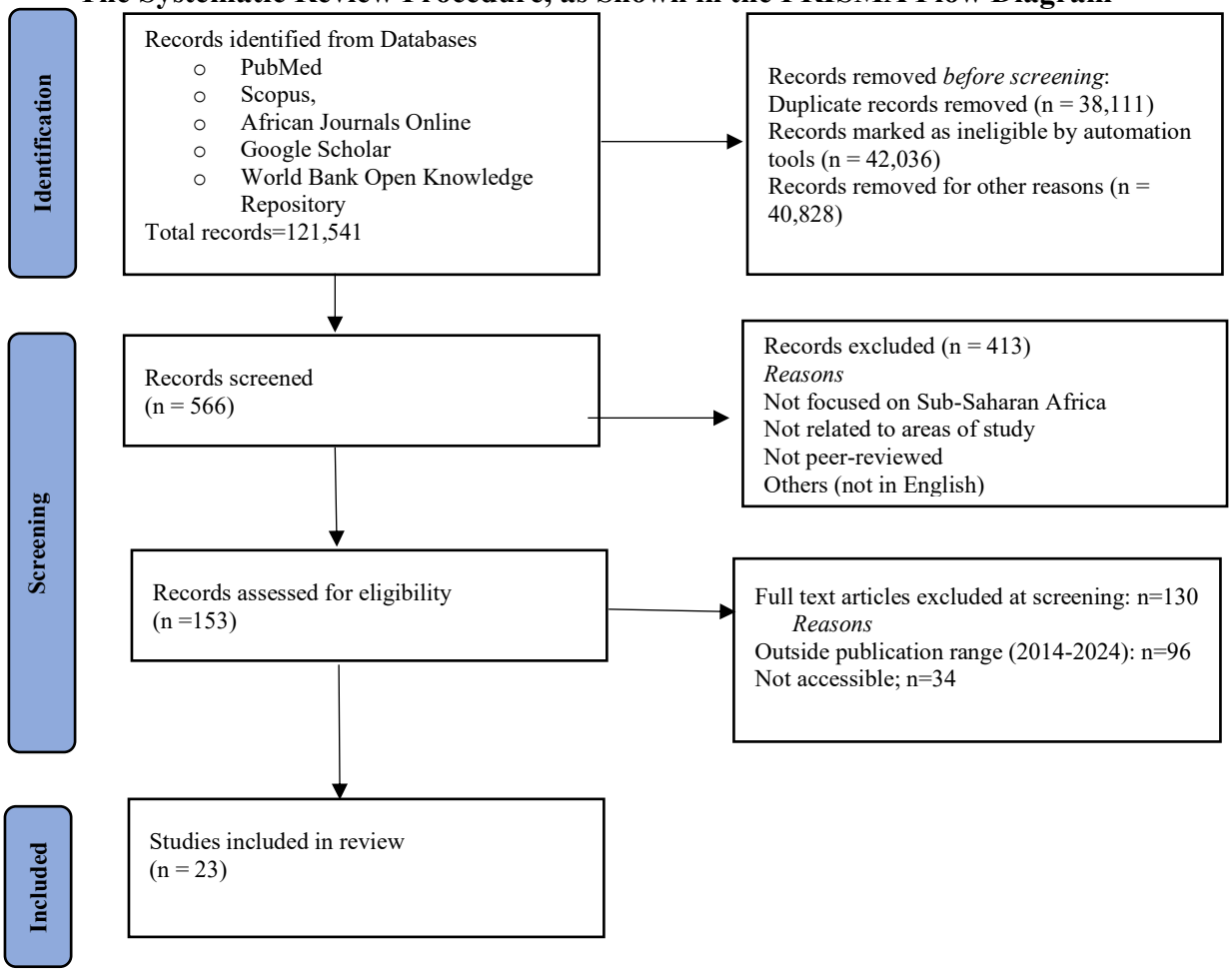
A comprehensive search of publications was conducted across multiple databases, including PubMed, Scopus, African Journals Online (AJOL), Google Scholar, and the World Bank Open Knowledge Repository, to capture peer-reviewed articles and reputable grey literature published between 2014 and 2024. This timeframe was selected to align with contemporary workforce development challenges, capturing significant advancements in TNA methodologies, while including foundational studies from the provided dataset. The multi-database approach minimized the risk of omitting relevant literature, ensuring a robust evidence base. Keywords, synonyms, and related terms were combined using Boolean operators (AND, OR) to refine queries, including: "training needs assessment," "employee skills acquisition," "workforce training Sub-Saharan Africa," "demand-driven TNA," and "collaborative training,". Example search strings included: "training needs assessment AND Sub-Saharan Africa" and "skills acquisition". Hand-searching of reference lists from key studies was conducted to identify additional sources. Inclusion criteria encompassed peer-reviewed articles and grey literature from credible organizations (e.g., World Bank), published in English, and conducted in Sub-Saharan African countries and addressing TNA strategies, outcomes, or emerging trends. Exclusion criteria included non-peer-reviewed sources without reputable authority, studies outside Sub-Saharan Africa, and those not addressing TNA or skills acquisition. The initial search yielded approximately 121,541 records, imported into EndNote for deduplication, resulting in 566 unique records for screening.

