



**Framework for apprenticeship training programs: a case study of
manufacturing small and medium enterprises in South Africa**

By

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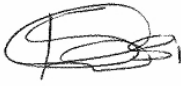
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DECLARATION

I, Suzan Nkosi, student number 54765366, declare that this thesis is my original work, supervised by Prof. NF Ramasimu and Dr. G Maake. All sources used have been acknowledged and quoted in the reference list.



Signature

20 January 2026

Date

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ABSTRACT

This study assesses apprenticeship training programs in South Africa's manufacturing industry through the viewpoints of key stakeholders, including SMEs, colleges and training centres. A purposive, criterion-based sampling strategy was used to select participants who were directly involved in apprenticeship delivery and management across these institutional contexts. A total of 12 participants were included, representing SMEs, TVET college and a training centre. The sample size was determined based on qualitative research principles of information-rich cases and depth of insight. Data collection continued until thematic saturation was reached, where no new codes or themes were emerging from the interviews. This approach is consistent with qualitative multi-case study designs where smaller samples are appropriate for achieving depth and contextual understanding rather than analytical richness rather than statistical generalisation.

The study investigates how mentorship, the apprenticeship framework, and systemic factors influence skills development and workplace readiness. The findings identifies critical obstacles such as obsolete and antiquated curricula that fail to keep pace with continuous technological innovations such as automation and robotics, resulting in persistent skills mismatch. Access barriers, including digital divides and funding inequities, further restrict equitable involvement, particularly for learners from disadvantaged backgrounds. Centralised policy structures prohibit institutional independence, restricting curriculum innovation and responsiveness to industry needs.

Notwithstanding these systemic limitations, the study underscores strengths such as the pivotal role of on-the-job training, structured mentorship, and personalised feedback in promoting practical skills and enthusiasm among apprentices. SMEs demonstrate efficacious mentorship practices that improve learner engagement, whereas training centres impart valuable formative evaluations. The study also highlights the significance of soft skills, communication, adaptability, and teamwork as essential for employability and career success. Continuous professional development for trainers is a crucial factor underpinning quality apprenticeship delivery in a developing industrial landscape.

The research improves theoretically by amplifying cognitive apprenticeship models within the South African context and methodologically through a multi-case qualitative approach that triangulates data across different stakeholders. Methodologically, data were analysed using thematic analysis following Braun and Clarke's framework, employing an iterative process of coding, categorisation, and theme development. Analysis was supported using ATLAS.ti Version 25, which facilitated systematic organisation and refinement of qualitative data derived from semi-structured interviews.

The study contributes theoretically by extending cognitive apprenticeship theory within a South African manufacturing context and methodologically through a multi-case qualitative design that enables cross-stakeholder comparison and triangulation. Practically, this study provides evidence-based awareness to enhance program design, instructional techniques, and collaborative participation between educational institutions and industry. Policy implications call for curriculum change to promote flexibility and alignment with labour market standards, improved funding mechanisms to foster equity, and stronger government–industry partnerships to support mentorship and trainer development.

Recommendations include decentralising curriculum evolution, institutionalising structured mentorship and feedback systems, enhancing professional development for trainers, and increasing SME involvement in curriculum design and workplace learning. Future studies should explore the scalability of mentorship models, policy execution at institutional levels, and collaboration with digital learning tools in vocational training.

Keywords:

Apprenticeship, Collaboration Curriculum evolution, Government support, Quality training,

MOHOPOLO

Boithuto bona bo lekola mananeo a kwetliso ya boithuto indastering ya tlhahiso ya Afrika Borwa ka maikutlo a bankakarolo ba bohlokwa, ho kenyeletswa di-SME, dikholetjhe le ditsi tsa kwetliso. Ho ile ha sebediswa leano le nang le maikemisetso le ipapisitseng le ditekanyetso ho kgetha bankakarolo ba neng ba ameha ka kotloloho phano ya boithuto le tsamaiso maemong ana a ditsi. Nomoro e felletseng ya bankakarolo ba le 12 ba ne ba akaretswa ke ba emetseng di-SME, kholetjhe ya TVET le sebaka sa thupello. Boholo ba sampole bo ile ba kgethwa ho ipapisitswe le melao-motheo ya boleng ba dipatlisiso tsa dinyewe tse nang le tlhaiso-leseding le botebo ba temohisiso. Pokello ya dintlha e ile ya tswela pele ho fihlela ho fihlelwa ka botlalo, moo ho neng ho se na dikhoutu tse ntjha kapa dihlooho tse hlahang dipuisanong. Mokgwa ona o dumellana le meralo ya boleng ya boithuto ba maemo a mangata moo disampole tse nyane di loketseng ho fihlella botebo le kutlwisiso ya maemo ho ena le borui ba tekolo ho fapana le kakaretso ya dipalopalo.

Phuputso e batlisisa ka moo boelets'i, moralo wa boithuto, le dintlha tsa tsamaiso di susumetsang ntshetsopele ya ditsebo le ho itokisetša sebaka sa mosebetsi. Diphuputso di supa ditshitiso tse mahlonoko tse kang kharikhulamo ya kgale e hlolehang ho tsamaisana le dintlafatso tse tswelang pele tsa theknoloji tse kang automation le robotics, e leng se bakang ho se dumellane ho sa feleng. Ditshitiso tsa phihlello, ho kenyeletswa dikarohano tsa dijithale le ho se lekane ha ditjhelete, di boetse di thibela ho kenya letsoho ka tekatekano, haholo-holo ho baithuti ba tswang malapeng a hlohang menyetla. Mekgatlo ya maano a mahareng e thibela boikemelo ba setheo, e thibela boiqapelo ba kharikhulamo le ho arabela ditlhoko tsa indasteri.

Ho sa tsotellehe dikgaello tsena tsa tsamaiso, thuto e totobatsa matla a kang karolo ya bohlokwa ya kwetliso ya mosebetsing, tlihabollo e hlophisitsweng, le maikutlo a motho ka mong bakeng sa ho kgothaletsa ditsebo tse sebetsang le tjheseho hara diithuti. Di-SME di bontsha ditlwaelo tse sebetsang tsa boelets'i tse ntlafatsang boitshebetso ba baithuti, athe ditsi tsa kwetliso di fana ka ditlhahlobo tsa bohlokwa. Boithuto bona bo boetse bo totobatsa bohlokwa ba ditsebo tse bonolo, puisano, ho ikamahanya le maemo, le tshebedisano-mmoho e le tsa bohlokwa bakeng sa ho hirwa

le katleho ya mosebetsi. Ntlafatso e tswelang pele ya profeshenale bakeng sa bakwetlisi ke ntlha ya bohlokwa e tiisang phano ya boleng ba boithuto sebakeng sa indasteri e ntseng e tswela pele.

Patlisiso e ntlafala ho latela mohopolo ka ho hodisa mekgwa ya boithuto ba kelello ka hara maemo a Afrika Borwa le ka mekgwa wa ho sebedisa maemo a mangata a kopanyang dintlha ho pholletsa le bankakarolo ba fapaneng. Ho latela mekgwa, dintlha di ile tsa hlahlojwa ho sebediswa tlhahlobo ya sehlooho ho latela moralo wa Braun le Clarke, ho sebediswa mekgwa o pheta-phetwang wa ho ngola dikhoutu, karohano le ntshetsopele ya sehlooho. Tlhahlobo e ile ya tshehetswa ho sebediswa ATLAS.ti Version 25, e nolofaditseng tlhophiso e hlophisehileng le ntlafatso ya dintlha tsa boleng tse nkilweng dipuisanong tse hlophisitsweng hantle.

Patlisiso e kenya letsoho ho ya ka mohopolo ka ho atolosa mohopolo wa boithupelo ba kutlwisiso e mabapi le maemo a tlhahiso a Afrika Borwa le ka mekgwa wa mohopolo wa maemo a mangata a maemo ao a bapisang batho ba nkang karolo ba fapaneng. Ha e le hantle, thuto ena e fana ka tlhokomediso e thehilweng ho bopaki ho matlafatsa moralo wa lenaneo, mekgwa ya ho ruta, le ho kenya letsoho tshebedisanong pakeng tsa ditsi tsa thuto le indasteri. Ditlamorao tsa leano di hloka phetoho ya kharikhulamo ho kgothaletsa ho tenyetseha le ho ikamahanya le maemo a mmaraka wa basebetsi, mekgwa e ntlafaditsweng ya ditjhelete ho kgothaletsa tekano, le dikamano tse matla tsa mmuso le indasteri ho tshehetsa boeletsu le ntshetsopele ya bakwetlisi.

Ditlhahiso di kenyelletsa ho arola thuto ya ho iphetola ha dintho, ho theha boeletsu bo hlophisitsweng le ditsamaiso tsa maikutlo, ho matlafatsa ntshetsopele ya ditsebi bakeng sa barupelli, le ho eketsa seabo sa SME moralong wa kharikhulamo le ho ithuta mosebetsing. Dithuto tsa nako e tlang di lokela ho lekola bokgopo ba mehlala ya boeletsu, tshebetso ya maano maemong a ditsi, le tshebedisano mmoho le disebediswa tsa ho ithuta tsa dijithale kwetlisong ya mosebetsi wa matsoho.

Mantswe a bohlokwa:

Boithuto, Tshebedisano mmoho Kharikhulamong, Tshehetso ya Mmuso, Kwetliso ya boleng,

MAWANWA

Ngudo iyi i tōla mbekanyamushumo dza vhugudisi ha u guda mushumo kha ndowetshumo ya vhubveledzi ya Afrika Tshipembe nga kha mavhonele a vhakwamei vha ndeme, hu tshi katelwa na dziSME, kholedzhi na senthara dza vhugudisi. Tshithirathedzhi tsha tsumbonanguludzwa tshi re na ndivho, tsho tewaho kha maitele tsho shumiswa u nanga vha dzhenelaho vhe vha vha vha tshi shela mulenzhe thwii kha u netshedzwa ha vhugudisi na vhulanguli kha nyimele idzi dza tshiimiswa. Vhadzheneleli vha linganaho 12 vho katelwa, vha tshi imela dziSME, kholedzhi ya TVET na senthara ya vhugudisi. Vhuhulu ha tsumbonanguludzwa ho tiwa ho sedzwa kha milayo ya thodisiso ya vhuimo ha milandu yo pfumaho nga mafhungo na u dzika ha ndivho. U kuvhanganya data zwo bvela phanda u swika hu tshi swikelelwa u dala ha thero, hune ha vha na khoudu ntswa kana thero dzine dza khou bvelela kha inthavhiyu. Ndila iyi i tshimbilelana na ndila dza ngudo dza kheisi nnzhi dza vhuimo hune tsumbonanguludzwa thukhu dza vha dzo teaho u itela u swikelela vhudzivha na u pfesesa ha vhuimo nthani ha na u pfuma ha tsenguluso nthani ha u angaredza ha zwitatamennde.

Ngudo i thodisisa ndila ine vhueletshedzi, muhanga wa u guda mushumo, na zwithu zwa sisieme zwa thutuwedza ngayo mveledziso ya zwikili na u dilugisela mushumoni. Mawanwa a topola zwithithisi zwa ndeme zwi ngaho kharikhulamu dzo fhelelwaho nga tshifhinga na dza kale dzine dza kundelwa u tshimbila na vhubveledzi ha thekhinolodzhi vhu bvelaho phanda vhu ngaho u diitela na robotho, zwine zwa bveledza u sa tendelana ha zwikili zwi sa fheli. Zwithivheli zwa tswikelelo, hu tshi katelwa na u fhandekana ha didzhithala na u sa edana ha masheleni, zwi isa phanda na u thivhela u dzhenelaho ho linganelaho, nga maanda kha vhagudi vha bvaho kha vhubvo vhu si na zwishumiswa. Zwivhumbeo zwa mbekanyamaitele zwo tanganaho zwi thivhela u diimisa ha zwiimiswa, zwi thivhela vhubveledzi ha kharikhulamu na u fhindula kha thodea dza ndowetshumo.

Hu sa londwi mikano iyi ya sisteme, ngudo i ombedzela maanda a ngaho mushumo wa ndeme wa vhugudisi ha mushumoni, vhueletshedzi ho dzudzanywaho, na vhubfiwa ho khetheaho kha u thutuwedza zwikili zwi shumaho na u fhisea kha vhagudiswa. DziSME dzi sumbedza maitele a vhueletshedzi a shumaho ane a

khwinisa u dzhenelela ha vhagudi, ngeno senthara dza vhugudisi dzi tshi netshedza tsedzuluso dza ndeme dza u vhumba. Ngudo i dovha ya sumbedza ndeme ya zwikili zwa sofuthiwee, vhudavhidzani, u kona u tangeredza zwiimo, na u shuma sa tshigwada sa zwa ndeme kha u tholiwa na u bvelela kha mushumo. Mveledziso ya phurofeshinala i bvelaho phanda ya vhagudisi ndi tshithu tsha ndeme tshine tsha tikedza netshedzo ya vhugudisi ha vhuimo ha ntha kha shango la ndowetshumo line la khou bvelela.

Tsedzuluso i khwinisa nga teori nga u engedza modele dza u guda ha thalukanyo nga ngomu ha nyimele ya Afrika Tshipembe na nga maitele nga kha ndila ya khwalithethivi ya kheisi nnzhi ine ya tanganya data kha vhakwamei vho fhambanaho. Nga ndila, data yo senguluswa hu tshi shumiswa tsenguluso ya thero hu tshi tevhelwa muhanga wa Braun na Clarke, hu tshi shumiswa maitele a dovhololaho a u khouda, u khethekanya, na mveledziso ya thero. Tsenguluso yo tikedzwa hu tshi shumiswa ATLAS.ti Vesheni 25, ye ya leludza ndangulo yo dzudzanyeaho na u khwinisa data ya vhuimo yo bviswaho kha inthavhiyu dzo dzudzanywaho nga tshipida.

Ngudo i shela mulenzhe nga teori nga u engedza teori ya u guda ha thalukanyo nga ngomu ha nyimele ya vhubveledzi ha Afrika Tshipembe na nga maitele nga kha mveledziso ya khwalithethivi ya kheisi nnzhi ine ya konisa u vhambedza na u ita zwipida zwiraru zwa vhakwamei vho fhambanaho. Nga ndila ya u shuma, ngudo iyi i netshedza ndivho yo tewaho kha vhuanzi u itela u khwinisa nzudzanyo ya mbekanyamushumo, thekhiniki dza u gudisa, na u shela mulenzhe ha tshumisano vhukati ha zwiimiswa zwa pfunzo na ndowetshumo. Zwine mbekanyamaitele ya amba zwone zwi vhidzelela tshanduko ya kharikhulamu u itela u tutuwedza u tendelana na zwilinganyo zwa makete wa vhashumi, maitele o khwiniswaho a u netshedza masheleni u itela u tutuwedza u lingana, na vhufarisani ho kwaathaho ha muvhuso na ndowetshumo u itela u tikedza vhueletshedzi na mveledziso ya vhagudisi.

Themendelo dzi katela u fhandekanya mvelaphanda ya kharikhulamu, u ita uri sisiteme dza vhueletshedzi na vhupfiwa dzo dzudzanywaho dzi vhe dza tshiimiswa, u khwinisa mveledziso ya phurofeshinala ya vhagudisi, na u engedza u dzhenelela ha SME kha u divhadza kharikhulamu na u guda mushumoni. Ngudo dza tshifhinga tshi daho dzi tea u sedzulusa u linganela ha modele dza vhueletshedzi, u shumiswa ha

mbekanyamaitele kha maimo a zwiimiswa, na u shumisana na zwishumiswa zwa u guda zwa didzhithala kha vhugudisi ha mishumo ya zwanda.

Maipfi a ndeme:

U guda mushumo, U shumisana Mvelaphanda ya kharikhulamu, Thikhedzo ya Muvhuso, Vhugudisi ha vhuimo ha ntha,

ACRONYMS

Acronym	Definition
DHET	Department of Higher Education and Training
ETI	Employment Tax Incentive
GDP	Gross Domestic Product
MERSETA	Manufacturing Engineering and Related Services Sector Education and Training Authority
NAADAB	National Apprenticeship and Artisan Development Advisory Body
NDP	National Development Plan
OJT	On-The-Job Training
QCTO	Quality Council for Trades and Occupations
SDA	Skills Development Act
SDG	Student Development Goals
SDL	Skills Development Levy
SDP	Skills Development Practitioners
SME	Small and Medium Enterprise
TVET	Technical and Vocational Education and Training
UK	United Kingdom
UN	United Nations
US	United States

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Matsuo and Tsukube (2020) posit that the South African economy has insufficient skilled labour. The underperformance of pupils in science and mathematics remains a persistent problem in the provision of artisans to the industry. The South African Department of Higher Education and Training (2023) affirms that school leavers need to place more emphasis on technical education because the country is increasingly in need of these skills at the Centres of Specialisation Artisan Graduation in 2022.

There are countless school leavers that the government is propelling to be inculcated in various trades to avert the demand for scant skills. In 2022, the Katlehong Engineering School of Specialisation assisted their 20 matriculants for 2022, who were sitting at home with no money for tertiary education, by applying for a discretionary grant at sector education and training authorities (SETA) to be trained and hosted at Mandrew (Pty) Ltd. as Electrical and Fitter and Turner apprentices. Mandrew (Pty), Ltd., is sponsoring the Ekurhuleni School tutoring project for extra lessons in mathematics and science from Grade 9 to Grade 12 learners to promote proficiency levels in these subjects to foster possibilities for pupils to take up technically oriented careers after completing Grade 12 (What's Watt, 2024).

Moschella (2023) emphasise that the economies of scale have been remarkably reduced, increasing the possibility for SMEs to become prevalent contributors in the global market. Given the constraints of the turbulent global market and instantaneous technological transformations, South Africa must be competitive (Moschella, 2023). Smith (2021) underlines the significant contribution of SMEs in on-the-job training, a practice that is not only recognised but also diligently encouraged by the government. On-the-job training offers apprentices the opportunity to acquire practical work experience, a prerequisite for obtaining their Red Seal certificate and being recognised as artisans (Adamu, 2020). The absence of on-the-job training inhibits apprentices from writing their trade tests, thereby prohibiting them from qualifying. On-the-job training affords hands-on experience for apprentices by offering a limpid career pathway in a selected trade (Islam & Abd Wahab, 2021). It allows apprentices to acclimate quickly to the work environment they will be exposed to after qualification.

On-the-job training permits apprentices to earn while learning, and it is the most efficient and cost-effective method for SMEs to increase production.

The government of South Africa offers precedence to the evolution of SMEs to minimise the unemployment rate and contribute to the evolution of the economy (Gupta & Dharap, 2022). Although the contribution of SMEs is immensely questioned, studies have proven the current relationship between job creation, on-the-job training and SME growth (Islam & Abd Wahab, 2021).

The theoretical foundation of this study is grounded in four theories. Cognitive apprenticeship theory explains learning as a process of modelling, coaching, scaffolding, and gradual learner independence within authentic workplace settings. Kolb's experiential learning theory emphasises that learning is done through experience. Vyogotsky's socio-cultural theory emphasises that learning is socially constructed through participation, interaction and shared engagement within professional groups. Illeris learning theory recognises motivation, emotions and social interaction essential for effective and sustained learning in apprenticeship programs. Together, these theories provide a lens for understanding how mentorship, experiential learning, feedback, and stakeholder collaboration influence apprenticeship effectiveness in the South African manufacturing context.

1.2 BACKGROUND OF THE RESEARCH PROBLEM

The performance of the South African manufacturing industry has been declining in recent years, reflecting structural weaknesses in industrial productivity and skills supply (Smith, 2021). This decline is significant because manufacturing remains a key pillar of the South African economy, contributing approximately 11%–13% of national GDP and serving as a major driver of export earnings, industrial development, and formal employment creation (PwC, 2024). However, over the past five years, the sector has experienced stagnant growth and periodic contraction, with reduced output in key sub-sectors such as automotive components, textiles, and basic metals (Statistics South Africa, 2023). Capacity utilisation has remained below optimal levels, and employment in some manufacturing segments has declined, particularly during periods of economic disruption such as global supply chain shocks and domestic energy constraints. These performance indicators highlight weakening

competitiveness and structural inefficiencies in comparison to emerging and advanced manufacturing economies (Smith, 2021).

A key driver of this decline is the persistent shortage of appropriately skilled labour capable of adapting to modern industrial demands such as automation, robotics, and advanced production systems (Ehteshami, 2020). Despite SMEs being widely recognised as central contributors to economic growth, employment creation, and industrial resilience (Matsuo & Tsukube, 2020), their effectiveness is constrained by insufficient access to skilled apprentices and inconsistent training quality. On-the-job training remains essential for enhancing productivity and operational efficiency within SMEs, as it directly strengthens workplace competence, innovation capacity, and production quality (Islam & Abd Wahab, 2021). In this context, apprenticeship training is critical for sustaining industrial competitiveness and ensuring workforce readiness in a globalised economy (Aithal, 2023). Abd Wahab

International comparisons further highlight the importance of structured vocational systems. European countries such as Germany, Austria, the Netherlands, and Denmark have successfully implemented dual vocational education systems that integrate classroom instruction with workplace training, enabling smoother school-to-work transitions (Mursa, Iaconbuta & Zanet, 2018). In contrast, many developing regions continue to experience fragmented technical and vocational education systems characterised by outdated curricula, limited resources, and weak industry alignment (United Nations, 2020). These global disparities underscore the importance of reforming apprenticeship systems in South Africa to align with international best practice. International comparisons further highlight the importance of structured vocational systems. European countries such as Germany, Austria, the Netherlands, and Denmark have successfully implemented dual vocational education systems that integrate classroom instruction with workplace training, enabling smoother school-to-work transitions (Mursa *et al.*, 2018). In contrast, many developing regions continue to experience fragmented technical and vocational education systems characterised by outdated curricula, limited resources, and weak industry alignment (United Nations, 2020). These global disparities underscore the importance of reforming apprenticeship systems in South Africa to align with international best practice.

