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A Situational Analysis of Training and Skills Development Approaches in the Kenyan Clothing Textile and Apparel Industry

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Abstract

Evidence from East Africa's recent growth shows the Clothing, Textile, and Apparel (CTA) industry is among the leading industries in current and potential job creation. The industry includes textile mills, textile product mills, and apparel manufacturing. The CTA industry shows potential to grow into a leading export industry for Africa and a leading employer, considering geo-climatic factors, making Africa one of the richest raw material regions for the industry globally. Kenya is one of the African countries with a promising CTA industry. It is noted from literature that developing the Kenyan CTA industry requires proper financial investment, human capital development, and technological infusion. This research paper focuses on human capital development, more particularly underpinning the training approaches used to develop the human capital in the CTA industry in Kenya and their situatedness. An integrative literature review methodology is employed in this study. Under this methodology, the situation in which the Kenyan CTA industry's training and skills development is developed is analysed. The objective is to investigate the training gap and skills development in degree programs for the CTA industry in Kenya. A situated learning approach is then used to understand the training programs for the CTA industry, especially in degree programs, their similarity and difference to best practices and industry standards across the world, and their relevance to the industry and field. The Constructivist Learning Theory and Situated Learning Theory are used to interrogate available data on learning approaches and methodologies in the CTA industry compared to industry standards and needs. This study concludes that the CTA industry in Kenya does not have an effective environment to match skills and trends required in the market to the current degree programs.

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The environment for collaboration and interaction between the CTA industry and institutions offering CTA courses should be enhanced to ensure knowledge, skills, and trends can be shared across the spectrum. Learning institutions should work with industry players to develop apprenticeship, work-based learning, and general industry experiences for CTA students. A transdisciplinary approach to CTA degree courses is recommended as a critical pathway to incorporate all players into the CTA degree courses.

Keywords: CTA courses; Fashion design; Textile engineering; Apparel design; clothing and textile science; CTA skills; CTA trends; skills development; Kenya.

1. Introduction

For over 150 years, the Clothing, Textile, and Apparel (CTA) industry has been on an upward trajectory, including growth in the number of businesses, exports, and technologies in the industry [1]. The CTA industry is strongly connected to industrial growth in many countries in the world. Throughout industrialization, the CTA industry has been among the leading trades in most of the countries. The Clothing, Textile, and Apparel industry is critical in many economies as it provides employment and revenue, with large numbers of employees being women [2]. It is crucial for some countries like Egypt, Mali, Ghana, South Africa, among others, in terms of trade, Gross Domestic Product (GDP) growth, and employment [3]. It has contributed significantly to several others. In the past, the industry offered opportunities for export diversification and expansion of manufactured exports for low-income countries that could exploit their labour cost advantages and fill emerging niches as well as meet buyer demands [1].

The global supply chain in the CTA industry is dominated by countries that have increased their investment in the industry, such as China, Germany, Bangladesh, India, and Italy [4]. Other low-income and developing countries such as Cambodia, Pakistan, and Sri Lanka also depend on CTA exports for more than 50% of their total manufacturing exports [6]. Traditionally, technologically and industrially advanced nations have had an advantage in the CTA industry because of their technological and production power. However, developing countries have entered the market strongly powered by globalization and demand for their products worldwide [7]. In Sub-Saharan Africa, many countries have advanced their CTA industries, including Mauritius, South Africa, Lesotho, Egypt, Mali, Tanzania, and Kenya. Treaties like AGOA (African Growth Opportunities Act) helped export textiles and apparel goods mainly to the US.

As one of the main players in the apparent industry in Africa, Kenya has been steadily growing the industry as part of the wider manufacturing industry in the country. At its peak in the 1980s, Kenya was producing about 70,000 bales of cotton for the domestic textile industry, which also had 52 medium-scale textile mills and hired about 42,000 skilled persons, second only to the civil service at the time [8]. However, the industry has declined slightly, with other industries coming up and taking the top spot. Still, the CTA industry accounts for nearly 30% of the jobs in manufacturing in Kenya [5]. By 2005, the global export from the CTA industry had declined by over 50% from the 1980s output due to a range of factors, including market liberalization, an expanding import of secondhand clothes, low investment in the industry, outdated technology, increasing costs of production for utilities, consumer preference and lack of ample skills in the human capital [8].