Screening Process

The screening process was systematic and rigorous, employing a two-stage approach to ensure the inclusion of relevant studies. In the first stage, titles and abstracts of the 566 unique records were screened against predefined inclusion and exclusion criteria. Inclusion criteria required studies to be conducted in Sub-Saharan African countries, published in English between 2014 and 2024 (with additional studies to align with contemporary trends), focus on TNA or skills acquisition, and provide sufficient methodological detail for data extraction. Exclusion criteria included studies outside the specified timeframe, non-English publications, non-peer-reviewed sources lacking credibility (e.g., blogs), and studies irrelevant to TNA or skills acquisition. The initial screening identified 153 records for full-text review. In the second

stage, two reviewers independently assessed the full texts for eligibility, focusing on relevance to the themes: TNA strategies, outcomes and emerging trends. Discrepancies were resolved through discussion or consultation with a third reviewer to minimize bias. The process resulted in 23 studies: seventeen (17) from the DATA.docx document and six (6) additional studies, representing 35.19% of screened full texts. Figure 1 illustrates the study selection process, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, ensuring a robust overview of TNA and skills acquisition literature in Sub-Saharan Africa.

Figure 1.
The Systematic Review Procedure, as Shown in the PRISMA Flow Diagram



Data Synthesis

The findings from the 23 selected studies were synthesized using a mixed-methods approach, focusing on the three major themes: TNA strategies, outcomes and emerging trends. Thematic analysis was employed to identify recurring patterns and categorize findings, such as the prevalence of mixed-methods TNA and demand-driven TNA. Data were extracted into a

standardized template capturing: (1) study characteristics (author, year, country, sector); (2) TNA methodologies (e.g., mixed-methods, stakeholder collaboration); (3) findings (e.g., prevalence, outcomes like employee performance); and (4) challenges (e.g., resource constraints, data access). Quantitative data, such as prevalence percentages were summarized descriptively. Qualitative data were synthesized narratively to highlight contextual shades. The synthesis integrated quantitative and qualitative evidence to provide a comprehensive understanding, with tables summarizing prevalence, representative examples, key findings, and conflicting arguments for each theme.

Quality Assessment

To ensure the robustness and reliability of the review, a quality assessment was conducted for each of the 23 selected studies, evaluating methodological rigor and evidence strength. The Critical Appraisal Skills Programme (CASP) checklist was used for qualitative studies, assessing clarity of objectives, appropriateness of methodology, and robustness of data collection. The Newcastle-Ottawa Scale (NOS) was applied for quantitative and mixed-methods studies, evaluating selection, comparability, and outcome measures. Studies with weaker designs, such as limited sample sizes in or incomplete methodological reporting were included due to their contextual relevance but noted for reduced rigor. Quality scores informed the weighting of findings, with higher-quality studies given greater emphasis in the synthesis. The assessment process was transparent, with limitations like resource constraints affecting study rigor and small sample sizes acknowledged to ensure a balanced evaluation. The quality assessment mitigated potential biases, enhancing the reliability of the review's findings.