In South Africa, the National Skills Development Plan 2030 emphasises the urgent need to strengthen artisan development, targeting the production of at least 30,000 artisans annually to support socio-economic transformation (Department of Higher Education and Training, 2023). However, despite these policy ambitions, the apprenticeship system remains structurally misaligned with industry needs. The current system is governed primarily through the Quality Council for Trades and Occupations (QCTO), which enforces standardised occupational qualifications and centralised curriculum structures.

While this standardisation ensures regulatory consistency, it has also introduced limitations, including limited institutional flexibility, slow curriculum responsiveness, and weak adaptation to emerging technologies such as automation, robotics and smart manufacturing systems. Furthermore, the current apprenticeship pathway under QCTO requires apprentices to follow a rigid sequence of institutional learning, workplace placement, and logbook-based assessment. Although structured, this system often results in weak integration between theory and workplace practice, as well as inconsistent mentorship quality across SMEs.

Despite these policy ambitions, the South African apprenticeship system remains structurally misaligned, fragmented and insufficiently responsive to industrial transformation. The current apprenticeship model under the Quality Council for Trades and Occupations (QCTO) is highly standardised and centralised, which limits institutional flexibility and delays curriculum responsiveness to emerging technologies such as automation, robotics, and advanced manufacturing systems. Additionally, the system is constrained by fragmented feedback mechanisms between training providers and industry, limiting continuous curriculum improvement and responsiveness to labour market demands. These challenges collectively indicate that the current apprenticeship model is not sufficiently adaptive to support a rapidly transforming manufacturing sector.

Within this context, the study is motivated by the need for a new integrated apprenticeship framework that can be adopted at national level, particularly by the QCTO and associated stakeholders. Such a framework is necessary to address systemic fragmentation, improve alignment between training and industry needs, and enhance the responsiveness of apprenticeship systems to technological and

economic change. Without structural redesign, incremental policy adjustments are unlikely to resolve the deep-rooted inefficiencies in the current system.

The study setting was therefore purposively selected within South African manufacturing SMEs, training centres, and TVET colleges due to their direct involvement in apprenticeship delivery and their central role in skills formation. These institutions represent the core ecosystem where apprenticeship policy is translated into practice. SMEs provide workplace-based learning, colleges deliver theoretical instruction, and training centres facilitate structured skills development. Studying these interconnected actors provides a comprehensive understanding of how apprenticeship systems function in practice and where breakdowns occur between policy design and implementation.

The National Apprenticeship and Artisan Development Advisory Body (NAADAB) further encourages SME participation in skills development through mechanisms such as Artisan Recognition of Prior Learning (ARPL), while SETA frameworks require workplaces to support structured learning environments (Department of Higher Education and Training, 2023). However, implementation remains inconsistent due to capacity constraints and uneven institutional participation.

In addition, apprenticeship development aligns with global development priorities such as Sustainable Development Goal (SDG) 4 and SDG 8, which emphasise quality education, skills development, productive employment, and inclusive economic growth (United Nations, 2024). Apprenticeship systems are therefore not only economic instruments but also critical mechanisms for promoting equity, employability, and sustainable industrial development.

Therefore, this study is situated within the South African manufacturing sector because of its strategic importance to GDP contribution, employment creation, and industrial competitiveness. Given the sector's declining performance, persistent skills shortages, and structural limitations within the current QCTO apprenticeship framework, there is a clear need for a redesigned, integrated, and system-wide apprenticeship framework. Such a framework would enable stronger alignment between policy, training institutions, and industry, thereby supporting South Africa's broader re-industrialisation and skills development agenda.

1.3 PROBLEM STATEMENT

SMEs in South Africa are crucial in stimulating long-term development and economic enhancement (Sibiya, 2023). Since 1995, the government of South Africa has encouraged SMEs to drive economic development by being competitive, developing jobs, and distributing income (Mmbengeni, Mavhungu, & John, 2021). SMEs are acknowledged as important to the enhancement and growth of the regional economy (Ramasimu, Majadibodu, & Ladzani, 2023). There is no doubt that SMEs are important to the economy of South Africa's performance (Adebowale & Agumba, 2023). Despite this vital role, SMEs face obstacles in South Africa.

Apprenticeship programmes are essential within the South African manufacturing sector because they provide structured, work-based learning that bridges the gap between theoretical knowledge and practical industrial competence. The manufacturing industry is highly technical and depends on specialised occupational skills such as machining, welding, automation, production systems, and emerging digital manufacturing technologies. These competencies cannot be fully developed through classroom-based instruction alone, but require sustained exposure to real workplace environments under the supervision of skilled practitioners. Therefore, apprenticeship programmes are critical for developing industry-ready artisans, improving productivity, reducing skills shortages, and strengthening the competitiveness of the manufacturing sector within a global, technology-driven economy.

One of the solutions to the obstacles faced by SMEs could be to introduce on-the-job training, as it is the most efficient and cost-effective process for SMEs to maximise production. However, the effectiveness of on-the-job training is constrained by weaknesses within the current apprenticeship training framework governed by QCTO, which is often characterised by rigid curriculum structures, limited workplace integration and inconsistent implementation across SMEs. These structural limitations reduce the ability of the system to produce fully work-ready artisans.

Smith (2021) suggests that, despite the benefits and advantages of on-the-job training, some SMEs still underinvest and reject the thought of hosting apprentices. Mayombe (2021) assert that some of these SMEs are in partnership with large enterprises that

do not even comply with SETA regulations. Most SMEs lack the knowledge and comprehension of hosting apprentices. These SMEs have a culture of utilising apprentices as cheap labour. They do not use them as per SETAs requirements (Adamu, 2020). Gupta and Dharap (2022) assert that there is a lack of knowledgeable mentors, which is why they are tasked with transferring their knowledge and skills to apprentices when they arrive at these SMEs for hosting. This reflects a broader systemic weakness within the apprenticeship ecosystem, where insufficient regulatory enforcement, weak mentorship structures and limited institutional support undermine the intended outcomes of the QCTO apprenticeship model.

Although promising results have been obtained regarding technical and vocational training programs, their delivery encounters several obstacles. These obstacles are linked to structure, inadequate hands-on relevance, inadequate amenities and educational materials, an insufficient number of skilled trainers, facilitation processes and extreme underperformance (Akoojee, 2019). For example, in the context of Mozambique, Adamu (2020) reported that insufficient resources prohibit the efficacy of apprenticeship training programs. Moreover, Bratti, Ghirelli, Havari, and Santangelo (2022) reported that apprenticeship training programs lacked a positive effect on the job market effects of disadvantaged youth because the procedures of training facilitation were theoretically oriented instead of practical training. In the South African context, similar limitations persist within the QCTO framework, particularly the imbalance between theoretical instruction and practical workplace exposure, which results in apprentices graduating without sufficient occupational competence for industry demands.

A gap exists in the body of discipline regarding the structure of such training, particularly in manufacturing SMEs in South Africa. More specifically, there is limited empirical evidence on how the current QCTO apprenticeship framework can be redesigned to better integrate SMEs, strengthen mentorship quality, and align curriculum content with rapidly evolving manufacturing technologies such as automation and robotics. This study intends to close this bridge and establish a structure for apprenticeship training programs: A Case Study of Manufacturing Small and Medium Enterprises in South Africa. There is hope to develop an understanding of on-the-job training and add to the current and future on-the-job training literature on

South African manufacturing SMEs. The study therefore justifies the need for a new, adaptive apprenticeship framework that can address the identified systemic weaknesses in the current QCTO model and improve the effectiveness, relevance, and responsiveness of skills development in the manufacturing sector.

1.4 RESEARCH AIM AND OBJECTIVES

This section outlines the research aim and objectives that guide the study in addressing the structure and effectiveness of apprenticeship training programs within manufacturing SMEs in South Africa.

1.4.1 Aim of the Study

The research aimed to establish a structure for apprenticeship training programs: A Case Study of Manufacturing Small and Medium Enterprises in South Africa.

1.4.2 Objectives of the Study

The following research objectives piloted the study:

1.4.2.1 Primary Objectives

- To develop a comprehensive framework for apprenticeship training programs that are tailored to the specific needs and challenges of SMEs in the manufacturing sector in South Africa.

1.4.2.2 Secondary Objectives

- I. To examine alignment between apprenticeship curricula and industry needs in the manufacturing sector.
- II. To investigate the influence of government policies and regulatory frameworks on apprenticeship training in SMEs.
- III. To analyse the role of mentor-led training and workplace learning in apprentice performance and development.
- IV. To assess the capacity of trainers in delivering effective apprenticeship outcomes.

1.5 RESEARCH QUESTIONS

The research questions for this study are presented below.

1.5.1 Primary Question

- How can a comprehensive framework for apprenticeship training programs be developed to address the specific needs and challenges of SMEs in the manufacturing industry in South Africa?

1.5.2 Secondary Questions

- I. How well do apprenticeship curricula align with current industry needs in SMEs within the manufacturing sector?
- II. How do government policies and regulatory frameworks affect apprenticeship training programmes in SMEs?
- III. How does mentor-led training and workplace-based learning influence the effectiveness of apprenticeship programs in SMEs?
- IV. To what extent are trainers adequately prepared and capable of delivering effective apprenticeship training programs?

1.6 SUMMARY OF THE RESEARCH METHODOLOGY

Bordens and Abbott (2022) define research methodology as a method of distinguishing, determining, refining and analysing data from a study. It offers the processes utilised to conduct the research. In this section, the researcher included the research strategy utilised to areas where problems of interest occur and recognise vital elements developed in the study (Dauti, Dauti & Krasniqi, 2020). The chosen research design for the study is an exploratory design to assist in defining what was researched. The interviews were employed as the main strategy for gathering data and as a measurement tool for the study. A combination of physical and digital interviews was used to gather data. Atlasti is a qualitative data analysis software utilised to manage, analyse and interpret qualitative data. Thematic analysis was adopted to distinguish, analyse and report re-occurring patterns. This allowed the researcher to delve into diverse data patterns (Burlea-Schiopoiu & Mihai, 2019).

The study population comprised key stakeholders involved in apprenticeship training within South African manufacturing SMEs. These included training centre managers, college lecturers, SME management, and workplace mentors directly involved in apprenticeship delivery. A purposive sampling technique was used to select participants based on their direct involvement and experience in apprenticeship training programmes. The sample size consisted of 12 participants drawn from selected SMEs, training centres, and colleges within the manufacturing sector.

The study was conducted within selected provinces/regions in South Africa; however, it is framed within the broader national context of South Africa's manufacturing apprenticeship system governed by DHET, QCTO and SETAs.

Ethical considerations were observed throughout the study, including obtaining informed consent from all participants, ensuring confidentiality and anonymity. Participants were also allowed voluntary participation with the right to withdraw at any stage without penalty. Data was securely stored and used strictly for academic purposes.

1.7 SIGNIFICANCE TO THE STUDY

The significance of this study lies in its development of a structured, context-specific framework for apprenticeship training in South African manufacturing SMEs, providing a roadmap that ensures logical coherence and operational clarity throughout the training process. By synthesising insights from colleges, training centres, and SMEs, this study creates a six-pillar framework that integrates curriculum responsiveness, experiential learning, trainer capacity, feedback and quality assurance, stakeholder collaboration, and access and equity. This structure moves beyond theoretical discussion by offering practical, actionable strategies for addressing systemic challenges such as outdated curricula, skills mismatches, limited workplace access, and inequitable participation, thus providing a tangible guide for enhancing the effectiveness of apprenticeship programs.

The study's significance is further reflected in its focus on bridging the gap between education and industry. By embedding risk identification and mitigation strategies within each pillar, the framework anticipates potential implementation challenges and

provides feasible solutions, ensuring that apprenticeship programs are both robust and adaptable to the dynamic demands of the manufacturing sector. Moreover, the framework promotes a holistic approach to skills development, balancing technical competency with soft skills, mentorship, and institutional autonomy, which equips apprentices not only with employable skills but also with the capacity to innovate, adapt, and thrive in complex workplace environments. This multi-dimensional focus makes the study unique, as it addresses both practical operational needs and broader workforce development goals.

Finally, this study holds practical, policy, and research significance. Practically, it provides SMEs, colleges, and training centres with a concrete guide for designing, implementing, and evaluating apprenticeship programs, thereby increasing productivity, employability, and industrial relevance. At the policy level, the framework offers evidence-based insights for legislators, SETAs, and regulatory bodies to support flexible curriculum reform, equitable access, and collaborative industry engagement. Future research could lay the foundation for longitudinal studies on apprenticeship outcomes, the scalability of mentorship models, and the integration of digital learning tools. In essence, the study contributes a cohesive, actionable, and forward-looking blueprint for strengthening the apprenticeship ecosystem in South Africa, transforming fragmented practices into a systematic, high-impact approach to skills development and industrial growth.

The following subsections outlines the study's contributions to theory, practice and policy, with a specific aim to determine how apprenticeship training programs promote academic comprehension, inform real-world applications, and shape workforce development techniques.

1.7.1 Contribution to Theory

This study contributes to theory by extending existing educational and workforce development frameworks through empirical insights drawn from apprenticeship training in South African manufacturing SMEs. Specifically, the study engages with and extends three key theoretical frameworks: Cognitive Apprenticeship Theory, Experiential Learning Theory, and Communities of Practice. By integrating hands-on experiential learning, mentorship, and structured feedback into a cohesive six-pillar

framework, the study demonstrates how theoretical constructs such as cognitive apprenticeship and experiential learning manifest in real-world contexts.

Firstly, in relation to Cognitive apprenticeship theory, the study extends the traditional focus on modelling, coaching, and scaffolding by incorporating the realities of SME environments, where resource constraints, time limitations, and production pressures influence how mentorship is enacted. The findings suggest that cognitive apprenticeship in this context is less structured and more adaptive, requiring a flexible, context-responsive approach to skill transfer.

Secondly, the study builds on Experiential Learning Theory by demonstrating that learning in the manufacturing SME context is not always cyclical and reflective as traditionally proposed, but often occurs in fragmented, task-driven environments. This challenges the linearity of experiential learning models and highlights the need for more integrated feedback mechanisms to support continuous learning in practice.

Thirdly, the study extends the concept of Vygotsky's theory where the key concept is the Zone of Proximal Development, where learners work under professional guidance. Lastly, Illeris learning theory emphasises on how thinking, feelings and social context work together. A multiple-theoretical approach was adopted for the study because there is no single theory that fully explains apprenticeship learning.

This connection between theory and practice not only validates existing models of skill acquisition and professional development but also identifies specific areas where conventional theories require adaptation to accommodate contextual realities, including resource constraints, digital access limitations, and localised industry demands. Furthermore, the framework developed in this study offers a novel conceptual lens for understanding apprenticeship training as a multi-dimensional, systemic process. It moves beyond traditional emphasis on technical skill acquisition to incorporate mentorship, stakeholder collaboration, and equity considerations, thereby broadening theoretical interpretations of workforce development. By situating theory within the practical constraints and opportunities of South African SMEs, the study provides a rigorous, contextually grounded model that can inform future research and theoretical refinement, offering both explanatory power and operational guidance for enhancing apprenticeship programs globally.

1.7.2 Contribution to Practice

The study contributes to practice by providing actionable insights and a structured roadmap for enhancing apprenticeship training within South African manufacturing SMEs. The six-pillar framework developed in Chapter 6 offers a practical guide for integrating curriculum alignment, experiential learning, mentorship, trainer capacity, feedback mechanisms, and stakeholder collaboration into operational programs. By identifying potential risks and corresponding mitigation strategies, the framework equips training institutions and industry stakeholders with concrete measures to enhance program delivery, ensure consistency, and enhance apprentice readiness for real-world work environments. This practical structure bridges the shortfalls between theoretical training principles and workplace realities, allowing apprentices to acquire both technical proficiencies and critical soft skills in a systematic and monitored manner. Additionally, the study provides guidance for policymakers, institutions, and SMEs in improving institutional processes, enhancing workplace-based learning, and expanding access and equity in apprenticeship programs. By illustrating effective mentorship systems, on-the-job training techniques, and responsive curriculum adaptation, the findings enable practitioners to implement evidence-based practices that increase productivity, minimise skill mismatches, and strengthen employability outcomes. The study's practical contribution lies in offering a replicable, context-specific model that aligns education, industry, and policy, developing a resilient and adaptive apprenticeship ecosystem capable of addressing both existing and emerging skills needs in South Africa's manufacturing industry.

1.7.3 Contribution to Policy

The study provides evidence-based guidance for shaping apprenticeship regulations and national skills development strategies. By emphasising systemic shortfalls such as antiquated curricula, restricted institutional autonomy, fragmented stakeholder collaboration, and unequal access, the findings inform policymakers on areas requiring reform to create a more agile, inclusive, and effective apprenticeship ecosystem. The six-pillar framework developed in Chapter 6 offers concrete strategies for integrating education, industry, and policy objectives, supporting the design of standards that ensure consistency, quality, and relevance throughout apprenticeship programs. Furthermore, the study underscores the importance of formalised partnerships

between government bodies, educational institutions and industry stakeholders to strengthen apprenticeship pathways and enhance workforce readiness. Insights from SMEs, colleges, and training centres reveal how policy interventions can promote mentorship, workplace-based learning, and continuous trainer development, thereby aligning legislation with real-world training needs. By translating stakeholder experiences into actionable policy recommendations, this study provides a practical foundation for crafting regulations that advance lifelong learning, support skills transfer, and foster sustainable workforce development in South Africa's manufacturing sector.

1.8 LIMITATION OF THE STUDY

While this study provides valuable observations of apprenticeship training programs in South Africa's manufacturing industry, multiple constraints must be acknowledged. The research relied mainly on semi-structured interviews, making the findings dependent on self-reported experiences and thus subject to subjectivity and social desirability bias (Demir, 2021; Furlong, 2020). The lack of triangulation with additional data sources, such as observations, surveys, or archival documents, also limits the breadth of evidence supporting the findings (Cieslik, Barford & Vira, 2021). The sample size of 12 participants, combined with purposive sampling, restricts the diversity of perspectives and may introduce selection bias, potentially overrepresenting some viewpoints while under-representing others (Almansour, Almansour & Almansour, 2019). The study was further limited by its geographical scope, focusing on a single province, which may not reflect variations in SME engagement, institutional capacity, and apprenticeship practices across South Africa (Cartel, Kibler & Dacin, 2022).

Other limitations include the cross-sectional nature of the research, capturing experiences at a single point in time and not accounting for long-term outcomes (Sokolova & Kefi, 2020). Prior professional interactions between the researcher and participants may have influenced candour (Almansour *et al.*, 2019). Additionally, time constraints and non-responses to some interview questions could restrict data completeness (Demir, 2021; Furlong, 2020). Despite these limitations, the study offers contextually rich insights, although findings should be interpreted cautiously regarding their generalisability and long-term applicability. Importantly, these limitations were considered in the development of the six-pillar framework and proposed

recommendations in Chapter 6, ensuring that the model remains adaptable, contextually informed, and grounded in the realities of South Africa's manufacturing apprenticeship ecosystem.

1.9 DEFINITIONS OF THE KEY CONCEPTS

The fundamental concepts presented below are as follows:

- **Artisan Recognition of Prior Learning** – an initiative that offers unqualified employees an opportunity to obtain a formal qualification through a structured method (OECD, 2020).
- **National Apprenticeship and Artisan Development Advisory Body** is a forum comprising organisations and the government that offers guidance to the minister on issues related to the establishment of apprenticeship training programs and artisans. This also includes policy and regulations (South Africa, 2023).
- **National Skills Development Plan 2030** – a technique executed by the government to increase the quality of education in South Africa (South Africa, 2023).
- **Sector Education and Training Authority** – is a public entity developed to foster skills growth. They do this by guaranteeing that people learn the skills required by employers and communities (QCTO, 2020).
- **Small and Medium Enterprise** – are organisations whose employees do not surpass 50 (Smith & Noble, 2023).
- **Department of Higher Education and Training** – offers technique leadership in monitoring and fostering skills growth (Schweisfurth, 2023).
- **Student Development Goals** – goals set by the UN to reform the world by eradicating inequality and enhancing health and education (South Africa, 2023).
- **United Nations** – a universal organisation intended to maintain peace and friendly relations among nations and foster social progress (United Nations, 2020).

1.10 STRUCTURE OF THE THESIS

The organisational framework of the study is outlined below.

Chapter 1: Introduction: The chapter provides the foundation of the study upon which the research is based. It introduces the key study variables, the problem statement, and the research objectives. It also outlines the scope and significance of the study setting the context for the research.

Chapter 2: Theoretical Framework: The chapter outlines the theories that guided the study. It bridges the gap between the theoretical knowledge in the field and the relevance to the study, aiding in structuring and guiding the entire research procedure.

Chapter 3: Literature Review: This chapter presents an extensive review of the objective of the examination and purpose of the research.

Chapter 4: Research Methodology: This chapter configures all the research techniques utilised in conducting the study.