Since then, Kenya has improved the situation for the CTA industry and the general manufacturing industry. There are plans to make the industry more competitive globally and position the products from Kenya well enough to attract interest from the export market. The Export Processing Zones have helped the industry keep tabs with the globalized CTA industry [9]. The past five years has witnessed an upward trajectory in the growth of the CTA industry in jobs created, businesses registered, output, and machine advancement [10]. Despite this growth, there are fears that the growth may not be sustained if the general problems facing the industry, which have plunged the industry into decline in the past, are not addressed.

The main problem that this research tries to analyze is the skills and human capital problem in relation to the training approaches that are currently present in institutions of higher learning. The global CTA industry has advanced in technology. Hence, the people working in the industry across nations and industrial powerhouses have improved and matched their skills to the production environment. The current CTA training at universities in Kenya has been criticized for providing inadequate practical skills, misaligned with the labor market needs, and lacking access to new technology [1, 2, 10]. It is essential to address the training gap in Kenya because a highly trained workforce can understand the changing needs of the industry and challenge the imbalance from cheap imports. Aligning the skills within institutions training employees and managers for the CTA industry with global trends and emerging industry needs is critical to attracting more investment and growth.

The aim of this paper is to investigate the training gap and skills development in degree programs for the CTA industry in Kenya. Therefore, this paper: (i) investigates the existing gap between the industry needs and the training and educational institutions; (ii) analyses the existing level of partnership between training institutions and the CTA industry in human capital development; and (iii) critically interrogates the policy, collaboration, legislative, and public-private partnership framework to improve the training and skills for the CTA industry in Kenya. The study uses an integrative literature review approach to achieve these objectives, which are considered critical for the industry's sustainability. The level of potential projected employment and general economic development associated with the CTA industry are important in justifying this study and create a framework that can be employed for success in the sector. The situational approach focuses on the training environment, the collaborative environment, the global environment, and the legal and legislative environment.

2. Materials and methods

This paper used an integrative literature review methodology, which describes the relationship between variables and contextualizes them to understand their effects on each other and their situation and affecting elements. This approach ensures that the results presented in this study will include a critical analysis of the findings from the study and the conclusions developed by various researchers and experts in the field. The integrative literature review is effective for situational analysis and, in combination with the theories applied in this study, to develop critical results and conclusions that can help make significant recommendations for the study.

The first step in this study was to determine the study context and research objectives through the introduction chapter's critical development. With the introduction developed, the second step was to find peer-reviewed

sources that could be used for the study. This was done through a search using databases including Ebscohost, Scopus, and Proquest. A summary of the search protocol is shown in table 1 below.

Table 1: showing the research protocol for the search phrases and terms used for this study.

Objective	**Search keywords**	**All results from Scopus, Proquest, Ebscohost**	**Sources with an Abstract**	**Sources published after 2016**	**Sources with a clear methodology**	**Sources focused on Kenya**	**Unique sources (Not covered in the other objectives**
1	industry + training + needs + clothing + textile + apparel	1,272,891	45,981	149	41	21	**11**
2	collaboration + partnerships + training + clothing + textile + apparel	1,091,053	11,099	98	26	15	**6**
3	policy + collaboration + legislation + policy + partnerships + clothing + textile + apparel	2,051,930	24,163	109	31	26	**7**
Total Used Sources (Main)							**24**

The 24 sources were included based on currency, the relevance of information, accuracy of the information, and reliability (peer-reviewed sources). The sources were also selected based on availability due to the need for verifiability of the sources.

Once the sources were selected, they were evaluated to ensure they have the information needed by reading

them and summarizing the results. The main concepts and points were derived from the sources and presented through the results in section 3 below. The summarized results help to answer the research questions and achieve the research objectives. Analysis of the study was done with a critical review and consideration of the two critical theories used in this study. Results are theoretically presented with the potential weaknesses of the studies incorporated in the critical analysis.