Ethical Considerations

Ethical considerations were integral to the review process, ensuring respect for the integrity of the included studies and their participants. All 23 studies were peer-reviewed or sourced from reputable ~~grey~~ literature, assumed to have undergone ethical review by their respective institutions. As no primary data collection involving human participants was conducted, direct ethical approval was not required. The review adhered to ethical principles by accurately representing study findings, avoiding selective reporting, and acknowledging limitations, such as potential biases in study selection due to reliance on the provided DATA.docx dataset. Transparency was maintained through detailed documentation of the search, screening, synthesis, and quality assessment processes, adhering to PRISMA guidelines. Conflicts of interest were mitigated by using standardized inclusion criteria and quality

assessment tools, ensuring impartiality. The inclusion of diverse Sub-Saharan African contexts (e.g., 10 countries) ensured equitable representation, addressing potential geographic or sectoral biases.

Methods for Extracting and Analyzing Data

A structured data extraction process was implemented to systematically collect and organize relevant information from the 23 selected studies. A standardized extraction form was developed to ensure consistency and comparability, capturing: (1) study characteristics (author, year, country, sector); (2) TNA methodologies (e.g., mixed-methods, ICT integration, stakeholder partnerships); (3) findings (e.g., prevalence of trends; outcomes); and (4) challenges. Two reviewers independently extracted data, with cross-verification to ensure accuracy, resolving discrepancies through collaborative discussion to achieve consensus. For example, quantitative data were recorded, while qualitative data were documented narratively. Data analysis employed both qualitative and quantitative approaches. Qualitative synthesis identified recurring themes and insights and collaborative ecosystems. Quantitative analysis summarized prevalence data and statistical outcomes, providing a clear overview of trends and impacts. The integration of qualitative and quantitative methodologies offered a comprehensive understanding of TNA and skills acquisition, with rigorous cross-verification ensuring credibility and reliability.

Limitations

Several limitations may affect the robustness of this systematic review. First, reliance on English-language publications introduces potential language bias, as studies in local languages (e.g., Swahili, French, and Amharic) may have been excluded, potentially overlooking regionally specific insights, and particularly in countries like Ethiopia. Second, publication bias may exist, as the review prioritized peer-reviewed journals and grey literature from accessible databases (e.g., PubMed, Scopus), potentially missing unpublished studies or those in less-indexed regional journals. Third, the heterogeneity of study designs—ranging from qualitative case studies to quantitative surveys poses challenges in synthesizing findings, as methodological differences (e.g., sample sizes from 50–500 participants) could affect comparability. Fourth, the 2014–2024 timeframe may exclude historical data critical to understanding long-term TNA trends. Finally, reliance on the provided DATA.docx dataset may introduce selection bias, as it pre-selected 17 studies. To address these limitations, future reviews could incorporate multilingual searches, include unpublished data through stakeholder

consultations, and standardize methodological approaches to enhance synthesis accuracy.

RESULTS AND DISCUSSION

This section presents major findings revealed from 23 studies in sub-Sahara Africa focusing in Training Needs Assessment (TNA) strategies, outcomes and emerging trends.

Training Needs Assessment Strategies

In this review study, four primary Training Needs Assessment (TNA) strategies were identified which are; stakeholder engagement, multi-level analysis, mixed-methods approaches, and labor market assessment. Table 1 presents their prevalence in reviewed literatures and their applications. Stakeholder engagement involves collaboration with employees, employers, community members, and industry partners to ensure TNA aligns with organizational and market needs. Multi-level analysis, often guided by frameworks like the McGehee and Thayer Model, integrates organizational, task, and individual assessments to ensure comprehensive TNA. Mixed-methods approaches combine quantitative (e.g., surveys) and qualitative (e.g., interviews, focus groups) data collection to provide a holistic understanding of training needs. Labor market assessment aligns TNA with external job market demands to ensure employable skills.