Chapter 5: Results, Discussions and Interpretations of Findings: This chapter presents a complete description of the data collection, methods and data analysis, aiming to answer the research questions.

Chapter 6: Conclusion and Recommendation: The chapter will summarise the structure and conclusions of the research based on findings of each objective outlined in Chapter 5. Additionally, it provides recommendations for a prospective structure concerning job training within SMEs.

1.11 CHAPTER SUMMARY

This chapter introduced the backgrounds of the study, emphasising the scarcity of artisans in South Africa and the government's efforts to motivate SMEs to develop supportive environments for apprentice training. A well-trained workforce promotes a motivated and effective work environment, leading to increased employment generation and increased job satisfaction. This study is critical in its development of a structured framework for on-the-job training within SMEs aimed at ensuring a coherent and systematic progression throughout the apprenticeship training program.

This study aimed to examine and comprehend the significance of workplace training in South African manufacturing SMEs by documenting and critically analysing the viewpoints of technical training managers and trainers from the Catom Training

Centre, management and lecturers from Niatec College, management from Mbilipha Solutions, and management from Motar. The chapter further outlined the theoretical foundation underpinning the study, highlighting key learning theories that explain how apprenticeship training is influenced by mentorship, workplace learning, and stakeholder collaboration. It demonstrated how these theoretical perspectives collectively inform the understanding of apprenticeship training dynamics within SMEs. The chapter also presented the research problem, research aim and objectives, research questions, and a brief overview of the research methodology used in the study. In addition, ethical considerations guiding the research were briefly introduced to ensure adherence to academic research standards.

The next chapter presents a thorough theoretical structure. Chapter two presents the theoretical foundation supporting the study. It examines fundamental learning and training theories that inform the design and application of apprenticeship training programs in SMEs.

CHAPTER TWO: THEORETICAL FRAMEWORK

2.1 INTRODUCTION

Theoretical structures are vital in constructing and interpreting apprenticeship training programs, providing structured viewpoints to explore pedagogical models and crucial constructs. Pineda, Pineda and Piedrahita (2021) emphasises their responsibility as interpretive lenses, whereas Arslan and Wong (2022) note that these structures explain the functions of stakeholders and the combination of classroom and workplace learning. Bok (2022) adds that they link individual growth with wider social goals, strengthening the societal application of vocational education. Frequently employed theories include cognitive apprenticeship, Kolb's experiential learning theory, Vygotsky's socio-cultural theory and Illeris's Learning Theory. These models are utilised in both South African and universal contexts, reflecting multiple cultural and educational requirements (Sangwan & Singh, 2022). Conceptual frameworks, as Bolick, Glazier and Stutts (2022) explain, are distinct in that they critically synthesise and organise theoretical foundations rather than simply summarising empirical data. Irvine *et al.* (2023) highlight their ability to clarify fundamental constructs and distinguish the gaps of the study. Smith (2021) adds that they suggest guidelines for future academic inquiry.

According to Blaine and Akhurst (2022a), conceptual frameworks serve as structural backbones within research, guaranteeing coherence and supporting logical progression. Clarke and Braun (2021) further argue that they align theoretical and methodological components effectively. In the context of this study, the conceptual framework develops scholarly justification and guides methodological choices. Blaine and Akhurst (2020) stress the requirement for a clear articulation of the structure's components, especially in qualitative research, where depth and interpretive rigour are important. Bok (2022) reinforces the significance of these components in supporting valid and comprehensive analysis. Pedagogical techniques such as learner-centred teaching, cognitive apprenticeship, and Kolb's model remain grounded in technical and vocational education, enhancing experiential learning (Sangwan & Singh, 2022). The chapter lays a theoretical groundwork for the research by linking fundamental educational models with the study's objectives.

This study is underpinned by cognitive apprenticeship theory, David Kolb's experiential learning theory, Vygotsky theory and Knud Illeris theory. The theories are presented comprehensively below.

2.2 COGNITIVE APPRENTICESHIP THEORY

Andrews, Ahmed and Blakemore (2021) present cognitive apprenticeship theory as a foundational educational structure that emphasises the function of social interaction and authentic, real-world tasks in promoting comprehensive learning. Smith (2021) underpins this by highlighting the theory's pedagogical framework, which guides learners from wide holistic insight to the mastery of specific skills through maximising task complexity and variation. Mechanic (2021) explains that the theory is concerned primarily with the acquisition of practical knowledge via guided involvement in authentic contexts. Gilbertson, Bates, Siklander and Ewert (2023) extend this by illustrating its adaptability throughout diverse learning environments, including classrooms, digital platforms, and vocational training. Andrews *et al.* (2021) note that anchoring instruction in real-world contexts improved participation and assisted learners in establishing domain-specific skills. Pineda *et al.* (2021) and Bolick *et al.* (2022) further outline how sturdily maximising task complexity and introducing multiple obstacles support deeper learning.

Ehteshami (2020) and Smith (2021) argue that developing universal holistic comprehension prior to acquiring specific skills leads to enhanced content mastery. Down *et al.* (2023a) suggest that this approach affects apprenticeship training program design by focusing on partnership, real-world relevance, and mentorship. Jostad, Sibthorp, Butner and Rochelle. (2019) highlight the significance of authentic tasks for promoting training relevance, whereas Arslan and Wong (2022) and Gilbertson *et al.* (2023) emphasise mentors' functions in modelling, coaching, and giving feedback. Sangwan and Singh (2022) ground the approach in social learning and instructional scaffolding, with Irvine *et al.* (2023) and Jamieson, Govaart and Pownall. (2023) stressing collaborative, peer-driven learning environments. Clarke and Braun (2021) and Lehalle (2020) focus on scaffolding, where mentors sturdily minimise support as apprentices obtain competence. Bok (2022) notes that this gradual withdrawal promotes confidence and autonomy, offering a strong foundation for SMEs to promote their growth and self-efficacy through scaffolding.

2.2.1 Benefit of Cognitive Theory to the Study

Cognitive theory emphasises the importance of active, learner-driven participation in the educational process, especially in apprenticeship settings. Xie (2021) highlights that apprentices must actively interact with information rather than passively receive it, which promotes deeper learning. Mulders (2022) adds that the theory motivates learners to examine the underlying "why" and "how" of concepts, fostering prolonged retention and allowing knowledge transfer throughout diverse contexts. Mulders, Buchner and Kerres (2020) argue that apprentices establish strong problem-solving skills through methodical techniques to overcome obstacles, whereas Jamieson *et al.* (2023) emphasise the importance of utilising techniques such as trial-and-error to refine those skills. A fundamental component of cognitive theory is the establishment of metacognition, the ability to reflect on and regulate one's learning. According to Makransky and Petersen (2021), this self-awareness helps apprentices adapt their approaches and make better decisions in real-world scenarios. Mechanic (2021) links this to the concept of scaffolding, which includes offering specific support that adjusts to an apprentice's current level of insight. This personalised support framework enables accessible yet demanding learning experiences.

Another major goal of cognitive theory is knowledge exchange. Xie (2021) and Radianti *et al.* (2020) note that by combining new knowledge with previous experiences, apprentices are more capable of applying what they have learned in varied and unfamiliar situations. Kim *et al.* (2020) argue that this adaptability is particularly essential in dynamic fields such as engineering, medicine, and the arts, where problem solving needs flexible thinking. Cognitive theory also recognises the significance of social learning. Bok (2022) and Huang *et al.* (2020) underline the function of mentors and peers in designing learning, as apprentices observe, interact with, and learn from skilled experts. Clarke and Braun (2021) explain that this procedure enables apprentices to internalise skilled thinking patterns. Mulders (2022) further supports the idea of collaborative learning environments, where exchanging knowledge and techniques among peers promotes the overall learning experience. Together, these cognitive principles establish a comprehensive structure that supports both the individual and social dimensions of apprenticeship training programs.

2.2.2 Limitations of Cognitive Theory to the Study

While cognitive theory has many strengths in supporting active learning and problem solving, it also provides notable constraints, particularly in apprenticeship contexts. Mulders *et al.* (2020) and Kester and Merrienboer (2021) argue that the theory's aim at internal mental methods such as perception, memory and reasoning can be restricting. It often overlooks the external social, cultural and environmental elements that essentially construct how apprentices interact with their learning environments (Makransky & Petersen, 2021). These contextual influences are essential in on-the-job apprenticeship environments, where hands-on skill growth depends on real-world experiences. Additionally, cognitive theory tends to underestimate the functions of encouragement and emotion in learning. Unlike self-determination theory, which integrates emotional involvement and intrinsic motivation, cognitive theory primarily centres on knowledge management.

Kim *et al.* (2020) and Radianti *et al.* (2020) emphasise this as an essential drawback, particularly in apprenticeships where persistence, interest and emotional investment are important for mastering complex tasks and navigating challenges. Another concern is the theory's dependence on learning techniques such as chunking and schema constructing. While these strategies assist in managing the cognitive load by organising data into logical sequences, Bok (2022) believes that these strategies can backfire if too much content is introduced too quickly. Mulders (2022) note that this approach can overwhelm beginners, especially first-year apprentices who are not knowledgeable with the material. Notwithstanding the assumption that the cognitive load decreases as learners cultivate schemas, Mechanic (2021) and Gill *et al.* (2021) caution that many tasks still require simultaneous multifarious information integration, leading to potential bottlenecks and decreased learning efficacy. Thus, while cognitive theory has clear pedagogical value, its restrictions must be contemplated and augmented with more systemic techniques in apprenticeship training programs.

The study addressed the outlined limitations of cognitive theory by employing a more holistic and context-sensitive technique for apprenticeship learning. To counter the theory's narrow focus on internal mental methods, the study integrated socio-cultural structures that highlight the significance of cultural, environmental and social contexts in cultivating learning experiences. It also incorporates self-determination theory to

account for emotional participation and intrinsic motivation, both of which are important for maintaining interest and persistence in complex, real-world tasks. To mitigate issues related to cognitive overload from schema-based approaches, the study adopted progressive task sequencing, scaffolded support, and combined learning environments, enabling apprentices to develop competence without being stressed. By combining cognitive principles with motivational and contextual considerations, the study provides a more rigorous model that supports efficacious learning in apprenticeship settings.

2.2.3 Relevance of Cognitive Theory to the Study

Cognitive theory is central to apprenticeship learning, as it stresses how apprentices process and organise information, which is critical for mastering hands-on tasks in skilled trades. Hamilton *et al.* (2021) highlight that comprehending cognitive procedures, especially problem solving, is vital for apprentices. This is reinforced by Dengel *et al.* (2021), who emphasise the significance of on-the-job training in cultivating these skills. Cognitive theory also stresses the need for apprentices to comprehend the underlying structures and processes that guide tasks. Mentors play a fundamental role by illustrating how to examine complex issues, such as mechanical malfunctions, and assisting apprentices in establishing independent problem-solving skills. Truter *et al.* (2023) explain that apprentices learn to recognise subtle indicators, such as unusual noises or vibrations, which enhance diagnostic accuracy. Cognitive techniques, such as fault-finding, require technical expertise and the ability to think logically through complex problems (Mulders *et al.*, 2020; Kester & Merrienboer, 2021).

While cognitive theory provides expert guidance on mental methods, it does not fully address the complexities of apprenticeship training programs. Apprenticeships need an integration of cognitive, social, emotional, and motor skills, which cognitive theory alone cannot explain. Mulders (2020) notes that apprenticeship training programs are social in nature, as apprentices often engage with mentors, peers and supervisors, which aid in establishing professional reputations and social capital (Dengel *et al.*, 2021). Additionally, apprentices establish important social competencies, such as communication and conflict management, which are significant for lasting achievements (Arslan & Wong, 2022). Cognitive theory must be complemented by

other theories that address the relational and affective dimensions of learning, such as emotional regulation and physical manipulation. Xie (2021) and Gill *et al.* (2021) argue that a holistic approach, including these additional aspects, is necessary to capture the full scope of apprenticeship learning (Jamieson *et al.*, 2023).

2.3 DAVID KOLB'S EXPERIENTIAL LEARNING THEORY

David Kolb's experiential learning theory offers essential groundwork for comprehending apprenticeship training programs, as it highlights the function of first-hand experience in learning procedures. According to Sampietro (2019), Kolb's model conceptualises learning as a transformative method where knowledge is designed through a change in experience, with learning developing from the dual procedures of grasping and changing these experiences. Rudhumbu (2021) highlights that this dual method is central to how apprentices internalise new concepts, linking hands-on experiences with theoretical knowledge. Cieslik *et al.* (2021) further stress that experiential learning enables apprentices to apply theoretical knowledge attained in classrooms to real-world tasks, thereby improving their capability and personal comprehension.

Experiential learning also emphasises the environmental conditions needed for effective learning, with Sampietro (2019) suggesting that a supportive, formal learning environment aligned with experiential principles is important for apprentices to succeed. Sangwan and Singh (2022) underscore the importance of mentors in guiding apprentices through well-defined training outcomes, frequently based on structures such as a logbook, which aid in tracking the progress and guarantees the efficacy of the apprenticeship training program. During on-the-job training, apprentices actively participate in operational activities, and under the mentorship of experts, they complete tasks that evaluate their proficiency and concepts (Smith, 2021). The culmination of this stage is frequently marked by trade test preparation and successful certification, such as the nationally recognised Red Seal (Rudhumbu, 2021). Moreover, practical training contributes not only to technical skill enhancement but also to personal and professional development, including the development of soft skills such as communication, self-confidence, and critical thinking, which are important for success in the workplace (Abdullah, Yaacob, Hashim, Hussain & Roslan, 2019; Gidado & Babakura, 2019).

2.3.1 Kolb's Experiential Learning Model: Learning Cycle and Learning Styles

Experiential learning theory, as explained by Mathew and Aithal (2020), emphasises the development of skills and knowledge through direct engagement with real-world experiences. Kolb's experiential learning model provides a structured framework that explains how individuals transform experience into knowledge through a continuous learning process. The theory highlights the importance of linking abstract concepts with practical application in authentic environments where apprentices engage in guided, task-based learning. According to Ngcwangu (2019), learning is strengthened when individuals actively apply knowledge in real workplace contexts, which enhances understanding, retention and skill development. Kolb's model is therefore widely applied in vocational education to explain the integration of theory and practice in apprenticeship training. The model is commonly explained through four sequential stages of the learning cycle, which are concrete experience, reflective observation, abstract conceptualisation and active experimentation. These stages illustrate how learning progresses through experience, reflection, conceptual understanding and practical application.

2.3.1.1 Concrete Experience

During this initial stage, Rudhumbu (2021) believes that apprentices partake in concrete learning experiences, which may either introduce entirely new concepts or develop upon their current knowledge base. According to Bok (2022), apprentices work closely with skilled mentors, actively engaging in real-world tasks such as welding, fitting and metal machining. Through being engaged in on-the-job training, apprentices are motivated to be open-minded and employ a formal, problem-solving strategy to their work. In particular, the Posit Tool, Jig, and Die Maker apprentices receive supplementary instruction from their mentors. As noted by Gidado and Babakura (2019), instructions strengthen and increase upon the foundational knowledge previously attained at technical schools or colleges. Concrete experience focuses on the operation of machines such as lathes and milling machines. Aithal and Aithal (2023) noted that strict adherence to safety regulations is highlighted prior to the utilisation of machinery. Adamu (2020) believe that once safety measures are observed, apprentices are provided with tasks to practice on machines in a controlled, supervised environment, thereby obtaining valuable practical experience.

2.3.1.2 *Réflexive Observation*

Yusof *et al.* (2020) highlight the importance of apprentices involved in reflective thinking to assess their learning ability and apply knowledge based on their strengths and learning capabilities. Radianti *et al.* (2020) emphasise how mentors support this method through practical illustrations of trade-specific machinery, motivating apprentices to observe and obtain personal understanding. Cieslik *et al.* (2021) further support reflective participation through journal writing, where apprentices record daily experiences, obstacles and achievements and develop self-awareness and significant assessment of their learning (Sangwan & Singh, 2022). As Mathew and Aithal (2020) note, this stage is essential for reforming theoretical knowledge into hands-on learning. Xie (2021) adds that apprentices learn to operate machinery under supervision, following safety regulations, whereas Maneesha (2020) underlines the need for flexibility in employing different supervisory techniques to facilitate constant growth. Additionally, Sampietro (2019) emphasise the function of frequent debriefing sessions, where apprentices share experiences with peers and mentors, promoting integrative learning and deepening knowledge.

2.3.1.3 *Abstract Conception*

Smith (2021) suggests that after observation and reflection, apprentices must begin applying their obtained knowledge, typically under the mentorship of a skilled supervisor. Ahmed, Noreen, Ramakrishnan and Abdullah (2021) emphasise that the abstract conception stage allows apprentices to transition beyond theoretical knowledge and begin incorporating it into hands-on performance. Aithal (2023) highlights the importance of peer involvement, where apprentices integrate to confer nuances in their comprehension of concepts, promoting integrated learning. Abuka, Tunga and Nwandu (2020) explain that this entails assessing experiences against one's own conceptual comprehension. Although many workplace concepts are introduced in the classroom, they are re-examined in detail during on-the-job training, enabling apprentices to refine and adapt their knowledge through practical experience, as noted by Britzelmaier, Pöpplow and Andraschko (2020) and Bok (2022). This method of hands-on application, such as fault-finding in electrical work, leads to a deeper comprehension and enhancement of current knowledge.

2.3.1.4 Active Experiment

According to Mathew and Aithal (2020), the phase of active application marks a crucial point where apprentices assess and apply their previous learning in real-world settings. Apprentices transform from passive observation to actively implementing skills, as noted by Aithal and Aithal (2023). Smith and Burd (2019) highlight that apprentices are tasked with obstacles that require the innovative application of both theoretical knowledge and hands-on skills, such as diagnostic equipment. This hands-on experience enables apprentices to evaluate and resolve issues such as diagnosing malfunctioning equipment (Mulders, 2022). Raimez-Montoya *et al.* (2021) stress the importance of self-examination during this stage to enhance skills. This phase also prepares apprentices for the trade test, a fundamental milestone in certification, with possibilities for practice assisting apprentices in retaining and internalising knowledge (Akanbi, 2021). Kolb's four-stage experiential learning model offers a formal structure for apprentices to process their learning and measure progress (Mayombe, 2024). Additionally, incorporating applied learning in apprenticeship training programs promotes educational experience and prepares apprentices to meet industry standards (Makransky & Petersen, 2021; Xie, 2021).

The following section offers a thorough explanation of the learning styles relevant to apprentices during their on-the-job training, thereby providing an understanding of how individual preferences impact skill growth and knowledge acquisition.

2.3.1.5 Diverging

According to Mayombe (2021), apprentices possess the ability to assess their learning experiences from diverse viewpoints, enabling profound apprehension and adaptability. In addition, Yusof *et al.* (2020) emphasise that such apprentices place essential value on the views of others and illustrate respectful awareness of their peers' emotions. Consequently, Mulders (2022) suggests that apprentices who adopt this learning style often thrive in group-based settings. Within these environments, apprentices are active in integrating and illustrating interest in the input of their peers. Moreover, as noted by Raimez-Montoya *et al.* (2021), these learners enjoy engaging in brainstorming sessions. Aithal and Aithal (2023) postulate that apprentices are also eager to examine new possibilities within assigned tasks, investing focused attention

and maintaining effort in their activities. Furthermore, Abuka *et al.* (2020) assert that such apprentices gain from clear explanations regarding a task's strengths and weaknesses, especially when operating machinery, as this promotes their ability to prepare efficiently and perform confidently.

2.3.1.6 Assimilating

Apprentices who prefer this type of learning typically partake in thoughtful reasoning, as they seek to digest newly obtained knowledge and formulate workable remedies to obstacles they face, as posited by Aithal (2023). In addition to this reflective technique, apprentices assess situations critically and review the whole learning experience to distinguish fundamental patterns and implications. Mayombe (2024) alludes that apprentices illustrate a deep desire in experimentation, frequently examining different procedures to achieve tasks efficiently. Apprentices are characterised by their proactive attitude, which constantly illustrates a willingness to take initiative to increase their knowledge base (Akanbi, 2021). As a result of their interest and autonomy, they tend to understand quickly, motivating mentors to assign tasks that can be completed with limited supervision. To assist apprentices' learning journeys, instructions are delivered through multiple processes. In particular, Raimez-Montoya *et al.* (2021) noted that mentors frequently offer hands-on illustrations or verbal guidance before assigning activities, guaranteeing that apprentices are adequately prepared to work independently.

2.3.1.7 Converging

According to Maneesha (2020), a converging learning style is characterised by problem-solving strategies, where apprentices are motivated to make informed decisions and apply their ideas to resolve obstacles. As Abuka *et al.* (2020) note, contrary to the diverging style, which highlights integrative brainstorming and group-based ideation, this strategy allows apprentices to autonomously execute technical solutions based on their understanding and analysis. Yusof *et al.* (2020) further emphasise that apprentices employing this style depend on hands-on application rather than group reflection to resolve matters efficiently. To facilitate this form of learning, Mayombe (2021) believes that making relevant learning materials readily available is important. Additionally, Xie (2021) posits that training activities should be

developed to be interactive and task oriented to involve apprentices in active problem solving.