Two main theories were used as part of the analysis. They include The Constructivist Learning Theory and Situated Learning Theory. The constructivist learning theory postulates that learners construct knowledge rather than simply taking in information in a passive learning environment [11]. Through this theory, the best way to acquire and retain knowledge is active involvement through an experiential environment where learners and the disseminator of knowledge work together to exchange and collaborate knowledge and information. A learning process is collaborative and multidirectional and not one-directional, as is often the case in traditional learning and information dissemination. By understanding critical aspects of the constructivist learning theory, the goal is to understand how industry partnerships can help in improving the learning environment while evaluating the level of constructivist learning in the CTA industry in Kenya. It helps to understand the improvement of the knowledge and skills of the degree students in Kenya through industry partnerships and collaborations to move away from the trickle-down learning model to a collaborative learning model between the learners, lecturers, and the industry. Demand-side inclusion with the customers and bottom-of-the-pyramid stakeholders is also a good learning strategy that would transform the CTA industry into one of the few using the transdisciplinary learning approach.

Situated learning involves creating similar situations or replicating a real work environment to ensure that a learner acquires the theoretical skill and practical knowledge in the specific area [12]. The theory states that knowledge is not static but constantly changing because it is constantly ongoing. It is influenced by social, cultural, and historical factors. It also involves people who are not the same- those who have different social perspectives, interests, or motivations and therefore negotiate their way through activities in a different way [12]. In situated learning, there are activities developed within the context of a work environment that a learner should complete. At the end of the activities, the learner has experience with different aspects of selected jobs, including decision making, problem-solving, and stakeholder management. Examples of situated learning that can be applied in the CTA industry include apprenticeship, work-based learning, and simulation. Situations are not the same in the work environment because current, individual, and circumstantial factors differentiate them [13]. However, awareness of these situations by taking them during the training and degree acquisition helps prepare for them. It helps the learners to understand potential situations that they might face and prepare for them. The situated learning theory is applied in the context of several critical actors, as shown in figure 1 below.

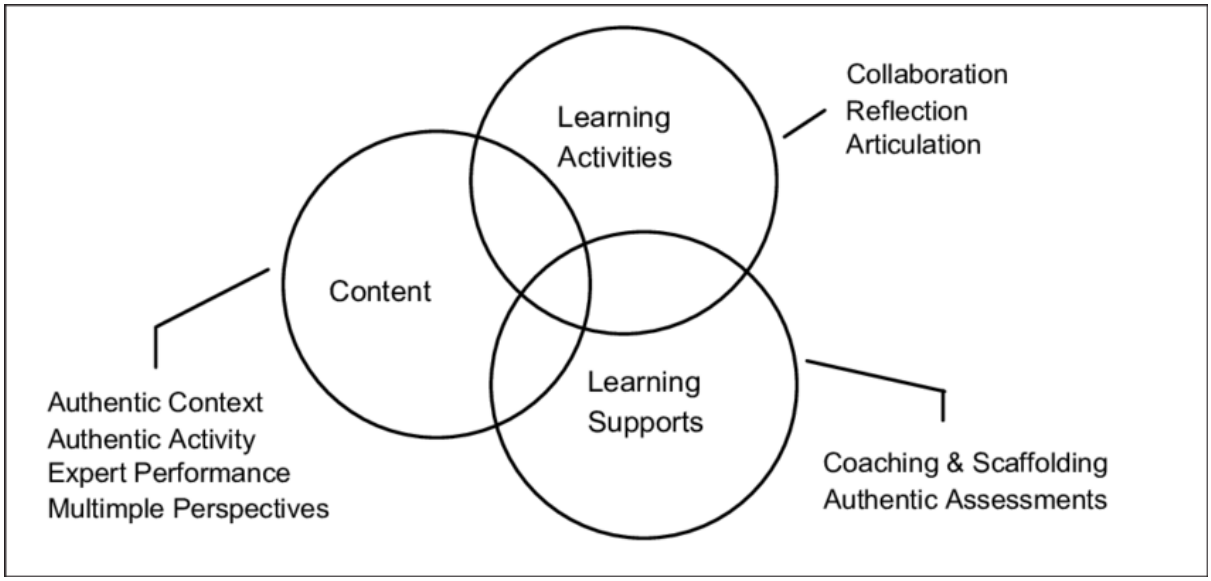

Figure 1: Elements of situated learning making up the situated learning theory [32]

The situated learning theory provides for authenticity, practicality, role play, and legitimate peripheral participation by the learners. Looking at the CTA industry in Kenya, Situated Learning and New Design Education theories would be suitable training approaches to adopt. The literature in this study is analyzed with a keen focus on whether learning provides for situated learning as an effective way to improve learning and bridge the industry gap in the CTA industry.