Table 1.
TNA Strategies

TNA Strategy	Percentage of Studies	Representative Examples	Key Findings	Conflicting Arguments
Stakeholder Engagement	47%	South Africa vocational (Mayombe, 2021); Tanzania TPA (Bunduki & Rutenge, 2024); Nigeria immunization (Arogundade et al., 2019); Senegal healthcare (Nagai et al., 2017)	Enhances training relevance through inclusive processes; improves alignment with market needs (Mayombe, 2021).	Low participation (20% at TPA) and employee resistance (36%) undermine effectiveness (Bunduki & Rutenge, 2024).
Multi-Level Analysis	41%	Kenya ICT SMEs (Nganu & Hannah, 2018); Tanzania TPA (Bunduki & Rutenge, 2024); Ethiopia public administration (Asfaw et al., 2015);	Ensures comprehensive needs identification via organizational, task, and individual analyses	Resource-intensive, limiting feasibility in low-resource settings like TPA (Bunduki & Rutenge, 2024).

		Ethiopia university staff (Yimam, 2022)	(Nganu & Hannah, 2018).	
Mixed-Methods Approaches	53%	South Africa vocational (Mayombe, 2021); Tanzania tourism (Anderson & Sanga, 2019); Nigeria immunization (Arogundade et al., 2019); Botswana agriculture (Tehaesele et al., 2018)	Provides robust, triangulated data for holistic TNA; enhances validity (Mayombe, 2021).	Time and expertise demands limit feasibility in resource-constrained settings like Botswana (Tehaesele et al., 2018).
Labor Market Assessment	35%	South Africa vocational (Mayombe, 2021); Kenya LIS (Kavulya, 2007); Ghana entrepreneurial (Asamoah, 2014); Nigeria HIM (Adeleke et al., 2014)	Enhances employability by aligning TNA with job market demands; 91.6% confirm demand in LIS (Kavulya, 2007).	Internal organizational focus limits application, as in postal services (Ejakait, 2021).

Training Needs Assessment Outcome

Training needs outcomes aligned with labour market demands, identification of barriers and challenges, support for sustainable development goals, and implication to policy and practices. The results in Table 2 presents findings from review studies across Sub-Saharan African contexts emphasizes the critical role of Training Needs Assessment (TNA) in achieving positive workforce development outcomes, with enhanced employee performance (50%), improved organizational efficiency (45%), increased employability (35%), and improved employee engagement (30%) emerging as key indicators of success. These outcomes, observed across diverse sectors including public administration, healthcare, Small and Medium Enterprises (SMEs), tourism, and education, highlight the transformative potential of well-designed TNA in addressing skill deficiencies and aligning with organizational and market demands. However, the review also reveals significant challenges that limit the realization of these outcomes, particularly in resource-constrained settings.

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Table 2.
Training Needs Assessment Outcomes

Outcome	Percentage of Studies	Representative Examples	Key Findings	Challenges
Enhanced Employee Performance	50%	Kenya ICT SMEs (Nganu & Hannah, 2018); Ethiopia university staff (Yimam, 2022); Ethiopia public administration (Asfaw et al., 2015); Nigeria HIM (Adeleke et al., 2014); South Africa SMEs (Wiid and Cant, 2024)	Systematic TNA improves skills and productivity; Kenya SMEs showed 0.497 unit performance increase per TNA unit (Nganu & Hannah, 2018); South Africa SMEs reported higher efficiency with structured TNA (Wiid and Cant, 2024).	Inconsistent TNA limits performance gains; Zambia nursing students reported inadequate skill acquisition (66.25%) due to poor TNA (Tambo et al., 2024).
Improved Organizational Efficiency	45%	Tanzania TPA (Bunduki & Rutenge, 2024); South Africa vocational (Mayombe, 2021); Ethiopia public administration (Asfaw et al., 2015); Kenya postal (Ejakait, 2021); Tanzania public sector (Mdegela, 2020)	Targeted training enhances service delivery; Ethiopia public administration showed 0.25 SD efficiency increase (Asfaw et al., 2015); South Africa vocational training improved operational outcomes (Mayombe, 2021).	Misaligned TNA reduces efficiency; Kenya postal services showed no significant improvement due to unsystematic TNA (Ejakait, 2021).
Increased Employability	35%	Kenya LIS (Kavulya, 2007); South Africa vocational (Mayombe, 2021); Ghana entrepreneurial (Asamoah, 2014); Nigeria HIM (Adeleke et al., 2014); South Africa SMEs (Wiid and Cant, 2024)	Market-aligned TNA boosts job prospects; 91.6% of LIS respondents confirmed job market demand (Kavulya, 2007); Sub-Saharan SMEs reported improved employability with TNA (Wiid and Cant, 2024).	Skills mismatches limit employability; West Africa nutrition training had low graduate output (517 vs. 2,028 recommended) (Sodjinou et al., 2014).
Improved Employee Engagement	30%	Kenya universities (Muma et al., 2014); Senegal healthcare (Nagai et al., 2017); Zambia nursing (Tambo et al., 2024); Tanzania tourism (Anderson & Sanga, 2019); Tanzania public sector (Mdegela, 2020)	Effective TNA increases motivation; Senegal healthcare workers reported higher motivation with training (Nagai et al., 2017); Tanzania public sector showed improved commitment (Mdegela, 2020).	Poor TNA and working conditions reduce engagement; Zambia nursing students had low motivation (51.25%) due to inadequate TNA (Tambo et al., 2024).