2.3.1.8 Accommodating

The style is intuitive and employable. According to Yusof *et al.* (2020), apprentices prefer to try working until they find the right solution, and the accommodating style assists apprentices in developing as individuals. Cincera, Johnson and Kroufek (2020) believe that apprentices prefer finding things by themselves, offering them a sense of autonomy, responsibility and self-development. Apprentices can work well with other people and adapt easily to situations. Always ask questions for better clarity and knowledge (Britzelmaier *et al.*, 2020). Facilitators must be able to distinguish diverse learning styles in apprentices by observing them (Abuka *et al.*, 2020). Apprentices can illustrate their preferred style of working in groups with other apprentices through activities, discussions and presentations (Aithal, 2023). Facilitators must be able to communicate with apprentices of all age groups and attitudes throughout the learning cycle.

2.3.2 Benefits of David Kolb's Theory to the Study

Fleming (2020) argues that practical learning theory plays a significant role in apprenticeship training programs, highlighting the importance of first-hand experience, reflection, conceptualisation and active experimentation in learning procedures. This view is supported by Dessie, Gebeyehu and Eshetu (2023), who emphasise the structured nature of practical learning. Eren and Dokme (2022) stress the importance of developing engaging learning settings that actively engage apprentices, with Schweisfurth (2023) further noting that such environments strengthen comprehension and develop skill growth. Schall-Lekrone (2022) and Sato and Storch (2020) observe that hands-on activities, such as repairing equipped and performing technical processes, are critical for apprentices to obtain industry-specific skills. Pherson-Geyser, Villiers, and Kawai (2020) also argue that these hands-on experiences help apprentices enhance their technical expertise, preparing them for workplace standards, whereas Hewitt (2022) highlight the first-hand application of skills as fundamental to real-world readiness.

Reflection, a key aspect of practical learning, enables apprentices to examine their experiences, evaluate successful techniques and distinguish obstacles, as noted by Leo (2022) and Sahan and Sahan (2021). Mancilla-Martinez *et al.* (2020) state that reflection fosters comprehension and focused skill growth, especially in the face of obstacles, which Kim and Buric (2020) suggest should be seen as possibilities for development. This reflective method, according to Dessie *et al.* (2023), promotes resilience and enhances problem-solving capabilities. Additionally, Hanaba and Voitiuk (2022) argue that experiential learning develops learner independence, with apprentices eventually taking ownership of their learning journey. As they obtain confidence, they become less dependent on instruction, a shift that Dianita (2023) notes leads to self-reliant enhancement. Kolotouchkina, Valles and Mosquera (2020) emphasise the theory's adaptability, enabling personalised learning experiences, whereas Umarji *et al.* (2023) highlight how mentors can adjust training tasks based on individual development, guaranteeing a suitably demanding learning environment (Tang, Walker-Gleaves, & Rattray, 2021).

2.3.3 Limitations of David Kolb's Theory for the Study

Experiential learning theory, as discussed by Giraldo-Garcia and Chang (2023), is applicable to apprenticeship training programs, highlighting learning through first-hand experience and reflective practice. This technique underlines that skills are best established through active engagement in real-world tasks, followed by reflection and enhancement. However, critics such as Selvaraj *et al.* (2021) point out restrictions in formal vocational environments, where an experiential technique might have inadequate guidance. Critics argue that incorporating experiential learning with complementary pedagogical models can lead to the development of more efficient and sustainable apprenticeship training programs. Kreber and Wealer (2021) strengthened the cyclical nature of practical learning, which includes experience, reflection, conceptualisation and experimentation, but Bai and Wang (2020) critique its overemphasis on individual internal processing. The aim may result in inadequate formal support, restricting apprentices' capacity to interact meaningfully with tasks and comprehend the fundamental concepts behind them.

Eren and Dokme (2020) warn that practical learning can result in superficial knowledge if not supported by strong theoretical groundwork. Apprentices may perform tasks that

do not understand the basics, which restricts deeper learning and evolution. Andriopoulou and Prowse (2020) echo concerns about a disconnect between actions and insight. Similarly, Umarji *et al.* (2023) stress that not all practical experiences are equally important, particularly if they are unstructured. Giraldo-Garcia and Chang (2023) argue for thoughtfully constructed tasks that create difficulty in supporting progressive learning. Schall-Leckrone (2022) emphasises the need for consistent evaluations to guarantee that apprentices meet skill benchmarks, whereas Rabelo *et al.* (2022) point out that reflection alone may not capture measurable learning outcomes. Greenwood-Hau (2021) concluded that although practical learning is crucial, it must be paired with formal assessments and pedagogical techniques to be truly efficient.

The study addressed the outlined restrictions of practical learning theory by incorporating it with formal pedagogical structures to develop a balanced and efficacious apprenticeship model. While experiential learning offered groundwork through authentic, practical tasks and reflective practice, the study complemented this with guided instruction, scaffolded support, and consistent evaluation to guarantee that apprentices are not only involved in hands-on experiences but also comprehend the underlying theoretical concepts. To counter the risk of shallow learning and informal progression, learning tasks were intentionally sequenced in complexity, enabling apprentices to construct groundwork knowledge before progressing to demanding activities. Constructive feedback and formative evaluations were incorporated to support reflection and guarantee measurable skill growth. By integrating practical learning with cognitive and instructional design methods, this study contributes to the body of knowledge by providing holistic strategies that improve both hands-on competence and conceptual comprehension in apprenticeship training programs.

2.3.4 Relevance of David Kolb's Theory to the Study

Experiential learning theory coordinates with the fundamental principles of apprenticeship training programs, highlighting hands-on participation, guided practice and real-world problem solving, as noted by Giraldo-Garcia and Chang (2023). According to Fleming (2020), the theory is based on a periodic cycle of experience, reflection, conceptualisation, and experimentation. Within apprenticeships, this cycle involves how learners are involved in hands-on tasks, receive feedback, and enhance

their skills (Eren & Dokme, 2022). Morris (2019) corroborates the idea that practical learning is more productive than textbook learning is, with skill growth developing from active, practical practice.

The theory also emphasises the importance of learning through failure. Schweisfurth (2023) explains that making mistakes is important for establishing tacit, complex skills, as real-world tasks provide natural possibilities for reflection and development. For example, when an electrical apprentice incorrectly completes a task, feedback and reattempts promote resilience and enhance comprehension (Dianita, 2023; Fleming, 2020). However, while experiential learning offers strong groundwork, it should not function independently. Morris (2019) and Pherson-Geyser *et al.* (2020) argue that apprenticeships should incorporate formal mentorship, theoretical instruction, social interaction, and clear evaluations. When wider pedagogical techniques are incorporated, experiential learning contributes to more effective, complete apprenticeship models (Nzowa, (2020)).

2.4 VYGOTSKY THEORY

Cho and Lee (2020) assert that Lev Vygotsky's cognitive development theory is a socio-cultural strategy for comprehending how individuals, especially children, establish cognitive abilities. Hastiari (2020) believes that Vygotsky rejected the idea that cognitive development is a solitary, personal procedure. Instead, he proposed that social interaction and the cultural landscape are essential to the establishment of higher mental functions. Hewitt (2022) posits that the theory highlights that learning is not just about grasping information independently; it is deeply incorporated in the social and cultural context in which it happens. Vygotsky believes that social collaboration is the essential process through which cognitive development occurs (Cho & Lee, 2020). In his view, individuals learn through guided collaboration with more knowledgeable others, such as mentors or peers. These interactions are important because they offer a structure for the child to internalise concepts and skills.

Lustyantie, Ramli, Isnani and Supriyatti (2022) allude that one of Vygotsky's most dominant paradigms is the Zone of Proximal Development (ZPD). The ZPD represents the shortage between what a learner can do autonomously and what they can achieve under guidance. Fundamentally, Matsuo and Tsukube (2020) believe that ZPD is the

sweet spot for learning tasks that are demanding to be completed separately but can be accomplished with assistance. ZPD is the bridge between the actual growth of what a learner can accomplish on their own and their potential growth, which they can achieve with support (Moschella, 2023). Vygotsky's theory highlights that learning should occur in the ZPD because it motivates the learner beyond their existing capabilities but not thus far beyond that they cannot manage with suitable guidance. Hastiari (2020) states that an apprentice may not be able to independently diagnose complex mechanical failure. However, Cho and Lee (2020) underline that, with the assistance of an expert, they can solve the problem and internalise the procedure, proceeding closer to independent proficiency.

Vygotsky introduced the concept of scaffolding, which refers to the temporary support given by a more knowledgeable individual to assist the learner in performing tasks within their ZPD (Eid, 2022). The support is sturdily withdrawn as the learner becomes more capable, enabling them to take on more responsibility and eventually perform the task autonomously. Anikina (2020) believes that in the theoretical framework, scaffolding is a dynamic, integrative method that aligns with Vygotsky's wider view of cognitive development as socially mediated. According to Abu Ayyash (2022), this includes an integrative effort, where the learner and mentor jointly develop knowledge, with the mentor sturdily stepping back as the learner obtains more control. In an apprenticeship, a mentor might initially solve a complex transformer design before the apprentice, explaining each step (Hewitt, 2022). As the apprentice begins to understand the procedures, the mentor sturdily minimises their engagement, enabling the apprentice to complete similar problems autonomously.

2.4.1 Benefits of Vygotsky's Theory to the Study

Abu Ayyash (2022) explains that Vygotsky's socio-cultural theory views learning as most efficient when it happens through socialising. In apprenticeship training programs, Eid (2022) emphasise how this theory supports the significance of mentorship, peer participation, and shared problem solving in enhancing skills. According to Hastiari (2020) and Moschella (2023), apprentices profit from mentored practice, observation, and dialogue with skilled mentors, experiences that not only enhance their technical capabilities but also intensify critical thinking and problem

solving. These socially mediated learning procedures are central to efficient apprenticeship training programs.

A fundamental element in Vygotsky's theory is the ZPD, the shortage between independent capability and what can be accomplished with guidance, as emphasised by Matsuo and Tsukube (2020). This aligns with the apprenticeship model, where mentors provide scaffolding, temporary support through illustrations, instructions, and feedback (Lustyantie *et al.*, 2022; Kener, 2021). As apprentices enhance their confidence and ability, support is sturdily minimised to promote autonomy (Cho & Lee, 2020). Peer learning also plays an important role; integrative projects, peer mentoring and shared obstacles foster mutual development and knowledge-sharing (Setiawan & Komara, 2022). Saleh (2022) affirms that this multifaceted social participation reflects Vygotsky's vision of learning as an interactive and dynamic method.

2.4.2 Limitations of Vygotsky's Theory for the Study

According to Walters-Williams (2022), Vygotsky's socio-cultural theory highlights cognitive development through social interaction and cultural instruments, but it has restrictions when applied to apprenticeship training programs. While Sato (2022) emphasises the significance of mentorship, scaffolding, and social learning, it does not fully resolve the growth of physical skills, such as those needed for trades such as welding or plumbing. Apprentices need constant practice and trial-and-error learning, which the theory undermines (Eid, 2022). Additionally, Moschella (2023) asserts that the theory places restricted emphasis on individual learning and independence, which are crucial as apprentices move to more challenging tasks. Srinawati and Alwi (2020) note that Vygotsky's structure also ignores emotional and motivational elements such as confidence, self-efficiency, and resilience, which are significant in high-pressure apprenticeship settings. Furthermore, Kazuko (2020) suggests that the theory's universal model may not align with multifaceted cultural norms, which suggests that apprenticeship training programs in diverse cultural contexts may need to employ Vygotsky's principles to fit local dynamics.

This study addressed the restrictions of Vygotsky's socio-cultural theory by incorporating it with techniques that support physical skill growth, independence, and emotional involvement. While the theory's aim in mentorship and scaffolding was

retained, it was highlighted with hands-on learning and trial-and-error learning critical for trades. To enhance learner independence, the study integrated gradual release techniques, enabling apprentices to expand their responsibilities. Emotional and motivational elements such as confidence, resilience, and self-efficiency were supported through feedback, reflection, and goal-setting. The study also recognised the significance of individual learning within social contexts, balancing collaboration with independent tasks. Structured repetition and hands-on simulations assisted apprentices in internalising both conceptual and physical skills. Cultural adaptability was addressed by targeting learning activities to fit local norms and significance. This guaranteed that socio-cultural factors were applied in a contextually applicable manner. The study's combined technique guaranteed more holistic apprenticeship learning. It contributes to the body of knowledge by expanding Vygotsky's theory to enhance diverse, high-skill vocational landscapes.

2.4.3 Relevance of Vygotsky's Theory to the Study

Yamin, Setiawan and Anam (2023) suggest that Vygotsky's theory of cognitive development accurately replicates the framework of apprenticeship training programs, especially in its emphasis on social interaction, guided instruction, and scaffolding. According to Kazuko (2020), apprenticeships provide a real-world platform to apply fundamental Vygotskian concepts such as the ZPD, shared learning, and utilising cultural instruments such as language. Sharadgah *et al.* (2019) noted that apprentices often work alongside experts who guide them through tasks, offer constructive feedback, and model approaches supporting technical skill acquisition and cognitive development. Saleh (2022) adds that through these social exchanges, apprentices obtain hands-on expertise and a deeper conceptual understanding of their functions within the trade.

Maneesha (2020) explains that Vygotsky's view of learning as a shared method is illustrated in apprenticeships, where as Setiawan and Komara (2022) observe, knowledge is jointly developed between mentors and apprentices. Sato (2022) emphasise the mentor's function in narrowing the apprentice's skills shortage, which is constant with the ZPD. Language, a crucial cultural instrument in Vygotsky's theory, is also fundamental, as apprentices acquire trade-specific vocabulary and structures that support higher-level reasoning and innovative solutions (Saleh, 2022). This

linguistic and conceptual immersion strengthens proficiency. As Silviana and Miftakh (2021) and Walters-Williams (2022) conclude, Vygotsky's structure continues to be relevant to apprenticeship training programs, enhancing cognitive and hands-on skills growth through meaningful social engagement.

2.5. KNUD ILLERIS THEORY

Dimmock, Tan, Nguyen, Tran and Dinh (2021) describe Knud Illeris' theory of learning as an exhaustive structure that captures the diverse and interconnected nature of the learning procedures. In this context, Greenwood-Hau (2021) suggests that Illeris' theory provides a holistic viewpoint by acknowledging that learning is designed by the interaction of three fundamental elements: cognitive, emotional and social elements. Bai and Wang (2020) assert that the elements function in unison to influence how individuals absorb, retain and apply knowledge, skills and experiences. Importantly, Wooding (2019) believes that Illeris' model expands beyond traditional education, demonstrating high adaptability throughout multifaceted learning environments, including structured education systems, workplace training and unstructured learning scenarios. Apprenticeship training programs are an ideal context for employing Illeris' theory, combining theoretical instruction with hands-on experience. Kreber and Wealer (2021) emphasise that apprenticeship training programs enable apprentices to internalise academic concepts while employing them in real-world situations, strengthening sustainable learning.

2.5.1 Dimensions of Knud Illeris Theory

This section introduces Knud Illeris' Theory of Learning as a comprehensive framework for understanding how cognitive, emotional, and social dimensions interact to shape learning within apprenticeship training programs.

2.5.1.1 Cognitive Dimension

Ardasheva, Crosson, Carbonneau and French (2021) highlight that the cognitive dimension of learning includes intellectual procedures such as perception, memory, reasoning and critical thinking. This dimension aims to understand how apprentices comprehend concepts and incorporate new knowledge into current structures (Kim & Buric, 2020). In apprenticeships, this cognitive establishment is accomplished through

a combination of theoretical instruction and practical experience (Adriopoulou & Prowse, 2020). Aguilar, Uccelli, and Galloway (2020) highlight the importance of delivering critical theoretical knowledge, such as safety protocols and industry standards, through formal lessons and online platforms. Delprato and Antequera (2021) argue that efficient apprenticeship models combine classroom learning with real-world applications. The technique enables apprentices to intensify their cognitive comprehension through hands-on tasks, such as troubleshooting and repairing machinery after learning maintenance principles.

2.5.1.2 Emotional Dimension

Kendrick, Early, Michalovich and Mangat (2022) emphasise that the emotional dimension of learning, as explained by Illeris, includes the apprentice's emotional involvement and motivation. Negative emotions such as anxiety prohibit involvement, whereas positive emotions such as pride can enhance encouragement and learning (Walters-Williams, 2022). Furthermore, Leo (2022) highlights that the ability to discipline emotions and cope with setbacks is important for maintaining persistence and overcoming obstacles. In apprenticeship settings, Lin *et al.* (2023) suggest that developing environments where apprentices feel respected and encouraged can promote emotional involvement. Aiken (2021) notes that apprentices are frequently motivated by the possibility of establishing in-demand skills and safeguarding stable employment. As a result, Alban Conto *et al.* (2021) suggest that apprenticeship training programs highlight the connection between the skills being taught and career possibilities. Silviana and Miftakh (2021) also emphasise the significance of a supportive, inclusive environment, where mentors who are dedicated to the apprentice's achievement assist in constructing trust and confidence, allowing strengthened involvement in the learning method.

2.5.1.3 Social Dimension

The social dimension of learning highlights interaction as a fundamental aspect of learning procedures. Ardasheva *et al.* (2021) suggest that it includes the learner's involvement with others, including teachers, peers, mentors and colleagues. (Aiken, 2021) emphasises that learning is essentially sociable and is influenced by the environment in which it occurs. Andriopoulou and Prowse (2020) note that learning

frequently occurs through participation, feedback, discussion and observation, where knowledge is jointly developed and enhanced through socialisation. Additionally, Alban *et al.* (2021) underscore that the social element considers the wider social and cultural landscapes in which learning occurs. Apprenticeships exemplify this, as apprentices work closely with qualified mentors and adapt to the workplace culture (Greenwood-Hau, 2021). These experiences highlight that learning is not only about knowledge transfer but also about navigating social environments.

2.5.2 Benefits of Knud Illeris' Theory to the Study

According to Venn *et al.* (2023), Illeris' theory underlines the interconnectedness of the cognitive, emotional and social elements of learning. The structure is comprehensive and guarantees that apprentices not only master technical proficiency but also experience socio-emotional enhancement. In addition, Kim and Buric (2020) assert that apprentices who are emotionally involved, intrinsically encouraged and well connected with mentors and peers are more likely to succeed and remain committed to their training. Similarly, Tang *et al.* (2021) note that incorporating technical, emotional, and social elements develops well-rounded apprentices with the resilience and skills required for workplace success. In support of this viewpoint, Rabelo *et al.* (2022) highlight the importance of a holistic strategy for learning to promote an apprentice's preparedness for the workplace. Furthermore, Kreber and Wealer (2021) suggest that emotional commitment to learning, fostered through mentorship, can essentially strengthen encouragement, perseverance and achievement.

Extending this discussion, Lin *et al.* (2023) propose that Illeris' structure also supports the cohesive incorporation of theoretical learning with practical application, an important principle of effective apprenticeship training programs. As Sahan and Sahan (2021) and Sato and Storch (2020) observe, mentorship and social support are crucial in assisting apprentices in coping with setbacks and developing resilience throughout their learning journey. When apprentices experience cognitively challenging tasks while also feeling emotionally supported and socially connected, the depth and resilience of their learning increase drastically (Schweisfurth, 2023). In turn, this contributes to high retention rates and minimised dropout rates. Finally, Schall-Lekrone (2022) noted that developing a positive emotional and social environment

within apprenticeship settings increases the likelihood of program completion and extends the potential for continued employment with the host organisation.

2.5.3 Limitations of Knud Illeris' Theory to the Study

While Illeris' theory offers a holistic structure for learning through cognitive, emotional, and social dimensions, its relevance in the apprenticeship environment presents notable obstacles. Schweisfurth (2023) emphasises the complexity of employing the theory to multiple organisational settings and the different requirements of apprentices. Rabelo *et al.* (2022) note that training providers frequently scuffle to balance all three elements, particularly when compelled by restricted time and resources. Leo (2022) noted that incorporating theory with practice is complex, whereas Schall-Leckrone (2022) asserts that developing socio-emotional development creates stress, particularly in small enterprises with restricted mentorship capacity.

Moreover, Heron *et al.* (2021) argue that building a curriculum based on Illeris' model is challenging, as many mentors prefer imparting technical knowledge over supporting socio-emotional learning. Sato and Storch (2020) suggest that in fields such as manufacturing, which are performance oriented, Illeris' comprehensive model may conflict with current development areas. Consequently, Greenwood-Hau (2021) emphasise that apprenticeship training programs frequently prioritise task completion at the expense of emotional resilience and peer integration. Assessing socio-emotional learning is complex when evaluating technical skills, as it relies on subjective procedures such as self-evaluation and mentor feedback (Kim & Buric, 2020). Kandiko Howson and Kingsbury (2021) suggest that capturing these fewer tangible aspects may require innovative, resource-intensive assessment tools, posing methodological and practical complexities for many apprenticeship providers.

The study addressed the restrictions of Illeris' theory by combining socio-emotional learning with technical training without overwhelming mentors or resources. Activities such as peer feedback, reflection prompts, and guided communications were incorporated into routine tasks. Simple instruments such as self-evaluations and reflective journals were utilised to assess progress. The curriculum was designed to be employable throughout various organisational contexts. This technique provides a practical model for applying Illeris' comprehensive structure in apprenticeship settings.