The analysis theoretically presents the results, with critical conclusions and recommendations captured in the subsequent sections. The conclusions are also contextualized for easy understanding and interpretation. Bias is eliminated by considering the two theoretic perspectives and critical analysis showing potential gaps in each of the reviewed sources.

3. Results

Analyzing the quality of fashion graduates in Bungoma, Wasike argues that Kenyan graduates do not compare favorably with the rest of the world because they lack experience working with the industry during their studies [14]. She argues that enrollment for fashion industry courses has improved, and the industry has changed, yet the vocational training institutions have not improved their approaches to meet the changing market needs and situations [14]. Odhiambo and Wakiaga argue that nearly 55% of the teachers in higher learning institutions have little to no touch with changing industry needs, and the curriculums in most of the institutions are stuck in outdated content [15]. With little screening for trends, the authors argue that the teachers are less likely and minimally inclined to teach content that would prepare the students for the changing and current trends in the CTA industry.

Focusing on the quality of teaching methods, Mbila argues that the curricula in most higher education institutions in Kenya are theoretical and hardly meet the practical needs of the market [16]. Comparing the entrepreneurial content of the CTA curricula in select universities, the author concludes that there are significant

gaps and focus on the status quo and little focus on creativity and entrepreneurially solving the problems in the sector.

Holland, Mendenhall, and Pearson reference the fashion industry in Kenya, noting that the link between the industry and the educational institutions in a skills exchange, apprenticeship, and collaboration are missing [17]. Therefore, the skills required in the job market are hardly imparted on the graduates with most of the learning and memorizing theoretic concepts. Skill gain happens mostly with the interaction between the learning environment and the skills environment. However, the internship stints in Kenya have been found to be an average of 4 months, with some stretching to 6 months [14]. Lack of strong interaction with the market makes it hard for the degree holders and graduates in Kenya to compete with their compatriots from the rest of the world. The environment insufficiently supports professional and career growth for these students.

A comparative analysis of the degrees in the CTA industry in Kenya compared to the rest of the world shows that there are advancements in some of the countries that Kenya can learn from. A comparison of Kenya's CTA college degree to select countries over various factors is shown in table 2 below. It is evident that some of the countries have advanced in their college degree, and Kenya can emulate them.

Table 2: A comparative analysis of the degrees in the CTA industry in Kenya compared to the rest of the world

Characteristics of Curricula Around the World						
	UK **(LCF)**	**Germany** **(Berlin Institute)**	**Pakistan** **(PIFD/NCA)**	**South Africa** **(UJ)**	**Ghana**	**Kenya**
Course structure	1-year general foundation 3-year degree; course builds on knowledge year on year	3-4year degree after the pre-study internship	4-year degree course based on aptitude test, with a 1-year foundation program	3-year Degree	4year degree with 1-year foundation (not fashion)	4-year degree
Industry-focused	Optional internship, consultancy, collaboration Live industry projects	Compulsory work placement semester- 6months	Compulsory 4-6week internship	Live industry projects; many students have little industry experience	Alumni offer some internships and seminars. The internship is not compulsory	Short internships, field trips, seminars
Formal linkage: industry and academia	Graduate fashion week, internships, talks, seminars, crits, industry-sponsored projects and competitions, sandwich courses	Strong linkages with industry	Some formal collaborations with industry; competitions,	Not very well defined.	Not formal or documented and mostly relies on alumni	Not well defined;

			exhibition Collaboration with international institutions and universities		linkages	
Assessment methods	Portfolio presentation, written reports, Live or simulated industrial projects, Written assignments, Presentations to specialist audiences,3D outcomes. prototypes Assessment is carried out at the various stages with increased parameters	Project-based Thesis	Examination Projects Thesis	Examination Projects Research paper	Not clear	Projects Examinations Thesis
Collaboration/ Multi-disciplinarity	Collaborations between specializations are evident; cross-disciplinary research is also present	Inter-disciplinary projects are present	No evidence	No evidence	No evidence	No evidence
Faculty	More expert part-timers, few academics and professors; the majority of faculty have experience in practice.	Experts and Academics, most with industry experience	Few professional staff qualified in Fashion and Textiles; institutions tend to absorb their own	Mainly researchers and technicians	Not specialized in the area of fashion and textiles	More academics, fewer practitioners