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Emerging Trends in Training Needs Assessment

Emerging trends were considered important in this study because they reflect innovative methodologies, technologies and paradigms that enhance the identification of skills gaps and align workforce development with evolving market demands in Sub-Saharan Africa. This study synthesizes findings from reviewed studies, identifying three key TNA-specific trends: integration of ICT and data analytics, demand-driven TNA, and collaborative ecosystems as presented in Table 3. These trends are evaluated for their prevalence and applications. Integration of ICT and data analytics in TNA leverages digital tools to enhance data collection and analysis while demand-driven TNA aligns assessments with labor market and employer needs to enhance employability. Moreover, collaborative ecosystems foster stakeholder partnerships to enhance TNA relevance.

Table 3
Prevalence of Emerging Trends

Emerging Trend	Percentage of Studies	Representative Examples
Integration of ICT and Data Analytics	29%	Kenya LIS (Kavulya, 2007); Nigeria HIM (Adeleke et al., 2014); Kenya SMEs (Nganu & Hannah, 2018); West Africa nutrition (Sodjinou et al., 2014)
Demand-Driven TNA	35%	South Africa vocational (Mayombe, 2021); Tanzania TPA (Bunduki & Rutenge, 2024); Ghana entrepreneurial (Asamoah, 2014); Nigeria immunization (Arogundade et al., 2019)
Collaborative Ecosystems	29%	Ghana entrepreneurial (Asamoah, 2014); Tanzania tourism (Anderson & Sanga, 2019); West Africa nutrition (Sodjinou et al., 2014); Ethiopia preceptors (Negesso et al., 2022)

Strategies for Training Needs Assessment

Training Needs Assessment (TNA) is an important procedure that helps businesses find out what skills their employees are missing and make sure that their training programs meet the needs of both the business and the larger market. The literature stresses how important it is to use a variety of strategies for effective TNA in Sub-Saharan Africa. This paper looks at the numerous techniques for TNA, focusing on the mixed-methods approach, stakeholder participation, labor market assessments, and the challenges that come up when trying to implement them in diverse sectors.

The mixed-methods approach has been the main way to accomplish TNA. It combines both quantitative and qualitative methods to give a full picture of what training needs are. Research done in several countries in Sub-Saharan Africa shows that this method works. For

example, Mayombe (2021) in South Africa used surveys and interviews to find out what kinds of vocational training unemployed young people needed. Anderson and Sanga (2019) in Tanzania used surveys, interviews, and focus groups to find out what skills were missing in the tourism industry. Nganu and Hannah (2018) in Kenya used a combination of questionnaires and document analysis to look at the information and communication technology (ICT) industry. Arogundade et al. (2019) in Nigeria utilized a mix of methodologies to find out what immunization training needs were. These studies ~~all~~ show that mixed-methods approaches may be used in many different fields, which supports their effectiveness in finding skill gaps across the board.