2.5.4 Relevance of Knud Illeris' Theory to the Study

Peng, Orosco, Wang, Swanson and Reed (2022) explain that apprenticeships assist individuals in establishing fundamental skills for navigating difficult workplace elements, including communication and teamwork. Leo (2022) further highlights that dispute resolution is equally important for long-term professional achievement. These social skills align with Illeris' view, as Bowman, Salter, Stephenson and Humble (2022) affirm that socialising and integration are central to learning procedures. In this context, Delprato and Antequera (2021) note that apprentices frequently integrate into developed communities of practice within the workplace, where they learn through active engagement and observation. Greenwood-Hau (2021) adds that collaboration with skilled colleagues helps apprentices comprehend their functions and contributions to organisational goals.

Additionally, Kim and Buric (2020) emphasise the significance of apprentices viewing their initial training as the beginning of a lasting learning journey. Heron *et al.* (2021) believe that this mindset enhances a development-oriented viewpoint, motivating apprentices to constantly establish their skills. Illeris' structure equips apprentices with hands-on and emotional instruments, promoting their adaptability and career development (Kendrick *et al.*, 2022). Apprenticeships are efficient, as they engage apprentices in professional environments that they aim to join permanently. This engagement makes it more likely that apprentices will be incorporated into the organisational culture and surpass their training (Mancilla-Martinez *et al.*, 2020; Ardasheva *et al.*, 2021).

2.6 CHAPTER SUMMARY

The chapter presented the theoretical framework underpinning the study, providing a comprehensive foundation for understanding learning processes within apprenticeship training programs. Chapter 2 examined and integrated four key learning theories; Cognitive Apprenticeship Theory, David Kolb's Experiential Learning Theory, Vygotsky's Socio-Cultural Theory and Knud Illeris' Theory of Learning. Each one contributed a distinct complementary perspective on how apprentices acquire knowledge, skills and professional competence.

Cognitive Apprenticeship Theory emphasised the significance of guided learning, modelling, scaffolding, and the gradual development of expert thinking within authentic workplace contexts. Its focus on problem-solving, metacognition, and mentor-supported learning highlighted how apprentices progress from observation to independent performance. However, its limitations in addressing emotional and social dimensions necessitated integration with broader frameworks.

Kolb's Experiential Learning Theory provided insight into learning as a cyclical process involving concrete experience, reflective observation, abstract conceptualisation, and active experimentation. This theory aligned strongly with apprenticeship training, where learning is grounded in real-world tasks and reinforced through reflection and application. While highly effective for skill development, the theory's reliance on experience alone was recognised as insufficient without structured guidance and assessment.

Vygotsky's Socio-Cultural Theory introduced the critical role of social interaction, language, and cultural tools in learning. Concepts such as the Zone of Proximal Development and scaffolding illustrated how mentorship and peer collaboration facilitate cognitive growth beyond individual capability. The theory reinforced the social nature of apprenticeship learning but required supplementation to address physical skill mastery, learner independence, and emotional resilience.

Knud Illeris' Theory of Learning offered a holistic framework by integrating cognitive, emotional, and social dimensions of learning. This theory addressed gaps identified in earlier models by recognising motivation, emotional engagement, and social integration as essential to sustainable learning and persistence in apprenticeship programmes. Although implementation challenges were acknowledged, Illeris' framework provided a comprehensive lens for understanding the complexity of vocational learning.

Collectively, these theories informed the study's conceptual framework by highlighting that effective apprenticeship training requires a balanced integration of cognitive processes, experiential practice, social interaction, and emotional engagement. By synthesising these perspectives, the chapter established a robust theoretical basis for the study's methodology and analysis, ensuring that apprenticeship learning is

examined as a multidimensional, context-sensitive, and development-oriented process.

CHAPTER THREE: EMPIRICAL LITERATURE REVIEW OF APPRENTICESHIP TRAINING PROGRAM

3.1 INTRODUCTION

According to Wagner (2020), apprenticeship training programs play a fundamental role in addressing the perpetual skills shortfall in SMEs, which are largely recognised as fundamental drivers of economic development and employment generation. In the South African context, however, Udechukwu and Essien (2020) believe that SMEs frequently face considerable obstacles, including restricted resources and inadequate infrastructure, which impede the successful execution of structured apprenticeship initiatives. Consequently, Chimucheka (2021) explains that the disconnect contributes to a growing disparity between the skills demanded in the labour market and those required by the industry. Notwithstanding these obstacles, Leibbrandt and Zulu (2020) suggest that apprenticeship training programs provide a promising solution, as they enhance skill growth and promote overall productivity within SMEs.

Moreover, Andrews and Robin (2024) emphasise universal examples from countries such as Germany, Switzerland, and Australia that demonstrate the essence of the potential of well-designed apprenticeship systems. In these settings, Chigbu and Nekhwevha (2020) affirm that such training programs have demonstrated a crucial role in promoting skill levels in SMEs, thereby sustaining economic growth and workforce quality. Within this wider context, Müller and Jahn (2020) argue that the literature review seeks to significantly engage with recent scholarship on apprenticeship training programs in both South African and universal SME environments. This review aims to distinguish similar obstacles and enablers while also examining strategic techniques that may promote the design and application of apprenticeship models (Pavlínek, 2020). Particular emphasis is placed on analysing policy structures and practical interventions that hold potential for adaptation to the South African context (Kuczera, 2021).

This chapter examines the fundamental aspects needed to heighten apprenticeship training programs within South African SMEs, especially in the manufacturing industry. It begins by exploring obstacles prohibiting SME development and skills development, followed by techniques for promoting apprenticeship through industry-required

curricula, trainer capacity development and efficient policy structures. The chapter also analyses the effects of mentor-led apprenticeships on SME productivity, evolution and performance. Furthermore, it discusses the function of on-the-job training in resolving skills gaps and training shortfalls and concludes with policy and application recommendations focused on enhancing the quality and sustainability of apprenticeship training programs in South Africa.

3.2 ENHANCING APPRENTICESHIP IN SOUTH AFRICAN SMES

As Al-Fraihat, Joy and Sinclair (2020) noted, apprenticeship training programs have a significant function in upskilling the workforce within SMEs, especially in the manufacturing industry. In South Africa, the issue is crucial, as SMEs consistently encounter difficulties accessing formal apprenticeship training programs. Menolli *et al.* (2020) note that constraints prohibit SMEs ability to foster workforce growth and add value to a country's economic development. Xiang, Zhang and Liu (2020) explain that apprenticeships have historically transformed from unstructured knowledge-sharing among traders to more structured systems. As Khandakar and Pangil (2019) noted, this innovation emphasises the essence of apprenticeship models that can efficiently adapt to constant technological and economic innovations. In South Africa, Wagner (2020) notes that this innovation underlines the importance of developing a structured and contextually applicable apprenticeship structure targeted at the specific socio-economic conditions of the manufacturing industry.

The literature review of universal best practices assesses how efficient apprenticeship training programs are designed in diverse universal contexts. It also considers the distinctive possibilities and obstacles encountered within the South African setting (Pavlínek, 2020). According to Dignen and Burmeister (2020), fundamental factors fostering the success of apprenticeship training programs include policy structures, legislation environments, financial support and the ability of SMEs to offer hands-on, mentorship-based training. Accordingly, Xiang *et al.* (2020) highlight that universal case studies provide a significant understanding of these obstacles through joint efforts among industry stakeholders, training institutions and government bodies. As Khandakar and Pangil (2019) argue, comprehending these interrelated processes is important for designing a resilient and contextually applicable apprenticeship structure for South Africa.

Okolocha, John-Akamelu and Muogbo (2020) suggest that in developing economies such as South Africa, SMEs are recognised as the backbone of the manufacturing industry. However, these organisations often encounter obstacles in recruiting qualified personnel and cultivating a competitive edge within a rapidly transforming universal environment (Udechukwu & Essien, 2020). Tailored apprenticeship training programs, when tailored to reflect the realities and pressures of SMEs, hold significant capacity to resolve these issues, as noted by Kuczera (2021). According to Campbell *et al.* (2021), establishing a flexible apprenticeship structure capable of addressing the specific demands of diverse industries is necessary. Andrews and Robin (2024) noted that these demands include restricted resources, essential skill gaps, and adaptable, hands-on training formats. The design of such programs should be conducted by foundational principles, application, and accessibility (Chigbu & Nekhwevha, 2020). Arthur, Aneke and Otiji (2021) advocate for overarching skills shortage examinations and need evaluations to guarantee alignment with industry standards. Moreover, Stolfi *et al.* (2020) emphasise that successful execution depends on robust integration among fundamental stakeholders, including government agencies, industry bodies and educational institutions. This integration technique guarantees that training programs are contextually appropriate and future-ready.

3.3 CHALLENGES FACING SOUTH AFRICAN MANUFACTURING SMES

Iwueke, Halima and Oparaku (2020) postulate that apprenticeship training programs need important initial investments in structured training structures, appropriate learning materials and experts to guarantee efficient skill acquisition. However, Brixiová, Kangoye and Yogo (2020) believe that SMEs often encounter financial difficulties that constrain their ability to allocate adequate resources to such programs. Without sufficient funds, SMEs frequently scuffle to offer the necessary instruments, facilities and experts needed for successful apprenticeship training programs. In addition, Ehteshami (2020) allude that managing training programs entails administrative burdens, including compliance with national legislation and reporting requirements to government bodies such as South Africa's SETAs. Amador, Bragelman and Superfine (2021) argue that regulatory demands can burden SMEs with restricted administrative capacity, distracting them from core operations.

Pargeter *et al.* (2023) highlight that a critical obstacle in apprenticeship training programs is the restricted availability of qualified mentors who can offer high-quality training. Cieslik *et al.* (2021) further note that qualified employees in SMEs are frequently too busy with their duties to dedicate sufficient time to apprentice development. Without designated mentors, Akolgo-Azupogo *et al.* (2021) believe that apprentices miss out on the formal, practical learning required for building hands-on proficiencies, leading to inadequate training outcomes. Additionally, Iwueke *et al.* (2020) emphasise that SMEs function in fast-paced environments that need multitasking, leaving minimal time for in-depth apprenticeship support. The time-intensive nature of apprenticeship training programs frequently clashes with the urgent requirements of managing a small business, thus restricting their efficacy, as stated by Friesen and Kuntze (2021). Consequently, Dauti *et al.* (2020) highlight that employee turnover also presents a vital obstacle in the retail and hospitality industries, where workforce insecurity is common. High turnover rates interrupt training cycles, with apprentices frequently resign prior to completing their training, which undermines continuity and leads to financial losses due to investments in training infrastructure (Akolgo-Azupogo *et al.*, 2021).

Brixiová *et al.* (2020) emphasise that even after successfully completing apprenticeship training programs, SMEs face challenges in retaining apprentices due to competition from larger organisations that provide more extensive benefits. This results in a minimised return on training investments and exacerbates SMEs' continuous skill scarcity. Additionally, Ehteshami (2020) argues that some apprenticeship training programs may fail to align with transforming industry standards, leading to the production of graduates with skills that are obsolete, further fostering inefficiencies. In the South African manufacturing industry, SMEs encounter specific obstacles in executing efficient apprenticeship training programs, as noted by Mori and Stroud (2021). Iwueke *et al.* (2020) suggest that these obstacles stem from insufficient resources and inadequate infrastructure, whereas Campbell *et al.* (2021) highlight a persistent shortfall between the training provided and the rapidly evolving requirements of the industry.

One of the most pressing obstacles encountered by South African manufacturing SMEs is their constrained ability to invest in the infrastructure required for hands-on

apprenticeship training. Many SMEs cannot afford modern machinery, adequately equipped training facilities and structured mentorship systems, all of which are important for establishing industry-applicable skills (Fragapane *et al.*, 2022; Li & Pilz, 2023). This issue is rooted primarily in financial limitations, as SMEs frequently function under strict budgetary conditions that prohibit their ability to allocate adequate resources to training and establishing initiatives (Brixiová *et al.*, 2020). Furthermore, apprenticeship training programs need essential initial investments, including developing formal training structures, purchasing appropriate learning materials, and involving skilled mentors (Iwueke *et al.*, 2020). These exorbitant costs pressure SMEs even further with already inadequate resources. Compounding this obstacle is the acute shortfall of skilled mentors within the industry. As Van Den Heever *et al.* (2021) observe, this shortage further impedes the delivery of on-the-job training experiences, thereby compromising the quality and effectiveness of apprenticeship training programs.

Grigorievna *et al.* (2021) and Stolfa *et al.* (2020) argue that unclear legislation and poor stakeholder participation frequently lead to disjointed training that fails to meet industry requirements, underlining the necessity for coherent policies and inclusive integration. Moreover, Pavlínek (2020) noted that many SMEs lack innovated technologies and training instruments, restricting apprentices' exposure to industry practices, particularly in precision manufacturing and automation. Chigbu and Nekhwevha (2020) argue that without investment in digital instruments, apprentices may scuffle to obtain the technical skills required for modern manufacturing.

3.4 ENHANCING TRAINING THROUGH INDUSTRY-FOCUSED CURRICULA

Traditional training is insufficient as industries transition to automation, digitisation and sustainability. Scholars such as Ezeajughu (2021) and Akabike (2020) emphasise the importance of methodological teaching that establishes cognitive and technical proficiencies. This groundwork allows apprentices to address real-world obstacles and adapt to developing technologies. As a result, several studies advocate for performance-based strategies and curriculum reforms informed by consistent participation with industry stakeholders (Usman, Makhdum & Kousar, 2021; Veres *et al.*, 2020). The joint study conducted by IIEP-UNESCO and IFEF (2020) for employing Competency-Based Approaches (CBA) in TVET systems was conducted in seven

African countries: Benin, Ethiopia, Ghana, Morocco, Rwanda, Senegal, and South Africa. The study distinguished efficient practices and obstacles in executing CBA, providing an understanding to assist policymakers and educators in enhancing vocational training applicable throughout diverse African contexts. Similarly, Ndlovu (2023) distinguish between shortfalls and possibilities in industry-college engagements within South Africa, proposing a structure for promoting integration to increase graduate employability.

To guarantee that vocational curricula remain applicable, constant alignment with industry standards is important. Studies by Graf and Lohse (2021) and Seyffer *et al.* (2022) recommend developing advisory committees comprising professionals and academics to distinguish content inadequacies and incorporate current events. Advisory committees also aid in infusing workplace requirements such as lean manufacturing and safety procedures into the curriculum. Lantu *et al.* (2022) contend that sustainability-focused content is required to keep pace with industrial reforms. Collective models, such as apprenticeships and cooperative education, further close the gap between theoretical learning and practical experience, providing exposure to cutting-edge technologies and mentorship possibilities (Wuttke *et al.*, 2020; Bobkov *et al.*, 2022). In addition to technical skills, soft skills enhancement, communication, adaptability, and teamwork are increasingly prioritised, supported by immersive technologies such as digital reality, as supported by Sinclair & Rockwell (2021) and Anselmann, Harm & Faßhauer. (2022). As Thorne (2020) noted, a training process that incorporates industry integration, technological instruments and holistic skill enhancement yields graduates who are technically competent and adaptable contributors to evolution in the manufacturing industry.

3.5 POLICY FRAMEWORK

Schweisfurth (2023) defines a policy structure as a holistic set of guiding protocols, strategic techniques, and structural mechanisms aimed at addressing specific obstacles or objectives within a given domain. These structures provide a clear roadmap for decision-making, execution and assessment methods. In addition, Dorner and Görlitz (2020) highlight that an efficient policy structure outlines goals, describes stakeholder functions and liabilities and specifies the required actions to be undertaken. Haasler (2020) noted that this formal technique plays a fundamental role

in guaranteeing regularity and reliability throughout the execution stage. Thorne (2020) argues that a policy structure guides apprenticeship training programs' design, legislation and support to align with labour market standards and foster the establishment of sustainable skills.

3.5.1 Policy Framework Globally

Sato and Storch (2020) argued that the universal policy structure for apprenticeship training programs reflects the development of a universal consensus on the significance of incorporating theory-based education with formal, work-based learning. In addition, Papier (2021) asserts that such a technique is recognised as an efficient method of alleviating skills shortfalls and fostering youth employability. Furthermore, universal organisations such as the International Labour Organisation, UNESCO and the OECD actively support this structure, which, as emphasised by Altreiter (2021), involves core protocols such as inclusivity, quality assurance and stakeholder integration. Newton (2021) notes that the structure emphasises the need for consistent national approaches that align vocational education with labour market standards while fostering equity and clear progression routes. The following section focuses on the policy structures of two selected universal countries, Germany and the United Kingdom. Germany and the UK were selected for their divergent yet impactful apprenticeship structures. Germany's Dual Education System exemplifies efficient SME integration and public support for sustainable training (Euler, 2023; Hewitt, 2022), whereas the UK's Apprenticeship Levy highlights both funding opportunities and challenges for SMEs (Newton, 2021; Paz-Fuchs, 2021). These models offer applicable lessons for South Africa's resource-restricted manufacturing SMEs encountering legislation and skills requirements (Iwueke *et al.*, 2020; Campbell *et al.*, 2021). Their complementary techniques provide hands-on understanding for enhancing policy and execution locally.

3.5.1.1 Germany

A study by Euler (2023) affirmed that Germany's Dual Education System is widely acknowledged as one of the most efficient models of apprenticeship training, owing to its collaboration of theoretical education with applied knowledge and workplace-based experience. In addition, Cedefop (2021) accentuates the system's robust support for

SMEs, facilitated through financial subsidies directed at employers and educational institutions. Funding contributes to the development of a formal and integrated vocational training structure. Moreover, Hewitt (2022) emphasises the significant function of engagements between SMEs and training providers, which assist in upholding the quality of apprenticeship training programs while guaranteeing their alignment with shifting industry demands. Nevertheless, as Markowitsch and Wittig (2020) noted, the obligation for SMEs to make financial contributions to training can present critical obstacles, especially for smaller firms with restricted resources. In this context, Bowman *et al.* (2020) highlight the need to maintain a balance between public funding and employer investment to guarantee the long-term sustainability and efficacy of apprenticeship initiatives.

In support of this viewpoint, Hippach-Schneider *et al.* (2022) demonstrate how Germany's structured and publicly subsidised apprenticeship system allows SMEs to access high-quality training possibilities. Reflecting on this, Marsh (2021) contended that South Africa could benefit from employing common protocols, especially by designing an apprenticeship structure that balances government support with employer liability to develop sustainable skills growth. In response to changing demographic standards and economic requirements, Chian (2020) emphasised that Germany has executed several transformations focused on maximising SME involvement in its dual education system. A notable initiative in this regard is the *Passgenaue Besetzung* program, which helps SMEs attract suitable apprentices through adviser-led matching services, as stated by Sato and Storch (2020). According to Ertelt *et al.* (2021), this technique has essentially expanded access to apprenticeships and assisted in alleviating skills gaps. To further ease the financial burden on SMEs, the *Qualification Opportunities Act* offers tailored subsidies for organisations investing in workforce training. Complementing these efforts, Markowitsch and Wittig (2020) describe innovative cooperative structures such as the *Marktplatz-Verbundausbildung*, which allow SMEs to allocate training liabilities, thereby fostering both the quality and cost efficiency of apprenticeship. Expanding on these changes, Bowman *et al.* (2020) detail the provisions of the *2023 Continuing Education and Training Act*, which established guaranteed placements, relocation assistance and augmented funding for long-term learning. These measures are

advantageous for SMEs in demographically underrepresented regions, fostering their ability to capture and retain qualified talent.

3.5.1.2 United Kingdom

The introduction of the UK's Apprenticeship Levy in 2017 signified a critical change in national skills enhancement policy. Newton (2021) explains that the levy needs employers with annual payrolls surpassing £3 million to subscribe to a national fund designed for apprenticeship training programs. Although the initial intent was to involve larger organisations, the policy also offers access to funding for SMEs. In support of this, Schall-Leckrone (2022) emphasises that the levy allows SMEs to engage in training programs without bearing full financial distress. Nonetheless, Papier (2021) observes that many SMEs fumble through the system's administrative requirements, which frequently impedes their ability to use funding efficiently. Furthermore, Udechukwu and Essien (2020) refer to the findings of the Independent Apprenticeship Policy Group assisted by Pearson, which emphasises the need for strengthened employer-led investment, tailored SME support, and greater emphasis on apprenticeship development. The group also advocates increasing access to high-quality, industry-applicable programs that are responsive to reforming labour market environments.

Similarly, Sato and Storch (2020) acknowledge that, in addition to governmental efforts, SMEs continue to encounter incredible financial and functional challenges that limit broader engagement in the system. While Schweisfurth (2023) distinguishes the levy as a potentially efficient instrument to alleviate funding deficits and incentivise SME participation, Schendel *et al.* (2020) argue that more hands-on and accessible support systems are important if SMEs are to benefit entirely from the initiative. Marsh (2021) suggests that, regardless of its constraints, the UK's policy structure provides instructive lessons for countries such as South Africa, where common challenges prohibit SME participation in apprenticeship training programs. Government legislation, especially Apprenticeship Levy, has thus been instrumental in designing the UK's apprenticeship environment. However, as Hoidn and Stastny (2021) note, the effect on SMEs has been inconsistent. Between 2016/17 and 2020/21, apprenticeship among SMEs decreased by 49%, indicating that the policy may have developed unforeseen challenges (Chian, 2020; Li & Pilz, 2023). The main issue has

been the 5% co-investment contribution for non-levy-paying employers, which Iwara (2020) distinguishes as a crucial financial barrier. In response, Paz-Fuchs (2021) highlights that the government has developed multiple reforms, including full funding for apprenticeships in SMEs commencing in April 2024 and maximising flexibility in relocating unused levy funds. Nevertheless, continuous issues continue regarding the system's inclusivity and overall performance. Scholars such as Musa and Idris (2020) advocate reforming the existing structure into more adaptable skills that are better aligned with SME requirements. Hertog (2020) calls for further policy evolution to guarantee a more equitable and effective system.