Course emphasis (Artistic, creative, commercial, R&D)	Innovation and market-oriented practical skills. Originality and conceptual fashion	Creativity, Individuality, Technology, Self-drive; history and social, cultural studies; process	Design, Production Research, experimentation,	Technical, manufacturing and production,	Textiles, technology, design, fashion	Production and business skills
Main skills	Creativity, Innovation, Research, Manufacturing, Sustainability	Technology, Fine Art Problem-solving Decision-making Practical skills	Technical, materials & techniques, legislation and standards Business skills	Manufacturing, Design	Theory Production Textiles Business skills	Production, Design business skills, research, history, social, cultural studies
Research	Encourages research in a wide variety of fashion-based topics	Strong linkages with research institutions; emphasis on interdisciplinary research	A strong culture of research; affiliation with international academic institutions	Strong focus on research/ research outputs	Encouraged	Strongly encourages
Teaching/learning methods	Lectures, seminars, crits, group presentation, studio, visiting speakers, experimentation,	Interdisciplinary, experimental projects with no			Not clear	Lectures, field trips, research, visiting

	demonstration, field trips, self-directed study, research	predefined design language Scientific and technical				speakers, studio work
The course is generalized or specialized	Multiple specializations and sub-specializations	Specialized content in a wide area of study, few options of degree programs	Less specialization, but many fashion-related subjects	Few electives	Not specialized in fashion or textile, mixed degree; few electives	Few electives, not highly specialized
Human-centred design		Focus on the impact of design on humanity and the environment	Implied	Implied	No Evidence	No evidence
Multiple routes to learning	YES	No evidence	No evidence		No evidence	NO

Strydom and Kempen note that collaboration between the industry and the academic institutions in talent development is insufficient and could help to develop the degree students in line with the trends and developments in the market. Education support from the industry can be in the form of apprenticeships, mentorship, career development, and employment [18]. When internships and apprenticeships happen, they should build the skills and complement the students' learning. However, when internships are undertaken in Kenya, they are often focused on the needs of the CTA industry companies and fashion businesses rather than on students' skills development. Internships are relatively shorter in Kenya, with the average internship being four months [19]. However, four months are hardly enough to learn in a situational environment to adapt to the business and learn its working process. The internship period is short and does not facilitate sufficient learning. Another suggestion has been apprenticeship, which Kenyan businesses have avoided because they do not meet the needs of these businesses. Instead, they are structured so that the students end up in roles that are not tailored to the CTA trends [20]. Mentorship in collaboration would be important. However, there is insufficient mentorship with the students sent to departments where they are expected to help in different roles like clerical work and record-keeping that do not expand their skills in the CTA industry.

The curriculum in Kenya also lacks a critical focus on the industry trends and needs, with the lecturers mostly seasoned academics and teachers with little support from the industry [21]. Kobia and his colleagues note that many lecturers and faculty leaders in Kenya have little to no industry experience. The percentage of those with no industry experience is estimated to be 73% of the university and college heads [21]. Comparatively, developed countries leverage part-time tutors who are leaders and executives in the industry to disseminate knowledge. Many industry leaders and managers in Kenya do not have the interest or opportunity to work with university students to generate knowledge and work-based learning critical to industry skills development and success. With constant complaints about the lack of ample skills among graduates, the expected shift is developing the degrees to ease student transition to the industry [22]. However, 52% of college graduates in the CTA industry have had minimal to no experience in the industry by the time they graduate. This shows the minimal level of partnership and collaboration between the industry and the college trainers.