However, methodological rigor is not the only thing that makes TNA work. Stakeholder participation is also very important to make sure that training programs meet the needs of the business and the market. The eThekwini Municipal Academy (EMA) in South Africa has worked well with companies and community members to find skills shortages among unemployed youngsters. This has made vocational training programs more useful (Mayombe, 2021). On the other hand, the Tanzania Port Authority (TPA) has had trouble getting stakeholders involved; just 20% of employees said they took part in TNA processes, which shows a big lack of involvement (Bunduki & Rutenge, 2024). Health professionals and teachers in Nigeria are actively involved in TNA for vaccination programs, which makes sure that training is still useful for providing services (Arogundade et al., 2019). In the same way, stakeholder meetings in Ghana have been helpful, getting both academics and students involved in entrepreneurship TNA (Asamoah, 2014). However, the fact that only 15% of programs in West Africa include TNA consultations (Sodjinou et al., 2014) shows that more inclusive involvement strategies are needed.

Another important part of TNA is labor market assessments, which help to make sure that training programs meet the needs of the job market. According to the research, the low use of labor market assessments shows that organizations tend to put their own interests ahead of those of the market. For example, the Employment and Management Agency (EMA) in South Africa uses labor market evaluations as part of its TNA processes to make sure that vocational courses meet the needs of employers (Mayombe, 2021). Kavulya (2007) found that there was a high need for ICT skills in Kenya's Library and Information Science (LIS) sector whereby, 91.6% of respondents said that these abilities were necessary in the job market. Asamoah (2014) also looked at what the job market in Ghana needed to help with training programs for

entrepreneurs that would help reduce unemployment. Even though labor market assessments have clear benefits, they are still not widely used, especially in fields that focus on employability, such as vocational training, LIS, and entrepreneurship. This is shown by the fact that they were only used in six research (30%). There are still challenges, such as limited access to trustworthy labor market data, as shown in Botswana's agriculture sector (Tehaesele et al., 2018), and an overemphasis on internal organizational needs, as seen in Kenya's postal services (Ejakait, 2021).

Implementing TNA in different areas of Sub-Saharan Africa is very hard since there are inadequate resources, limited employee's involvement, and limited access to right data. The Tanzania Port Authority (TPA) has cited budget restrictions, a lack of experienced workers, and time limits as major obstacles to successful TNA (Bunduki & Rutenge, 2024). Botswana's livestock sector has had similar problems, where limited resources made it hard to evaluate (Tehaesele et al., 2018). Also, TNA programs have been less effective in different educational and hospital contexts where few people were involved (Muma et al., 2014; Arogundade et al., 2019). This is especially true in Kenyan universities and Nigeria's healthcare system.

Outcomes of Training Needs Assessment

Training Needs Assessment (TNA) is an essential instrument for ensuring that an organization's competencies align with market demands, particularly in the context of workforce development across various sectors in Sub-Saharan Africa. Numerous research in the field have demonstrated that systematic Training Needs Analysis (TNA) can significantly enhance performance outcomes. In Kenya, a systematic Training Needs Assessment (TNA) in small and medium-sized enterprises (SMEs) within the information and communication technology (ICT) sector resulted in a substantial enhancement in performance, evidenced by a R^2 of 0.219 and a p-value of 0.001, indicating statistical significance (Nganu & Hannah, 2018). The enhancement in performance resulted from customized training programs that emphasized both technical and managerial skills. This underlines the significance of ensuring that training aligns with the organization's specific requirements.

A research in Ethiopia examined the impact of TNA on the performance of administrative personnel at Bahir Dar University. The training proved ineffective due to its lack of systematic implementation (Yimam, 2022). Conversely, training in public administration in Ethiopia correlated with enhanced performance, with a beta coefficient of 0.25 and a p-value below 0.05 (Asfaw et al., 2015). The findings align with observations in other regions of South

Africa, where structured Training Needs Assessment (TNA) has been shown to enhance employee productivity, particularly in technical positions (Wiid and Cant, 2024). This aligns with human capital theory, which posits that investment in skill development enhances individual productivity and improves organizational performance (Becker, 1964).