3.5.2 Policy Framework in the African Context

Lassnigg (2020) asserts that apprenticeship training policy structures in multiple African countries demonstrate a steadfast dedication to resolving youth unemployment and fostering workforce skills through vocational education. Euler (2020) notes that Ghana and Nigeria have made attempts to formalise training and offer support for SMEs. However, the execution of these techniques is often prohibited by restricted funding, poor institutions, and consistent dependence on unstructured systems. Nevertheless, Markowitsch and Wittig (2022) emphasise an increasing awareness throughout the continent of the opportunity for apprenticeships to promote inclusive economic development and enhance sustainable employment. The following subsections aims on the policy structures of two selected national countries, Nigeria and Ghana.

Ghana and Nigeria were selected for their active attempts to validate apprenticeship training programs and enhance SME engagement (Lassnigg, 2020; Graf *et al.*, 2021). Nigeria's National Policy on Skills Development incorporates structured and unstructured training regardless of obstacles (Achatz, Jahn & Schels, 2020; Chian, 2020), whereas Ghana's apprenticeship improvements, including the Ghana Apprenticeship Program, indicate potential dual-training processes (Haasler, 2020; Lassnigg, 2020). Both countries encounter common socio-economic obstacles and policy transformations, providing significant understanding of African apprenticeship structures (Musa & Idris, 2020; Hertog, 2020). South Africa shares these obstacles, such as funding difficulties, inadequate infrastructure and poor SME education linkages, and is similarly working to formalise apprenticeship systems through

transformations and integrations (Udechukwu & Essien, 2020; Campbell *et al.*, 2021; Wagner, 2020; Kuczera, 2021). Lessons from Ghana and Nigeria can help South Africa intensify its support for SMEs and mitigate skills shortfalls more efficiently (Marsh, 2021; Lassnigg, 2020).

3.5.2.1 Nigeria

According to Li and Pilz (2023), Nigeria's vocational education technique highlights enhancing youth employability and fostering SME engagement. As emphasised by Graf *et al.* (2021), central to this approach is the National Policy on Skills Development (NPSD), which incorporates both structured and unstructured training into national establishment goals. Achatz *et al.* (2020) further emphasise the policy's aim in terms of industry-relevant curricula and quality requirements. Fundamental agencies such as the National Directorate of Employment (NDE) operationalise these goals through systems such as the Vocational Skills Development (VSD) initiative, the Graduate Attachment Program, and School-on-Wheels. Garba's (2022) study of the VSD in Kaduna offers a comprehensive understanding of its effectiveness in fostering youth employment. According to Udechukwu and Essien (2020), these initiatives are built to equip youth with hands-on skills while motivating SME engagement.

The National Vocational Qualifications Framework is important in standardising apprenticeship training programs and acknowledging unstructured learning (Chacaltana & Dasgupta, 2021; Deissinger & Gonon, 2021). However, multiple apprenticeships continue to operate informally, frequently unregulated and inconsistent (Einboden *et al.*, 2020). Chian (2020) identifies funding shortages, poor institutions, and weak SME education linkages as fundamental structural challenges. These problems call for coordinated transformation, inclusive policies, and strengthened infrastructure to better serve structured industry training standards. According to Sawyer (2023), agencies such as NDE and the Industrial Training Fund have laid a foundation for formal vocational systems; however, continuous obstacles persist. Marshal (2021) indicates enhanced employability through SME engagements, whereas Newton (2021) emphasises the NPSD's function in motivating public-private partnerships. However, unstructured SME functions, bureaucratic inadequacies, and resource shortfalls continue to undermine engagement (Murcio *et al.*, 2021; Allais & Fleisch, 2023; Papier, 2021). As Dorner and Görlitz (2020) conclude, unlocking the full

potential of Nigeria's apprenticeship system will require more inclusive, constant and efficient executed support structures.

3.5.2.2 Ghana

Recent assessments, such as those of Nunynameh, Obinnim and Adzivor (2024), suggest that Ghana's pilot dual-training methods have significant potential; however, its efficiency is determined by unified stakeholder integration and effective execution. Concurrently, Haasler (2020) accentuates that Ghana's apprenticeship system has been significantly improved to alleviate youth unemployment and foster workforce skills. Iwara (2020) asserts that fundamental initiatives such as the Ghana Apprenticeship Program (GAP), National Apprenticeship Policy, and GSDI each contribute significantly to designing Ghana's apprenticeship transformations. Launched in March 2024, the GAP sets out to train 50,000 individuals in fundamental trades, accredited 250 training providers, and distribute 5,000 start-up grants, all within a performance-based structure (Lassnigg, 2020). Ertelt *et al.* (2021) highlight the National Apprenticeship Policy's function in regulating practices to promote governance and coordinate training with national establishment goals. Hertog (2020) asserts that the GSDI, developed in partnership with the German Development Cooperation, employs a dual-training model that distributes instructional liabilities between structured institutions and skilled artisans. As Marsh (2021) and Sato and Storch (2020) noted, this technique aims to maximise access, enhance instructional quality, and minimise training costs. Nevertheless, Sawyer (2023) distinguishes consistent challenges, including legislation shortfalls, inadequate funding, and misalignment between obtained skills and labour market standards.

Moreover, Mirabel *et al.* (2022) observe that while government regulations have positively designed apprenticeship provisions for SMEs, obstacles continue. Schall-Lackrone (2022) draws attention to the National Apprenticeship Program, which incorporates hands-on and theoretical training, enhancing both quality and SME support with the assistance of universal partners such as the World Bank. However, Lambon-Quayefio *et al.* (2023) emphasise concerns regarding policy duplication and inefficient assessment mechanisms, indicating the necessity for fostering integration. In this context, Newton (2021) points to formal restrictions that impede program success, whereas Hertog (2020) explains that various SMEs functioning informally

scuffle to meet legislative standards or benefit from the government. Although the GAP indicates a revitalised governmental commitment, Lassnigg (2020) warns that funding gaps, infrastructure inadequacy, and oversight restrictions could prohibit progress. Ultimately, as Musa and Idris (2020) assert, maintained enhancement will require improved policy collaboration and strategic investment in vocational training infrastructure to fully support SME participation.

3.5.3 Policy Framework in South Africa

Cavaglia, McNally and Ventura (2020) emphasise the significant contribution of apprenticeship training programs to the establishment of a resilient workforce within the SME industry. Expanding on this perspective, Dorner and Görlitz (2020) argue that the success of such systems is widely designed by the surrounding policy and legislative landscape, which can either influence or prohibit SME engagement depending on how it is organised and executed. Within the South African context, Achatz *et al.* (2020) point to diverse policy enactments established to foster skill establishment and promote SME participation in vocational training. However, as Sawyer (2023) cautions, the success of these initiatives frequently hinges on how well they align with industry standards. In this context, Chian (2020) underlines the importance of well-designed policies in establishing the success of apprenticeship systems.

Moreover, South Africa's apprenticeship landscape is essentially governed by policies such as the Broad-Based Black Economic Empowerment Act (2003), which aims to motivate equitable skill establishment for SMEs (Cavaglia *et al.*, 2020). Nevertheless, observational studies by Mathibe and van Zyl (2021) indicate widespread ignorance among SMEs about available resources, compounded by inadequate service delivery. Further critiques by Smith and Foley (2021) have focused on SETAs, which encounter accusations of administrative failure, funding delays, and secrecy. These concerns are validated by data from the Auditor-General's 2022 report, which exposed endemic financial impropriety (Dela Cruz, 2022). According to Sheather and Slattery (2021), for multiple SMEs, the administrative challenges of acquiring training grants remain restrictive, with more than 60% of respondents in an SACCI survey indicating that the procedure outweighs the benefits.

In response, the South African government has launched tailored efforts such as the Integrated Apprenticeship Initiative, which fosters dual-training methods and promotes the function of business associations in vocational delivery (Murcio *et al.*, 2021; Paz-Fuchs, 2021). This is further supported by the Expanded Public Works Program, which prepares participants with entrepreneurial skills, with 90% reporting enhanced business abilities (Waxin, Kumra & Zhao, 2020). These efforts correspond with OECD recommendations prescribing closer correlations between training outputs and labour market standards (Musa & Idris, 2020). Nevertheless, Langthaler *et al.* (2022) highlight the importance of incorporating work-based learning strategies to enhance career prospects. Concurrently, the ILO warns of continuous challenges such as gender discrimination, social stigma and inefficiency, which continue to challenge the success of SME apprenticeship initiatives in South Africa. Below are systems in South Africa focused on financing, facilitating and promoting apprenticeships by improving employer engagement and fostering skills growth.

3.5.3.1 Skills Development Act and Skills Development Levy

The Skills Development Act (SDA) and Skills Development Levy (SDL) form the basis of South Africa's approach to workforce training, including apprenticeship training programs (Ganzer *et al.*, 2021). The SDL, as Smith and Foley (2021) explain, mobilises funds through a 1% payroll contribution from large organisations to support such programs. A 2024 British Council study compared skills levy systems across Morocco, Ghana, Tanzania, Malawi, Mauritius, Mozambique, South Africa and Botswana and examined different viewpoints between levy funding, exemptions for smaller employers and the requirement for accountability in levy operations. Markowitsch and Wittig (2020) add that while businesses with an annual payroll under R500,000 are excluded from levy, they still face financial and administrative challenges in accessing training resources.

3.5.3.2 Quality Council for Trades & Occupation

The Quality Council for Trades & Occupation (QCTO) occupies an important position in designing South Africa's apprenticeship settings through the establishment of industry-aligned requirements and evaluation structures (Allais & Fleisch, 2023). As strategic intermediaries, QCTO bridges the gap between vocational education and the

changing requirements of the labour market. A key appraisal by the QCTO evaluated the efficiency of apprenticeships in enhancing employability and career success. However, studies by the OECD (2020) accentuate inadequate data on program outcomes, calling for enhanced monitoring systems to inform more tailored training systems. To guarantee the applicability and significance of training, the Department of Higher Education and Training (2021) highlighted that QCTO needs to participate closely with employers and industry stakeholders, standardising curriculum content with current and expected industry standards. Dela Cruz (2022) affirms that the collaborative process supports the consistent enhancement of training standards, which define the essential proficiencies that apprentices must establish.

These constraints are systemic challenges such as delayed fund disbursement, administrative dysfunction, and inadequate monitoring systems. Beyond standard establishment, QCTO is also liable for managing apprenticeship evaluations. As noted by Papier (2021), these assessments are built to be performance-based and are in line with the National Qualifications Framework (NQF), guaranteeing national consistency in quality assurance. Mirabel, Sewagegn and Diale (2022) further highlight that the QCTO arranges evaluations that reflect hands-on learning, training apprentices with the ability to perform efficiently in a real-world environment. Through this dynamic technique for training and evaluation, SETAs play a key role in establishing a skilled, adaptable workforce, promoting the efficacy of national apprenticeship techniques (merSETA, 2020; Department of Higher Education and Training, 2024).

3.5.3.3 Incentives and Grants

Marsh (2021) emphasises the significant function the government plays in fostering skills development by offering incentives and grants to reinforce SMEs in apprenticeship training programs. While this financial aid is significant, Chacaltana and Dasgupta (2021) point out that its efficacy is frequently restricted by the challenges and administrative challenges involved in accessing these funds. A study by Spaulding and Petrov (2023) explored state-level incentives through Arkansas, California, Connecticut, Florida, Maryland, Michigan, Minnesota and Mississippi, aiming to use grants, compensation and tax credits to appeal to employers and maximise apprenticeship access, especially for disadvantaged groups. States that provided

financial incentives, such as tax credits and grants, experienced greater engagement from employers in apprenticeship training programs. However, as Dorner and Görlitz (2020) note, many SMEs scuffle with restricted resources, particularly in terms of personnel and administrative capability, to manage the challenging and time-consuming procedures involved. As a result, despite the availability of support, Ertelt *et al.* (2021) argue that bureaucratic obstacles continue to prohibit SME participation in apprenticeship initiatives.

3.5.4 Impact of Government Policies on SMEs Apprenticeship

According to Iwara (2020), government regulations play an important role in designing the involvement of SMEs in apprenticeship training programs on a universal scale. Expanding on this viewpoint, Hertog (2020) emphasise that policies such as tax incentives, subsidies and simplified policies encourage SMEs to invest in structured apprenticeship training programs. Nevertheless, when these beneficial actions are applied inconsistently throughout industries, SMEs frequently face substantial challenges, which, in turn, prohibit the efficacy and reach of apprenticeship training programs universally.

3.6 STANDARDS AND ASSESSMENT CRITERIA FOR APPRENTICESHIP TRAINING.

Banson (2022) asserts that developing simplified standards and evaluation systems is key to the success of apprenticeship training programs, as it guarantees that apprentices obtain the skills and knowledge needed to meet shifting industry standards in South Africa and universally. Similarly, Butler-Henderson and Crawford (2020) emphasise that these standards guarantee the efficacy and consistency of high-quality apprenticeship training programs throughout industries. The standards and evaluation systems for apprenticeship training programs are discussed below:

3.6.1 Standards and Assessment Criteria Internationally

Universally, countries have established defined standards and evaluation systems to guarantee that apprenticeship training programs deliver high-quality, industry-specific training and develop a consistent skilled workforce (Demir, 2021).

3.6.1.1 Germany

In Germany, apprenticeship training programs are underlined by defined standards and evaluation systems designed to deliver high-quality vocational education constantly (Demir, 2021). Central to this system are the training policies established by the Federal Institute for Vocational Education and Training (BIBB), which develop basic apprenticeship standards. As Dela Cruz (2022) explains, these standards apply to in-company training and offer a structure for guiding school-based instruction, thereby enhancing constituency throughout various training settings. Furthermore, competence evaluations within Germany's vocational education and training (VET) system are informed by normative and empirical structures. According to the OECD (2022), normative techniques, such as the German Qualifications Framework, serve as the basic orientation instruments for educational policymaking and the articulation of learning objectives. Similarly, Foerster *et al.* (2020) emphasise how empirical techniques disaggregate wider proficiencies into measurable sub-components, allowing the use of standardised evaluation instruments.

According to the Federal Republic of Germany (2020), evaluation methods in the dual VET system are strictly governed by the Vocational Training Act, with assessments administered by applicable chambers. These are managed by independent examination authorities consisting of qualified experts, who evaluate candidates through formal tasks tailored to replicate genuine workplace practices. A systematic review by Nickolaus, Gschwendtner and Abele (2020) indicates that these evaluation tools primarily target professional, basic, and social-communicative capabilities and typically undergo validation processes, although reliability levels differ. Germany's robust legislation and evaluation architecture guarantees that apprenticeship training remains responsive to labour market requirements while upholding educational quality throughout industries.

3.6.1.2 United Kingdom

The apprenticeship system in the UK is cultivated by stringent standards and detailed evaluation guidelines. Hertog (2020) notes that apprenticeship systems are carefully designed to guarantee that apprentices obtain the fundamental skills, knowledge, and behaviours required for their functions. A critical element of the UK's apprenticeship

structure is the end-point assessment, which serves as the summative assessment of an apprentice's performance. Iwara (2020) noted that end-point assessment organisations guarantee fair, constant, and impartial assessments. Furthermore, Lubbe and Svensson (2022) highlight that the evaluation outcomes are graded to reflect the level of performance illustrated. Allais and Ngcwangu (2023) state that while a pass is obligatory, many standards provide merit or distinction for competence, surpassing the foundational system. The Institute for Apprenticeships and Technical Education (IfATE) is critical in developing clear apprenticeship standards and evaluation systems. Allais and Fleisch (2023) note that IfATE works with employers to align standards with industry standards, enhancing apprentices' employability through transferable skills. The emphasis on clear, independent evaluation guarantees that apprentices are well qualified, enhancing their career opportunities and guaranteeing that they are well prepared for the workforce (Mirabel *et al.*, 2022).

3.6.2 Standards and Assessment Criteria in Africa

Papier (2021) notes that apprenticeship standards throughout Africa differ widely, although Danso and Osei (2021) highlight a shared goal of providing apprentices with skills targeted at local industry requirements. Increasingly, Agyemang (2020) points out that these structures also focus on aligning with universal benchmarks to enhance graduate competitiveness. Below is a discussion of the Standards and Assessment Criteria in Africa.

3.6.2.1 Nigeria

In Nigeria, apprenticeship training programs mitigate the country's skills shortfall, particularly within unstructured industries, by concentrating on experiential learning specific to industry standards. Ugwu and Mbah (2022) reported that the Igbo apprenticeship system improves SMEs' development, quality commitment and interpersonal skills, suggesting that organisational planning and public relations foster sustainability. Notably, Dela Cruz (2022) highlights that training programs are progressively aligned with local labour market standards, with the government, through agencies such as the NBTE, working to formalise training standards and evaluations to foster quality and consistency.

According to Ayodele (2021), standardisation efforts are accelerating to align more efficiently with the anticipation of both employers and apprentices. Bala and Nyaga (2024) report that mentoring essentially bolsters business startups, especially in the Plateau State's building materials market. Nigerian apprenticeship evaluation integrates theory and practice and is frequently facilitated through partnerships among employers, communities, and training institutions. Olayemi (2020) notes that training is industry tailored, with industry experts conducting competency assessments. While quality and constant obstacles persist, Mirabel *et al.* (2022) emphasised that NBTE changes intensify tracking systems. Eze (2023) further highlights the efficacy of the Igbo Apprenticeship System in enhancing entrepreneurship and calls for government-backed frameworks to support certification and skill growth.

3.6.2.2 Ghana

In Ghana, Papier (2021) notes that apprenticeship training programs are built to meet both national and local labour market standards, providing apprentices with significant skills in trades such as carpentry, plumbing and electrical work. These programs incorporate theoretical instruction with hands-on experience to prepare apprentices for the workforce. Danso and Osei (2021) identified ten fundamental obstacles in Ghana's apprenticeship system, including obsolete machinery, the absence of structured policies and inadequate entrepreneurial training. Scholars have highlighted the necessity of government intervention to offer resources and structure to increase apprenticeship efficacy. However, Agyemang (2020) noted that obstacles continue in standardising training practices throughout regions, leading to education inequality, making constant training quality a primary focus of recent transformation.

Afutu-Kotey *et al.* (2025) report that the inadequate regulatory structure in Accra's unstructured automobile industry hampers training quality and recommend policy transformation to increase quality assurance. Ghana's apprenticeship evaluations integrate technical skills with theoretical knowledge through practical assessments and exams, as explained by Asamoah (2021). Nunynameh *et al.* (2024) assess a dual-training approach, which scuffled due to flawed application and poor stakeholder engagement. They stressed that successful changes depend on strong partnerships and efficient implementation. Despite the unstructured nature of Ghana's apprenticeship system, attempts led by the CTVET focused on formalising and

standardising the procedure, guaranteeing that programs meet industry standards and improve apprentices' employability (Osei & Ayim, 2022).

3.6.3 Standards and Evaluation Systems in South Africa

Apprenticeship training programs in South Africa are aimed at providing apprentices with the necessary skills to meet national labour market demands, especially in industries such as engineering, construction and electrical work (Ngcobo & Mkhize, 2020). These programs are part of wider TVET programs and are important in providing skilled labour. Puchert *et al.* (2022) explored a South African automotive organisation's apprentice selection procedure, highlighting the efficacy of a multi-phase screening strategy that could serve as a model for national programs. Iwara (2020) explained that an evaluation system should concentrate on both hands-on skills and theoretical knowledge, with apprentices assessing task performance and their comprehension of trade theories (Marumo, 2021). The ILO (2021) also noted obstacles such as social stigma and gender discrimination in South African apprenticeships.

Waxin *et al.* (2020) noted that the dual strategy guarantees that apprentices establish technical competence and problem-solving skills, with evaluations overseen by accredited bodies such as the QCTO to maintain consistency with industry requirements. Partnerships between the government, employers, and training providers are important for program progression. Hoidn and Statsny (2021) emphasise that changes such as the SDA and NSDS focus apprenticeship training programs, increasing quality and standardise evaluations, improving employability, and supporting economic development. The standards and evaluation system within the South African context are presented below:

3.6.3.1 National Qualifications Framework

The South African government, in collaboration with fundamental industry associates such as the QCTO, NAMB and SETAs, plays an important role in designing the national structure for apprenticeship training programs. According to the SAQA (2023), these stakeholders work collaboratively to develop and execute precise protocols and evaluate systems, thereby guaranteeing that apprenticeship training programs remain

pertinent and responsive. As Tshabalala (2022) noted, these aligned strategies assist in coordinating educational programs with the evolving requirements of the national labour market. Central to this legislative structure is the NQF, which, as Powell and Reddy (2018) suggest, plays a crucial role in securing the quality and pertinence of vocational education and apprenticeship initiatives. Huber *et al.* (2024) further argue that the NQF systematically arranges qualifications into a chain of command, ranging from foundational to advanced levels, thereby promoting coherence and consistency in training and evaluations throughout the education system, as supported by Boateng and Baffour-Awuah (2023).