Chepchumba and Monica look at the fashion industry and academia opportunities, noting that institution-based institutes where the CTA experts can work with the lecturers and students would create good value and collaboration [23]. A sustainable model includes developing events and forums where information can be shared from the industry to the academia, curricula can be updated with modern trends, and trainers can exchange information on trends with industry leaders. When evaluating the factors affecting the apparel industry in Nairobi, Kariuki noted that over 60% of entrepreneurs in the industry did not have prior training in the industry and 81% of the employees in the industry, the majority of whom had the training, were ill-equipped with modern trends and techniques in the industry [24]. The result is a lack of strategic positioning in the market, leading them to resort to secondhand clothing trends. He recommends closer ties between the industry and the academic institutions in enhancing the entrepreneurial skills of the students taking CTA courses as a way to ensure business owners are aware of industry practices and trends and the strategy that the industry should take.

Several policies have been developed to support the CTA industry in Kenya. The Import-substitution policy was developed to ensure that manufacturing products in Kenya are prioritized and supported over the imported

products [25]. It was meant to ensure that the manufacturing industry was supported for its sustainability and growth without destroying the import-export business. The ISP (acronym for?) helped to boost the local intake for local manufacturing products but hurt the export market due to inward-looking policies. However, ISPs have not helped to improve the relationships within the CTA industry in Kenya [26]. The policies encourage the manufacturing industry to grow in output but do not focus on collaboration on the talent level. Focus on income rather than skills has improved productivity but affected the quality of skills within the CTA industry.

Trade liberalization has also contributed to the growth of the CTA industry in Kenya. In the mid- 1990s, the Kenyan industry was liberalized, meaning that with the opening of the trade borders came an influx of cheap and secondhand textile goods into the country, which has led to a notable reduction in the capacity utilization of the local textile mills to about 50%. It has also led to the emergence of Export Processing Zones (EPZ) supported by quota-free and tax-free export and unrestricted foreign ownership [28]. The EPZ in Kenya has provided a rich source of internships and apprenticeships for Kenyan CTA students. However, there has been a focus on production rather than skills development. In many cases, the interns in the EPZ for the CTA industry go into roles that are geared towards increasing production and not those focused on building skills, a sharp contrast with other developed countries that focus extensively on skills development [29].

Public-private partnerships have been mooted as possible policy changes that can help in building skills in the CTA industry in Kenya [30]. The CTA industry has witnessed a mild level of PPPs (acronym for?), especially with the small-scale CTA businesses. However, increasing PPPs can increase stakeholder collaboration and participation in the CTA industry and increase its contribution to skills development. The model for PPP should be centered on skills development and not the production-based collaboration that is the model of the EPZ.

4. Discussion

The training approaches for the CTA industry in Kenya can be classified into the institutional methods through teaching and the industry contribution with policymakers contributing to both. CTA students' training is common in the Kenyan institutional setup through classroom work, assignments, testing, and examinations. There are internships and placements in the area, with universities requiring four-month internships for the students. However, there is a minimal follow-up on the graduates or students' skills during these internships. In the industry, there is a focus on production and increasing output. Students coming into the sector mainly contribute to the sector's productivity with little to no contribution towards skills development. The experts are, in many ways, moderately involved while business people and entrepreneurs who may not have ample knowledge of the industry take up the business positions [22]. The government has policies focused on the growth and output improvement of the industry. However, there are no policies that help to foster training and skill development within the CTA industry. The results imply a growing need for the government to establish pathways for training within the CTA industry. With increased focus on industrialization and job creation, improving training can help to improve the output quality and quantity and enhance the workforce's skills and capabilities. Training also helps in developing a specialized workforce and working relations within the CTA industry in Kenya.

For training in institutions of learning, the results of the study show that there is a focus on theoretic learning with little focus on work-based learning and industry experience. This means that the training can ignore current trends due to a lack of trends update for the trainers and professors. This minimal focus on the industry trends creates CTA graduates who have the theoretical knowledge but lack the practical edge to be successful in the market [20, 21]. A comparative analysis with selected countries shows that some of the most successful countries have industry leaders and specialists working as part-time lecturers, which is an effective way for them to work. Part-timers are effective because they bring the industry experience to the classroom and have the students work with real business case studies [24,27]. In Kenya, the lecturers are seasoned academics with little to no industry experience. The results point towards a shift in the industry-education partnership with more industry players involved in teaching and training in learning institutions. Kenya should adopt more part-time trainers and tutors because they give the country and institutions a good chance for industry skills transfer. It also facilitates sustainability in training and skills necessary in the industry. Such an approach would enhance better and more efficient skills transfer, and training needs accomplishment.