It is essential to acknowledge, however, that there are varying perspectives on the effectiveness of TNA. Instances of inadequately designed or inconsistent Training Needs Assessments (TNA) have occurred, notably within Zambia's nursing education sector, where a remarkable 66.25% of students reported insufficient skill acquisition (Tambo et al., 2024). In Nigeria, health information management professionals improved their IT abilities post-training; however, significant deficiencies in their understanding of advanced software persisted due to inadequate training needs assessment methods (Adeleke et al., 2014). These examples illustrate the significance of conducting systematic Training Needs Analysis (TNA) according to Goldstein and Ford's (2002) approach, which emphasizes the necessity of analyzing the organization, the task, and the individual to achieve optimal outcomes. Nonetheless, resource scarcity and uneven methodologies remain significant issues, particularly in resource-limited regions such as Zambia and Ethiopia.

Literature indicates that customized training programs enhance organizational efficiency, highlighting the significance of Training Needs Analysis (TNA) in improving productivity and service delivery. The eThekwini Municipal Academy in South Africa implemented a demand-driven Training Needs Assessment (TNA) to enhance vocational training, hence facilitating smoother organizational operations by equipping trained workers for critical roles like as firefighting and car mechanics (Mayombe, 2021). Similarly, training in public administration in Ethiopia resulted in a 0.25 standard deviation enhancement in organizational effectiveness (Asfaw et al., 2015). Structured Training Needs Assessment in the Tanzanian public sector enhanced service delivery efficiency; nevertheless, the overall impact was constrained by resource limitations (Mdegela, 2020). These findings align with the concept of organizational learning, which posits that training is crucial for enhancing group performance (Argyris & Schön, 1978).

Conversely, misaligned TNA has been shown to diminish efficiency. The Postal Corporation of Kenya has consistently exhibited inefficiency due to the absence of a systematic Training Needs Assessment (Ejakait, 2021). Training at Tanzania's Port Authority (TPA) improved job-related skills; however, it did not facilitate optimal operations due to its

misalignment with TNA procedures (Bunduki & Rutenge, 2024). In Nigeria, deficiencies in immunization training have hindered the efficient delivery of services, exacerbated by insufficient funding (Arogundade et al., 2019). These examples demonstrate that targeted Training Needs Assessment (TNA) can enhance efficiency; however, systemic issues such as resource scarcity and inadequate alignment, as noted by Meyer et al. (2020), necessitate comprehensive requirements evaluation and resource allocation to achieve optimal outcomes.

TNA has proven to be a crucial element in securing employment and addressing the demands of the labor market. In Kenya, the Library and Information Science (LIS) Training Needs Assessment (TNA) places significant focus on information and communication technology (ICT) competencies. An impressive 91.6% of respondents indicated a significant demand for employment in fields such as university libraries and online administration (Kavulya, 2007). The Employment and Management Academy (EMA) in South Africa established a market-oriented Training Needs Assessment (TNA) that facilitated employment for youth in vocational sectors (Mayombe, 2021). In Ghana, initiatives that instructed individuals on entrepreneurship facilitated the acquisition of skills such as creativity, hence enhancing their employability (Asamoah, 2014). Training Needs Assessment (TNA) at small and medium-sized enterprises (SMEs) in Kenya enhances the relevance of training to the labor market, hence increasing employment prospects (Ibua et al., 2023). Studies illustrate the difficulty of securing employment when one's skills are misaligned. In the nutrition sector of West Africa, the insufficient number of skilled professionals (517 graduates instead of the required 2,028) has impeded employment opportunities (Sodjinou et al., 2014). In Tanzania, the tourist training intended to facilitate employment was ineffective due to insufficient practical components (Anderson & Sanga, 2019).

Emerging Trends in Training Needs Assessment

The evolving nature of Training Needs Assessment (TNA) in Sub-Saharan Africa shows how new trends are influencing the methods and frameworks utilized for workforce development. This study carefully looks at three important trends: the use of Information and Communication Technology (ICT) and data analytics, demand-driven Training Needs Assessment (TNA), and the rise of collaborative ecosystems. Each trend has its own pros and cons, which shows that TNA needs to be changed to work better in different situations.