Moreover, Demir (2021) asserts that apprenticeship training programs in South Africa are systematically designed around essential capabilities entrenched in qualifications at NQF Levels 2 to 4. As Udechukwu and Essien (2020) explain, these capabilities include the theoretical knowledge and hands-on experience that apprentices are expected to obtain. According to Einboden *et al.* (2020), the SAQA manages the execution of these standards, guaranteeing that apprenticeship training programs remain high in quality and responsive to labour market standards. In support of this, Foerster *et al.* (2020) maintain that SAQA's negligence ensures that apprentices' skills are evaluated through nationally standardised certification procedures that confirm the reliability of qualifications. Furthermore, as Allais and Ngcwangu (2023) observe, the NQF supports a formal strategy for apprenticeship training programs, guaranteeing that apprentices obtain defined capabilities nationally and universally recognised qualifications. According to Hippach-Schneider *et al.* (2022), this incorporated structure not only supports the establishments of a competent workforce but also intensifies the reliability and universal portability of South African apprenticeship credentials.

3.6.3.2 Quality Control for Trades and Occupations

QCTO is a fundamental institution in South Africa that is liable for managing the standards of apprenticeship training programs. According to Cavaglia *et al.* (2020) and the South African Department of Higher Education and Training (2021), the QCTO guarantees that these programs meet national and universal quality standards. As Altreiter (2021) explains, the QCTO establishes the needed curricula and evaluation system for occupational trades, guaranteeing that apprentices attain the required

competencies. Sawyer (2023) emphasises that apprentices undergo both formative and summative evaluations, with the final assessment conducted by independent evaluators to maintain fairness and objectivity. Papier (2021) underlines the QCTO's significant function in maintaining high-quality standards, whereas the Department of Higher Education and Training (2024) asserts that its oversight guarantees that apprenticeship training programs produce qualified, employable workers who meet universal expectations.

3.6.4 Challenges and Barriers in Apprenticeship Training Programs

Smith and Foley (2021) noted that apprenticeship training programs are significant for bridging structured education with labour market requirements. However, their effect is frequently prohibited by constant structural, organisational and systemic obstacles. Fundamental issues, as emphasised by Hertog (2020), include a lack of collaboration among stakeholders, incoherent training standards, resource limitations and restricted employer engagement, especially among SMEs. Ultimately, Iwara (2020) argues that these challenges degrade the quality and receptiveness of programs, preventing multiple strategies from efficiently establishing a workforce aligned with national economic requirements. The points below explore this discussion further:

3.6.4.1 Inconsistent Stakeholder Engagement and Collaboration

In South Africa, apprenticeship training programs face fundamental obstacles due to the lack of collaboration among stakeholders such as the DHET, SETAs, employers and educational institutions (Dela Cruz, 2022). Mirabel *et al.* (2022) argue that disunified stakeholder participation frequently leads to apprenticeship training programs that are misaligned with industry standards. The primary focus is the minimum participation of SMEs in establishing apprenticeship standards, leading to a shortage of training content and workplace requirements (Demir, 2021). Without employer input, apprentices lack the practical experience needed for their professional careers (Adewumi, 2021).

This barrier is not specific to South Africa. Countries such as the UK and Germany also scuffle to balance the interests of employers, unions and education providers. Chadwick *et al.* (2024) identify incoherent stakeholder involvement and unclear

liabilities as primary challenges to efficacious apprenticeship delivery. Employers frequently encounter time and resource constraints, which prohibit their participation in shaping standards (Lubbe & Svensson, 2022). These coordination challenges obstruct the establishment of clear, industry-specific training structures (Department of Higher Education and Training, 2024), eventually undermining the receptiveness and efficiency of apprenticeship systems (Department of Higher Education and Training, 2021).

3.6.4.2 Evolving Industry Needs and Technological Advancements

Apprenticeship training programs universally encounter obstacles in aligning with rapidly evolving industries, especially in industries such as digital technologies, green energy, and advanced manufacturing. Butler-Henderson and Crawford (2020) note that antiquated apprenticeship standards establish a shortage between training standards and industry standards. This inadequacy is apparent in South Africa, where Murcio *et al.* (2021) reported a significant skill gap in critical industries such as engineering and healthcare. Sheather and Slattery (2021) argue that constant shortages in apprenticeship standards hamper vocational training and intensify the disparity with industry requirements. The obstacle of antiquated apprenticeship standards is not specific to South Africa. Langthaler *et al.* (2022) argue that various countries scuffle to reform their apprenticeship training programs to keep abreast of technological enhancements. In the UK, Euler (2020) observes that traditional apprenticeship programs, in manufacturing and construction, overlook the digital skills constantly required by employers. Similarly, Lubbe and Svensson (2022) advocate for changes to guarantee that apprenticeship training programs remain applicable in the face of technological evolution.

Conversely, certain countries are advancing to modernise their apprenticeship systems. McGrath and Vos (2021) report that in Canada, apprenticeship training programs incorporate digital technologies to meet future workforce requirements. In Hong Kong, Sangwan and Singh (2022) discovered that apprenticeship training programs integrate digital and technical skills rapidly to meet digital economy requirements. These examples accentuate the importance of employing apprenticeship standards to align with industry standards and technological enhancements. Demir (2021) cautions that obsolete apprenticeship standards leave

apprentices unprepared for the advancing job market, whereas Li and Pilz (2023) note that outdated skills weaken competitiveness. Agyemang (2020) highlights that these shortfalls reflect a universal concern about apprenticeship systems' ability to adapt to the rapidly evolving labour market. Resolving these obstacles demands a concerted approach to upgrade apprenticeship standards, guaranteeing that they offer apprentices with the skills and competencies required to thrive in a rapidly transforming universal economy.

3.6.4.3 Varying Quality Assurance Processes

Boateng and Baffour-Awuah (2023) argue that while institutions such as QCTO, SETAs, and NAMB guarantee apprenticeship quality, there is a significant irregularity in their application throughout industries. In some cases, apprenticeships lack adequate accreditation or sufficient management, which leads to inconsistencies in standards and evaluation (South African Department of Higher Education and Training, 2021). Additionally, Butler-Henderson and Crawford (2020) believe that regulatory bodies in South Africa frequently encounter resource limitations, restricting their monitoring capabilities and assessment apprenticeship training programs efficiently. Altreiter (2021) notes that the outcomes are fragmented applications of standards, varying throughout multiple regions and industries.

Even in countries with comprehensive quality assurance systems, such as Germany and Australia, discrepancies persist, especially in smaller regions or with smaller training providers (Dela Cruz, 2022). These issues are consequences of inadequate tracking resources or conflicting legislation throughout multiple jurisdictions. Demir (2021) highlights that apprenticeship training programs may fail to produce proficient employees without constant quality assurance. Similarly, Lubbe and Svensson (2022) note obstacles in quality assurance in other countries, emphasising the necessity for efficient management to guarantee training relevance and efficacy.

3.6.4.4 Financial Constraints and Resource Limitations

Funding-related restrictions present key barriers to the efficacy of apprenticeship training programs in South Africa, especially for SMEs. Owing to restricted financial resources, Huber *et al.* (2024) suggest that many SMEs are hesitant to invest in

training, which compromises the establishment of a cohesive and sustainable system with constant standards. Banson (2022) further emphasise that this issue is aggravated by the shortfalls of skilled trainers and insufficient facilities in multiple regions, limiting access to quality training that aligns with national standards. Without adequate financial support, Mirabel *et al.* (2022) argue that both training providers and employers scuffle to provide enriching learning experiences, resulting in apprentices who are not prepared for the workforce. According to the Federation of Small Businesses (2024), only a small percentage of SMEs would continue apprenticeships without government funding, with most opting to minimise or discontinue involvement if subsidies were withdrawn.

Moreover, Lubbe and Svensson (2022) point to common financial challenges in the UK, where SMEs encounter barriers in providing apprenticeships owing to insufficient funding and constraint incentives. The 2017 Apprenticeship Levy caused a 49% drop in SME apprenticeship starting in 2020/21 due to stringent regulations, ill-suited courses, and weak program fit (CIPD, 2023). As a result, businesses returned £4.4 billion in surplus funds to the Treasury (The Times, 2023). These trends underscore the urgent need for stronger funding methods, tailored support for SMEs, and changes to the apprenticeship framework to better resolve transforming industry standards and economic realities.

3.7 ENHANCING TRAINER SKILLS FOR BETTER APPRENTICESHIP OUTCOMES

Foerster *et al.* (2020) highlight the significance of clear standards and evaluation guidelines in apprenticeship training programs, which are important for enriching apprentices with transferable skills that enhance career prospects and economic development. These apprenticeship training programs bridge education and the workforce by enriching apprentices with industry-relevant proficiencies. However, Allais and Ngcwangu (2023) caution that establishing these standards remains an essential obstacle, both within South Africa and universally. Dela Cruz (2022) distinguishes primary challenges to hands-on apprenticeships, including weak stakeholder involvement, poor quality assurance, restricted funding, and continuous technological reform. Demir (2021) concurs, noting that these factors considerably compromise the reactivity and effectiveness of training systems. Leo (2022) notes that restricted partnerships among the government, industry, education, and

employers prohibit programs from adapting to local and sectoral standards. Butler-Henderson and Crawford (2020) argue that apprenticeship success depends on continuous engagement and reformed training, particularly in fast-changing fields such as digital technology and green energy.

Sinclair and Rockwell (2021) highlight that antiquated systems scuffle to align with technological enhancements, as evidenced by obstacles in the UK. McGrath *et al.* (2020) report that legislative bodies frequently have insufficient resources to assess programs, leading to inconsistencies in quality. Lubbe and Svensson (2022) add that without rigorous monitoring, apprentices may find employment ill prepared. Financial limitations, particularly among SMEs, further restrict access to quality training, resulting in inconsistencies in countries such as South Africa, Germany, and Australia (Dela Cruz, 2022). Graf and Lohse (2021) advocate for adaptable, well-financed apprenticeship systems to meet the transforming standards of the labour market. Kuczera (2021) adds that programs must evolve in tandem with economic and technological standards, enhancing engagement throughout industries. Akabike (2020) stresses that fostering quality assurance, funding, and stakeholder involvement is essential to reinforcing apprenticeships as a career path to employment and economic stability.

3.8 IMPACT OF MENTOR-LED APPRENTICESHIPS ON SME PRODUCTIVITY, INNOVATION AND PERFORMANCE

Assaf (2021) highlights that the mentor–apprentice relationship is essential to effective OJT training, cultivating technical knowledge transfer and hands-on skill establishment. Hainke and Pfeiffer (2021) explain that mentors draw upon their professional experience to mentor apprentices, build confidence and support skill establishment through practical engagement. Complementing this viewpoint, Alpizar, Adesope and Wong (2020) observe that apprentices provide fresh ideas and tech insights, strengthening learning and demanding traditional practices. This mutual exchange promotes an interactive learning system, which, as noted by Assaf, Nunziante-Cesaro, Gopher and Vanditti (2023), allows both mentors and apprentices to jointly create knowledge, adapt to transforming workplace requirements and enrich organisational collaboration. Furthermore, Iliyasu and Etikan (2021) emphasise that apprenticeship training programs combine theory with practice, allowing apprentices

to execute knowledge with mentor guidance. In support of this, Puppe, Jossberger and Gruber (2021) argue that such training not only improves technical proficiency but also motivates the establishment of personal growth, as apprentices embrace greater accountability in their learning procedures. Expanding on this idea, Brown and Taylor (2023) assert that the self-directed aspect of apprenticeship is critical for promoting adaptability and independence in developing professionals.

From a strategic standpoint, apprenticeship training programs provide essential benefits for SMEs. Hult *et al.* (2022) and Cahuc and Hervein (2021) indicate that apprentices contribute directly to productivity by resolving urgent operational requirements and filling context-specific competency shortfalls. Regardless of the start-up cost and time constraints, Tsui and Chen (2020) and Nilsson (2022) find that long-term advantages such as evolution, employee retention and minimum recruitment costs frequently surpass these obstacles. Hughes and Saieva (2021) indicate that training apprentices familiar with the organisation's ethos enhances onboarding and facilitates strategic alignment. Nevertheless, Barker (2020) highlights that accessing government financing, such as SDLs, continues to be a considerable obstacle for countless SMEs, initially due to administrative hurdles and restricted awareness. Hofmann, Zelenka and Savadogo (2022) recommend easier funding and targeted support to enhance SME engagement in skill establishment. Hughes and Saieva (2021) also highlight coordinating apprenticeships with market reforms and new technologies to remain relevant and competitive. Ultimately, Bobkov, Simonova and Chernykh (2022) conclude that strong mentor–apprentice ties within formal training drive personal development, business success and economic stability. The following section discusses the mutual benefits shared between apprentices and mentors.

3.8.1 Benefits for Apprentices and Mentors

Scalise Sugiyama (2021) emphasises that mentorship essentially affects career development. For example, Asaf *et al.* (2023) note that mentees are more likely to pursue higher education, partake in extracurricular activities and embrace leadership designations. This finding is further supported by Iliyasu and Etikan (2021), who reported that mentored youth in the United States are 76% more prone to attend college enrolment and graduation than their non-mentored peers are. Additionally,

Nowell (2023) observes that mentored apprentices are more influenced to volunteer often and take leadership jobs in community organisations. In addition to providing benefits, apprenticeships contribute to business success by offering a stable pipeline of industry experts. Employers report increased productivity, minimised recruitment costs, and increased employee longevity. For example, Pargeter, Liu, Beney Kilgore, Majoe and Stout (2023) find that 91% of apprentices in the United States retained their employment nine months after completing their programs. Moreover, Gandon *et al.* (2020) argue that apprentices from underrepresented backgrounds obtain confidence, respect and career success through hands-on and academic training, benefiting apprentices and organisations.

In the South African context, Torres and Preysler (2020) observe that mentorship within graduate internship programs is connected to higher retention rates. Asaf (2021) noted that a study in the ICT sector revealed that mentorship essentially minimised interns' intent to quit and increased the likelihood of mentors providing permanent employment upon program completion. In a broader context, Centi *et al.* (2023) reveal that mentorship plays a fundamental role in South African entrepreneurs' business development, especially in revenue development. Similarly, Nassary (2020) emphasises that entrepreneurs report both personal and business-related advantages from mentorship, with female entrepreneurs expressing more positive viewpoints than their male counterparts do. Abu Daqar and Constantinovits (2021) emphasise that mentorship programs in South African organisations enhance insight transfer, skill enhancement and confidence-building. These programs provide mentees with significant understanding of industry standards and company ethos, accelerating their career progression.

3.9 RECOMMENDATION FOR POLICY AND IMPLEMENTATION

Optimising apprenticeship training programs within South African manufacturing SMEs demands a strategic approach for improving the establishment of vocational skills. In this context, Riede *et al.* (2023) highlight the importance of improving active employer engagement in building and executing training initiatives. Moreover, Dauti *et al.* (2020) emphasise that these systems must be systematically aligned with industry-specific competency standards and the innovating standards of the labour market. Recommendations for legislation and execution are discussed below in detail.

3.9.1 Strengthen Employer Engagement and Collaboration

According to González (2022), active employer engagement is crucial in designing the content and framework of apprenticeship training programs. Building on this, Einboden *et al.* (2021) propose the development of advisory bodies composed of SME representatives as a hands-on approach to bridging industry-specific skills shortfalls and guiding the establishment of industry-applicable curricula. Complementing this technique, Martinez and Navarro (2021) emphasise the importance of structured engagements between training providers and industry to deliver comprehensive theoretical and hands-on learning. Executing rigorous financial support systems is equally important for supporting and maintaining these initiatives. Ehteshami (2020) suggests that tailored incentives such as tax benefits and subsidies can efficiently motivate SME involvement in apprenticeship training programs. Similarly, Pargeter *et al.* (2023) emphasise the significance of collaboration between education and industry to offer training aligned with manufacturing industry standards. In this context, Thorne (2020) states that the government and industry can support SMEs hosting apprentices through tax relief and subsidies.

3.9.2 Enhance Skills Development and Curriculum Relevance

MacQueen and Aiken (2020) highlight that apprenticeship training program content must constantly be aligned with modern industry benchmarks to foster both the employability and productivity of apprentices. In light of this, Markowitsch and Wittig (2020) stress the need for SMEs to reform apprenticeship curricula to be in line with technological and workplace evolution frequently. Nzowa (2020) highlights the increasing necessity for modular, flexible learning to meet evolving industry standards. Similarly, Nilsson (2022) notes that flexible training meets various training necessities and specialisation in areas such as quality control, lean manufacturing, and advanced equipment.

Reinforcing this view, Puppe *et al.* (2021) stress that adaptive training frameworks are important for sustaining relevance in an industrial environment of consistent transformation. In addition to technical skills, soft skills enhancement has emerged as an essential aspect of practical apprenticeship training programs. Pan and Ressin (2022) assert that competencies such as critical thinking, teamwork, communication

and leadership are significant in today's workplace. Similarly, Kashif and Tahir (2020) contend that these soft skills promote apprentice career opportunities and are esteemed by employers, who prioritise resilience and partnership. Therefore, as Nassary (2020) concludes, a comprehensive apprenticeship training program must incorporate technical experience and soft skill enhancement to improve a multifaceted workforce that is competent in meeting the complex standards of contemporary industry and supporting efficient policy application.

3.9.3 Strengthen Mentorship and On-the-job Training

Ringle, Wende and Becker (2022) propose that experts and committed employees should play a primary role in mentoring apprentices. Garavan, McCarthy and Carbery (2020) stress that their engagement guarantees quality, real-world learning aimed at critical thinking and hands-on skills. In this context, Kuruppu, Kavirathne and Karunarathna (2021) state that mentorship helps bridge the gap between academic learning and workplace requirements. Supporting this viewpoint, Sani *et al.* (2021) argue that hands-on apprenticeship training programs must include substantial OJT experience within authentic manufacturing settings, permitting apprentices to learn first-hand from qualified artisans. Similarly, Smith (2021) strengthens the significance of practical training in establishing job-ready skills for thriving in today's competitive industrial landscape.

Einboden *et al.* (2021) emphasise the benefits of Germany's dual-training system, which incorporates structured education with OJT training for a comprehensive learning experience. As illustrated by Luo, Ma and Li (2021), universal training systems assist apprentices in incorporating theory in practice, reinforcing both insight and skills. On the basis of this evidence, Bhatti, Soomro, and Shah (2021) advocate the integration of formal mentorship in dual-training structures to modernise and intensify apprenticeship systems. Ultimately, incorporated approaches are important for keeping apprenticeship programs applicable, adaptable and aligned with the transforming requirements of the manufacturing industry.

3.10 IMPACT OF ON-THE-JOB TRAINING IN THE WORKPLACE

Stalder and Lüthi (2020) state that OJT is important for building workplace proficiencies and enhancing skills in apprenticeship and vocational training. Liu and Phelps (2020) note that OJT assists in designing the workplace by providing apprentices with real-world training. However, Verick (2021) notes that OJT efficacy differs by country, industry and apprenticeship framework. Regardless of the variations, Wahlström, Olsson, Öhberg, Olsson and Järvholm (2020) highlight that OJT's main objectives remain constant, offering practical learning, intensifying competencies and fostering apprentices' employability. A detailed discussion of the effect of OJT is presented below.

3.10.1 Positive Outcomes of On-the-job Training in the Workplace

Wenger, Sauli and Berger (2022) state that South African TVET apprenticeships focus on providing hands-on, industry-relevant skills in fields such as engineering and construction. Sani *et al.* (2021) state that these programs assist in the resolution of inadequate skills and support economic development by training apprentices in the workplace. In this context, Markowitsch and Wittig (2020) point to universal models, such as Germany's dual-training model, as exemplary standards. As noted by Liu and Phelps (2020), these systems efficiently combine academic learning with practical training, developing technically experienced and employment-ready graduates. In South Africa, OJT is fundamental to apprenticeship success, fostering youth marketability and bridging the skills shortfall (Santagata *et al.*, 2021). As Lu *et al.* (2020) observe, many apprentices obtain long-term employment with the host companies. OJT allows the acquisition of hands-on competencies that theoretical learning alone does not achieve. Scheiner (2021) notes that countries such as Switzerland and Australia link apprenticeships to high employment and retention in construction and electrical trades.

Furthermore, Stockero (2021) emphasise that apprenticeships enhance SME productivity by incorporating an experienced workforce into daily operations, growth development and competitiveness. Verick (2021) notes that these programs develop soft skills such as teamwork, communication and critical thinking to prepare adaptable graduates. Van Es and Sherin (2021) emphasise that South African initiatives are

becoming more comprehensive, aiming at disadvantaged groups such as people with disabilities and women in non-traditional trades to foster workplace diversity and equity. Taken together, as Tsui and Chen (2020) conclude, apprenticeship training programs are essential in developing a skilled, inclusive and resilient workforce aligned with the country's wider enhanced objectives.

3.10.2 Negative Outcomes of On-the-job Training in the Workplace

OJT can be advantageous; however, when executed poorly, it may lead to multiple negative outcomes. A major concern that Mathew and Aithal (2020) raised is adequate mentorship in South African SMEs, where mentors may be unskilled or lack patience and pedagogical skills to mentor apprentices. Louie, Adiredja and Jessup (2021) further explained that some mentors are intimidated by apprentices, leading to an unwillingness to offer quality training. This dynamic can result in poor skill development, demotivation, and increased dropout rates. Moreover, Moon (2019) points out that antiquated curricula and poor industry collaboration frequently cause training to be misaligned with existing labour market requirements, ultimately restricting employability. Louie *et al.* (2021) note that resource limitations in smaller organisations restrict access to contemporary machinery and infrastructure, weakening training quality.