The training environment is layered with the unwillingness of industry leaders to offer mentorship, apprenticeship, and sessions that can help the universities to improve their teaching. The results show that events and functions that bring together industry leaders in a situational training environment with the students could be mutually beneficial, with the students potentially gaining better and more focused industry awareness and experience in the market [29]. However, the situation currently has insufficient arrangements of this nature, creating a major disadvantage for the CTA students. The industry evolves from time to time, including trends and emerging challenges for different players. Mentorship is important in developing and maintaining high standards in the industry. As shown in the results, such mentorship is important in the sustainability and success of the CTA industry. Therefore, the industry leaders and academic leaders should work together to east the mentoship and transition environment between the CTA students and the industry.

There is a mismatch between the curriculum taught in the Kenyan CTA institutions and the industry requirements [16, 21]. Curriculum consultations are a potential situational solution because they would enhance the industry's contribution to academia. Curriculum partnerships are used in other countries, including Germany, and the United Kingdom, where students spend time with industry leaders, with the industry leaders being actively involved in curriculum development [21]. A similar approach is among the potential solutions to improve the training environment for the CTA industry in Kenya. A participatory approach in curriculum development that involves all stakeholders is recommended, along with more regular reviews. Curriculum reviews that consider the short-term changes in market needs and interests are necessary to enhance better training and knowledge transfer for the CTA students. A participatory approach also ensures that emerging trends and issues in the industry and continually part of the curriculum.

There is minimum focus on training employees in the CTA industry, with the majority of the industry focused on the output and increased productivity. The policy framework in the CTA industry has improved the desire of businesses in the CTA industry to be globally competitive. The global competitiveness of these businesses is increased by the changing trends and needs in the market. The growth of secondhand clothes in the Kenyan market has further pushed the focus towards productivity and output and away from skills development and

talent promotion. Partnership with training and human resource institutions are seen as potential pathways to improving the training and skills development in the CTA industry in Kenya [30]. The industry focus on internal training varies with businesses. However, a framework for collaboration would enhance the quality of training in the CTA industry.

5. Conclusion

The CTA industry in Kenya does not have an effective pathway for training graduates to effectively transition them to the CTA industry. The skills necessary in the industry are hardly understood and conceptualized by the students and their trainers because of a disconnect between the industry and academia. Unlike other countries where industry persons are part-timer lecturers and useful in curriculum development and teaching, Kenyan CTA industry trainers are mainly academics with little or no experience in the CTA industry. There is a disconnect in the understanding and knowledge of trends and skills necessary in the industry. On its part, the industry has benefitted from policy and regulations that have eased production and promoted the use and demand of local products. There is a deep focus on production and little focus on skills development and training. The disconnect between the industry and academia is responsible for a lack of exchange in the curriculum, lack of sufficient work-based learning and internships, and insufficiency in industry skills development and training. The major recommendation is a framework for interaction between the industry and the academia in the CTA industry to enhance skills development, human capital development, and quality of graduates from major CTA institutions. The framework should include guidelines for more people with experience in the CTA industry to work with students through apprenticeships, internships, and tutoring. Part-time teaching, lengthening the time for an internship, an evolutionary syllabus, and a framework for mentorship and apprenticeship can all contribute to better training and skills development for the CTA graduates. Policies focused on general industrial contribution to educational quality can also help in improving the partnership and collaboration between institutions of learning and training and the industry. Policies requiring the manufacturing and other businesses in the CTA industry to report on skills development and performance tied to skills development within the industry would go a long way to improve collaboration with training institutions and, in the end, quality in the industry. A number of factors limited this research. First, the time constraint was a factor. The number of reviewed sources was sufficient. However, with more time, primary research, including the collection of data from participants and a participatory approach in curriculum design, would have been important. The simulation would also have been done with more time available.

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