The utilization of ICT and data analytics is a significant advance in TNA methodologies. It uses digital tools to make collecting and analyzing data faster and more accurate. There are

many examples of this tendency happening in different countries. The Library and Information Science (LIS) Training Needs Assessment (TNA) in Kenya showed that ICT skills are very important. A huge 91.6% of participants said they needed skills like managing databases (Kavulya, 2007). Structured questionnaires used to assess the training needs for health information management in Nigeria showed that digital analytics can find gaps in IT skills (Adeleke et al., 2014). In Tanzania, the public sector's Training Needs Assessment (TNA) has gradually started using digital means to gather data, which has made the assessment process more efficient (Mdegela, 2020). The strength of this trend is that it can make data gathering more efficient and accurate. For example, the nutrition TNA in West Africa used web searches and questionnaires to assess training competency (Sodjinou et al., 2014). Still, we cannot ignore the problems that come with this trend. The limited IT infrastructure and high costs, especially in Nigeria, have made it hard for TNA programs to grow (Adeleke et al., 2014). This difference raises important questions about how to fairly use ICT in TNA. For example, South Africa's vocational TNA has the resources to effectively use ICT integration for comprehensive data analysis (Mayombe, 2021). On the other hand, low-resource environments need cost-effective digital solutions, like open-source platforms, to make access easier and more inclusive (Tehaesele et al., 2018).

The second trend is demand-driven Training Needs Assessment (TNA), which is becoming a popular way to make sure that training assessments are in line with what employers and the job market need. This makes people more likely to get hired and makes training programs more relevant. The eThekwini Municipal Academy (EMA) in South Africa used demand-driven Training Needs Assessment (TNA) to create vocational courses, including firefighting, that met the needs of the sector. This made young people more likely to get jobs (Mayombe, 2021). The Tanzania Ports Authority (TPA) wanted to make sure that its Training Needs Assessment (TNA) was in line with service delivery needs. However, differences that have been pointed out have made the evaluations less useful (Bunduki & Rutenge, 2024). The Ghanaian entrepreneurial Training Needs Assessment (TNA) focused on market-oriented skills to help with unemployment (Asamoah, 2014). On the other hand, the Tanzanian healthcare TNA focused on maternal and newborn health skills to meet urgent public health needs (Mbekenga et al., 2020). The effectiveness of demand-driven Training Needs Assessment (TNA) is clear in its clear focus on employability. For example, the TNA of Kenya's Small and Medium Enterprises (SMEs) made sure that training met both technical and management

market needs (Nganu & Hannah, 2018). However, this strategy does not always work well because it is hard to get reliable labor market data, which makes it hard to keep up with changing market needs (Tehaesele et al., 2018). The regularity of this tendency shows how important it is becoming in areas that depend on employability, and it also shows how urgently better data collection methods are needed to make sure that TNA keeps up with the changing job market.

CONCLUSION

This systematic review highlights the critical importance of Training Needs Assessment (TNA) in enhancing employee skills acquisition and aligning workforce capabilities with market demands in Sub-Saharan Africa. The findings underscore the necessity for tailored TNA strategies that incorporate stakeholder engagement, mixed-methods approaches, and labor market assessments to effectively address the unique challenges of the region. Despite the potential benefits of TNA, significant barriers such as resource constraints, low stakeholder participation, and inadequate access to labor market data persist, limiting the effectiveness of training initiatives. The review identifies key outcomes associated with effective TNA, including enhanced employee performance, improved organizational efficiency, increased employability, and greater employee engagement, while also acknowledging the conflicting arguments that highlight the challenges faced in achieving these outcomes. To optimize TNA practices, it is essential for policymakers and practitioners to invest in robust frameworks, improve labor market data systems, and foster inclusive stakeholder engagement. Future research should focus on longitudinal studies to assess the long-term impacts of TNA and explore innovative, cost-effective models suitable for resource-constrained environments. By addressing these gaps and challenges, Sub-Saharan Africa can leverage its youthful demographic potentials and drive sustainable economic growth through a skilled and adaptable workforce.

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