In addition, Dauti *et al.* (2020) emphasise that reluctance from experts can establish a toxic workplace, prohibiting apprentices' training and future prospects. If reluctance from experts remains unresolved, employees can diminish the efficacy of OJT and prohibit the establishment of a skilled, adaptable workforce. Furthermore, Umeokafor (2021) emphasise that apprentices frequently encounter gender- and race-based discrimination, which can create a hostile learning environment and obstruct professional development. Smith (2021) also notes that non-communication and collaboration between training institutions and employers aggravate these obstacles, whereas Wahlström *et al.* (2020) believe this results in a mismatch between the skills taught in training programs and those actually required in the workplace.

3.11 ON-THE-JOB TRAINING SKILL SHORTAGES AND TRAINING GAPS

Historically, South Africa's manufacturing industry has relied on large organisations, such as Eskom and ArcelorMittal, to execute formal OJT focused on fostering technical proficiency and productivity, supported by government incentives (Akolgo-Azupogo, Rubens & Bardy, 2021; Demir, 2021). Despite this tradition, skills gaps remain a constant obstacle (Friesen & Kuntze, 2021). Aruho, Nuwatuhaire, Manyange and Bateyo. (2022) emphasise a mismatch between training supply and industry standards, which has led employers to depend highly on foreign skilled labour, further demotivating investment in local talent.

This dependence emphasises shortcomings in post-school education, where objectives such as training 30,000 artisans yearly by 2030 are prohibited by elderly employees, emigration, and falling enrolments (Aithal, 2023; Akanbi, 2021). Many new entrants also lack hands-on experience and fundamental STEM skills (Liu & Phelps, 2020; Sangwan & Singh, 2022). Ivars, Fernández and Llinares (2020) argue that an integrated training method that combines theory, simulation and workplace learning restricts progress. Adams and Turner (2021) noted that realising the National Artisan Strategy's vision will therefore require systemic change and multi-industry partnerships.

Matsuo and Tsukube (2020) stress the importance of rigorous collaboration among SETAs, workplaces and accredited providers, whereas Konstantinou and Miller (2020) highlight the government's function in coordination. As noted in Germany, Austria and the Netherlands, European dual systems efficiently incorporate vocational and academic learning, minimising youth unemployment and easing school-to-work transitions (Dobrydina, Usvyat & Shipilova, 2019).

However, its application remains a challenge in multiple African and Middle Eastern countries because of antiquated curricula, restricted resources, and shortfalls of expert instructors (United Nations, 2020). Even in Europe, demographic standards such as elderly populations and falling birth rates add to consistent skill shortfalls (Bratti *et al.*, 2022; Statista, 2024). The pandemic further revealed vulnerabilities in education-to-employment pathways, encouraging immigration changes to attract experts (Abdullah *et al.*, 2019; Drewery *et al.*, 2020; Liu & Phelps, 2020). South

Africa's skills challenges in manufacturing reflect universal patterns. Notably, Dindyal *et al.* (2021) allude that conquering them will require extensive training, structural transformation, and more substantial alignment between education and labour market requirements, supported by integrated public–private collaborations.

3.12 CHAPTER SUMMARY

Chapter 3 examined apprenticeship training programs across Nigeria, Ghana, and South Africa, focusing on standards, evaluation systems, and implementation challenges. In Nigeria and Ghana, apprenticeship programs combine practical and theoretical training, often supported by mentorship, but face issues such as inconsistent quality, antiquated equipment, and uneven regional standards. South Africa has developed structured apprenticeship systems aligned with national labour market needs through formal frameworks and regulatory bodies, ensuring certification and competency assessments. Despite these structures, challenges such as limited stakeholder collaboration, inadequate SME engagement, evolving industry demands, technological changes, and financial constraints continue to hinder consistent delivery of high-quality training.

The chapter also highlighted the critical role of mentorship and on-the-job training in developing apprentice skills, employability, and SME productivity. Strong mentor–apprentice relationships facilitate knowledge transfer, technical competence, and innovation, while poorly executed training can limit skill development and create negative learning environments. Skills shortages in the manufacturing sector are further compounded by gaps in hands-on experience, foundational knowledge, and alignment between education and industry needs. Addressing these challenges requires strengthened employer engagement, adaptive and relevant curricula, structured mentorship, and integrated public–private partnerships to ensure apprenticeship programs remain effective, responsive to technological and market changes, and supportive of workforce development.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 INTRODUCTION

Adomako *et al.* (2021) emphasise the significance of developing a clear and meticulous methodological structure to guarantee the credibility and reliability of research findings. This chapter offers a thorough explanation of the research design and methods employed for the study of apprenticeship training programs in South African manufacturing SMEs. First, it explores the notion of trustworthiness, aiming at its four main aspects: credibility, dependability, transferability and confirmability. The chapter highlights the data analysis processes, including the use of thematic analysis supported by software tools such as ATLAS.ti. Version 25 Scientific Software Development GmbH. The section on data storage highlights safe handling of confidential information to maintain participant confidentiality and data integrity.

Cloutier and Ravasi (2021) further stress the necessity for transparency in research practices, which is resolved through a discussion of the study's restrictions and delimitations, acknowledging factors that may impact generalisability and scope. Smith and Lee (2023) highlight the significance of eradicating bias, and this chapter examines approaches such as reflexivity, triangulation, peer debriefing, and member checking to improve objectivity. Finally, Cartel *et al.* (2022) and Brixiová *et al.* (2020) emphasise ethical considerations that are important for safeguarding participant rights and guaranteeing research integrity. This section concludes with a thorough analysis of ethical principles, including voluntary participation, informed consent, confidentiality and risk mitigation. Collectively, these factors offer formal and ethical groundwork for the study's implementation and reporting.

4.2 RESEARCH PHILOSOPHY

Research philosophy refers to the fundamental beliefs about the nature of knowledge and how it is acquired. In accordance with Brixiová *et al.* (2020), it designs the researcher's inquiry strategy, influencing the data collection, examination and interpretation processes. Knowles, Andrews and Robin (2024) further explain that viewpoints such as positivism, interpretivism, constructivism and pragmatism offer diverse viewpoints on how knowledge is comprehended and developed.

This study follows an interpretivist philosophy, which is appropriate for examining the first-hand experiences of apprentices, trainers and SME employers in South Africa's manufacturing industry. Interpretivism follows a relativistic ontology, realising that individual viewpoints construct diverse realities. The process follows a subjectivist epistemology, where knowledge is jointly generated through socialising and context. As noted by Drewery *et al.* (2020), interpretivism views reality as being socially built and designed on the basis of first-hand experiences, making it a suitable philosophical groundwork for this study, which examines apprenticeship training programs within South African manufacturing SMEs. This view aligns with the study's goal of comprehending how apprentices, trainers, and managers view and react to obstacles related to mentorship, curriculum application and workplace learning. As supported by Guthrie *et al.* (2022) and McMahon, Spillane and Bradley (2023), interpretivist techniques have been efficient in capturing the interpersonal and contextual factors of apprenticeship that quantitative processes may overlook. Furthermore, Sharma and Singh (2021) and Rudhumbu (2021) indicated that interpretivism illuminates the challenges of learning in unstructured or resource-restricted settings, as it illustrates how cultural and institutional dynamics influence training practices.

As highlighted by Adomako *et al.* (2021), interpretivism is suitable for qualitative inquiries aimed at capturing rich, subjective experiences. In alignment with this, the study utilises semi-structured interviews and purposive sampling to gain insight into those directly involved in training. According to Ehteshami (2020), interpretivism validates the existence of various realities, which allows this research to examine diverse interpretations of apprenticeship throughout multiple SMEs and institutions. Similarly, Powell and McGrath (2021) utilised this strategy to explore unstructured apprenticeships in South Africa, arguing that only interpretivist techniques could fully capture the socio-cultural and economic trends at play. Therefore, interpretivism offers a fitting structure for this study by allowing the collection of extensive, contextual understanding that guides the establishment of a responsive and inclusive apprenticeship training program targeted at the requirements of SMEs in the South African manufacturing industry.

4.3 RESEARCH APPROACH

Creswell and Creswell (2022) define a research approach as the overarching plan and structure that guides the research process, encompassing the assumptions, techniques, and processes utilised for data collection and analysis. Consequently, it acts as a blueprint for inquiry, guiding the selection of qualitative, quantitative and mixed-methods techniques based on the nature of the research problem and objectives. Moreover, Saunders, Lewis and Thornhill (2019) highlight that a research approach develops a link between theory and hands-on training, thereby guaranteeing that the selected methods align with the philosophical foundations and intended outcomes of the study. In this study, the research approach is the overarching technique that directs the examination of OJT, mentorship and apprenticeship efficacy within South Africa's manufacturing SMEs. The qualitative approach determines how knowledge is constructed, what processes are used to collect data and how findings are analysed. Given the difficulty, real-world nature of apprenticeship systems and the involvement of different stakeholders, this research adopts a qualitative, interpretivist approach, focusing on comprehending first-hand experiences, institutional obstacles and systemic shortfalls in VET.

The inductive technique provides a robust structure for this study, as it improves the establishment of the environmentally informed knowledge necessary to resolve the unique obstacles of apprenticeship training programs in South African SMEs. This choice is better corroborated by both African and American research, which highlights the adaptability and applicability of inductive methodologies in dynamic and developing vocational education and workforce-enhanced settings. The inductive technique is suited for this study because it allows the establishment of new structures and theories grounded in empirical evidence, which is critical when resolving difficult and context-specific obstacles encountered by apprenticeship training programs within South African manufacturing SMEs. In contrast to deductive processes that examine pre-existing theories, the inductive technique enables researchers to examine real-world conditions, distinguish developing patterns and establish knowledge that is applicable and flexible to South Africa's unique socio-economic and industrial environment. This technique proves valuable in contexts where previous research is restricted or where current models may not fully capture local complexities,

such as the various requirements of SMEs and the innovating demands of the manufacturing industry.

In support of this viewpoint, Aruho *et al.* (2022) highlight that addressing a lack of skills and integrating training programs with industry standards in South African manufacturing industries requires a context-driven and exploratory methodology, allowing new knowledge to be generated from direct stakeholder participation. Similarly, Dindyal *et al.* (2021) contend that the dynamic and frequently disjointed vocational education systems in Africa need inductive techniques to completely comprehend systemic obstacles and collectively formulate hands-on solutions. Furthermore, supporting evidence from studies in the United States strengthens the value of inductive techniques in workforce enhancement research. Garavan, McCarthy and Carbery (2020) demonstrate that the inductive approach plays an essential role in designing mentorship and apprenticeship training programs that efficiently respond to rapidly innovating technological standards and labour market requirements. In addition, Liu and Phelps (2020) illustrate how inductive processes uncover misalignments between theoretical teaching and workplace requirements, thereby facilitating the establishment of more customised and efficient vocational training structures.

4.4 METHODOLOGICAL CHOICE

Knowles, Andrews and Robin (2024) define methodological choice as the researcher's selection of a qualitative, quantitative, or mixed method, directed by the research problem, questions and philosophical premise. Brink and van Rensburg (2023) emphasise that this choice must align with the study's epistemological viewpoint to guarantee consistency and methodological integrity. McMahon, Spillane and Bradley (2023) highlight that selecting the correct methodology intensifies research credibility by precisely capturing the intricacy of the phenomenon. Accordingly, this study employs a qualitative approach to examine participants' first-hand experiences in apprenticeship training programs.

A qualitative approach is well suited for this study, as it examines complex social phenomena through individuals' first-hand experiences and viewpoints. Drewery *et al.* (2020) note that qualitative processes enable deep involvement with participants to

examine the subjective meanings they assign to their experiences. This technique is aligned with the study's aim of exploring how trainers, managers and apprentices in South African manufacturing SMEs interpret and react to practical training obstacles. In support of this, Iwueke *et al.* (2020) emphasise that qualitative research enables systematic data collection and thematic analysis, which is significant for distinguishing patterns and relationships within comprehensive textual data. Therefore, the qualitative approach offers the in depth, flexible inquiry required to resolve the multifaceted dynamics of apprenticeship training programs in a way that quantitative methods may not sufficiently capture.

Moreover, this methodological choice aligns with the interpretivist paradigm that underpins the study. Cloutier and Ravasi (2021) explain that interpretivism perceives reality as being socially built and contextually embedded, making it appropriate for exploring human experiences in vocational training. As Brynard, Hanekom and Brynard (2021) argue, qualitative processes excel in encompassing the intricacy of human behaviour and institutional dynamics that cannot be efficiently represented through numerical data. This is pertinent when nuanced themes such as mentoring quality, curriculum applicability and policy execution are examined. Brink and van Rensburg (2023) further assert that qualitative research improves close researcher–participant interaction, which enables questions to be modified during data collection and illuminates greater understanding. This approach is efficient with semi-structured interviews, which provide both a framework and flexibility for apprentices and trainers to share meaningful reflections. Thematic analysis will then be applied to decipher the data, revealing repetitive themes and understandings that emerge from these narratives.

In addition, countless former studies have successfully implemented qualitative research methods in similar contexts, thereby validating the appropriateness of this technique. For example, Powell and McGrath (2021) used the capability technique to examine unstructured apprenticeships in South Africa, illustrating how vocational training supports poverty relief and human enhancement. Similarly, Guthrie *et al.* (2022) in Australia and Sharma and Singh (2021) in India adapted qualitative interviews and focus groups to analyse the function of mentoring and structural obstacles in vocational education systems. Bohle and Sampson (2021), studying

apprenticeships in Germany, reported that employer-led mentoring critically designed apprentices' professional identities, emphasising the value of qualitative inquiry in comprehending training environments.

Further reinforcing of this strategy is observed in studies such as Sani (2020), whose research in South Africa revealed the gender inequities faced by Black African women in male-centric technical fields. Similarly, Makgabaneng (2024) conducted qualitative interviews in Pretoria to examine how vocational education alternatives are determined by social customs and resource availability. These studies emphasise the intensity and contextual awareness that qualitative research offers when examining complex and frequently marginalised experiences. As highlighted by Brynard *et al.* (2021), such adaptability is vital for eliciting rich, validated outcomes. Therefore, utilising a qualitative technique with semi-structured interviews and thematic analysis is an admissible choice that aligns with the study's goal of improving apprenticeship training programs in South African manufacturing SMEs.

4.5 RESEARCH STRATEGIES

Saunders *et al.* (2019) explain that a research strategy interrelates a study's philosophical foundation to its execution, outlining the plan for data gathering, analysis and alignment with the chosen research approach. In line with the qualitative, interpretivist orientation of this study, the approach centres on examining first-hand knowledge and institutional processes within apprenticeship training programs. As emphasised by Ochwo, Wilson and Kasule (2023), qualitative methodologies are well suited for capturing the complex socio-cultural landscape that designs vocational education systems. Fischer and Kilpatrick (2023) further stress the importance of highlighting participants' views to reveal underlying factors that direct training objectives and learning settings.

The study embraces a case study strategy to examine apprenticeship training programs within practical organisational and educational environments. A case study is a comprehensive investigation of a contained system in its natural setting, which is useful when the confines between the phenomenon and its environment are uncertain. Cloutier and Ravasi (2021) highlighted that case study research is valuable for encompassing the richness and intricacy of organisational and institutional evolution

in applied social research. This technique aligns with the study's qualitative, interpretivist, and inductive structure, as it allows a thorough comprehension of context-specific evolution in designing vocational education in South African manufacturing SMEs. Adomako *et al.* (2021) assert that case studies advocate close relationships with participants and reveal nuanced realities, making them suitable for examining phenomena such as mentorship, curriculum application and on-the-job training. By exploring how training centres, colleges and SMEs collaborate in apprenticeship training programs, the case study provides an overarching, context-aware view of the system in practice.

A multiple-case study outline was selected to promote the credibility, depth, and transferability of the findings. As Brynard *et al.* (2021) note, multiple-case designs allow cross-case comparisons, providing a richer understanding of systemic patterns and diversity. Organisations were chosen utilising purposive sampling, an approach aligned with qualitative research and interpretivist paradigms, which focuses on data-rich cases pertinent to the research objectives (Saunders *et al.*, 2019). The chosen cases include a DHET-registered college for theoretical instruction, an accredited training centre for hands-on skills, and two SETA-approved SMEs providing formal on-the-job training and mentorship.

This sampling technique enables a comprehensive evaluation of apprenticeship applications throughout educational, training, and workplace landscapes. Adomako *et al.* (2021) highlight the importance of choosing multifaceted but integrated cases to examine multi-layered social systems. Similarly, Powell and McGrath (2021) emphasise that both structured and workplace-based learning contexts reinforce the analysis of vocational training models in South Africa. Studying these diverse actors offers a holistic comprehension of how cooperative institutional designs determine training outcomes in the manufacturing SME industry.

This methodological strategy has been carefully implemented in similar African contexts. Mtisi (2022) used a case study to explore rural enterprise establishment, illustrating the method's strength in resolving localised socio-economic challenges. Similarly, Powell and McGrath (2021) applied a case study technique in South Africa to examine the function of unstructured apprenticeships in promoting human ability

and eradicating poverty, further highlighting the importance of case studies in vocational education research within enhancing contexts.

4.6 TIME HORIZON

Saunders *et al.* (2023) define the time horizon as the duration over which data are collected, illustrating whether a study encompasses a single snapshot or various moments to investigate transformation or standards. Saunders *et al.* (2023) define the time horizon as the duration over which data are gathered, illustrating whether a study encompasses a single snapshot or multiple moments to investigate transformation or standards. Bell and Harper (2023) explained that a cross-sectional shape includes data collection occurring once, making it well suited for descriptive, exploratory, or explanatory research aimed at comprehending a certain moment. Nguyen and Thompson (2024) noted that this technique is effective and practical for studies with restricted time and resources and aligns well with qualitative methods such as semi-structured interviews that examine participants' viewpoints deeply within a fixed period. McCarthy and Li (2024) emphasise the benefits of cross-sectional designs, including rapid data gathering and analysis, cost effectiveness, and effectiveness in exploring relationships or phenomena that are stable over time. However, Turner *et al.* (2023) caution that cross-sectional studies cannot encompass changes over time and may be persuaded by transient factors specific to the time of data gathering. For example, this study adopts a cross-sectional design to examine the first-hand knowledge of apprentices and trainers in South African manufacturing SMEs at a single point, offering comprehensive contextual understanding without needing follow-up data.

4.7 TARGET POPULATION AND SAMPLING

Brynard *et al.* (2021) define the target population as a group of individuals on whom research is administered to allow significant outcomes. These participants are carefully curated based on their applicability to the research question, establishing the pool from which the sample is drawn. According to Marshal (2021), this selection is intentional and governed by attributes central to the study's objectives, such as expertise and direct engagement in apprenticeship training programs. In the context of this study, the target population consists of individuals with knowledge of and

experience with apprenticeship training programs within the manufacturing industry. Furthermore, Creswell and Poth (2021) emphasise that the determination of sample size focuses on participants who can offer rich, profound comprehension of the research topic. Importantly, the sample size is guided by the principle of data saturation, which occurs when additional data collection no longer yields new themes or information.

4.7.1 Target Population

The target population for this study consists of 46 individuals involved in apprenticeship training within South Africa's manufacturing SME sector. According to Brynard *et al.* (2021), a target population comprises individuals with attributes relevant to the research objectives from whom data can be meaningfully collected. The population is composed of four stakeholder groups directly involved in apprenticeship training delivery, namely: training centre lecturers, SME managers, workplace mentors, and training coordinators. These participants represent the key actors responsible for theoretical instruction, workplace-based learning, and apprenticeship supervision within the training ecosystem.

Although the study is framed within the broader South African manufacturing apprenticeship system, the empirical data was collected from selected provinces/regions within South Africa. The participating institutions therefore represent geographically situated case contexts rather than a nationally representative sample, and the findings should be interpreted as context-specific qualitative insights rather than generalisable national outcomes.

The total population of 46 individuals is distributed across four participating institutions involved in apprenticeship training. These institutions collectively contribute participants based on their functional roles in apprenticeship delivery rather than as the primary focus of analysis.

Niatec College contributed 15 participants (lecturers and management staff) responsible for theoretical and administrative training functions. Motar Machine Tools cc contributed 17 participants comprising managers and workplace mentors involved in structured apprenticeship supervision. Mbilipha Solutions (Pty) Ltd contributed 7

participants including managers and trade-specific mentors responsible for workplace-based training. Catom Training Centre contributed 7 participants consisting of qualified trainers and a Technical Training Manager involved in integrated theoretical and practical training delivery.

These participants were included due to their direct involvement in apprenticeship training processes across both institutional and workplace-based environments, ensuring representation of all key training modalities within the sector.

4.7.2 Sampling Strategy

Sampling strategies are processes used to select individuals, groups, or data sources from a larger population for study. Below are the common processes utilised in qualitative research:

Purposive sampling was utilised to nominate participants with first-hand knowledge in apprenticeship training programs, including apprentices, trainers and SME managers engaged in program design, supervision, or delivery. However, apprentices were not included as primary participants in the study as the research focused on institutional and industry perspectives responsible for the design, delivery, and supervision of apprenticeship training. The study aimed to explore system-level implementation, curriculum alignment, and training effectiveness from the viewpoint of decision-makers and implementers (college, training centre and SMEs), rather than recipients of training. This ensured depth of insight into governance, delivery structures, and workplace integration processes. In addition, excluding apprentices helped maintain a focused analytical scope and avoided role-based duplication of experiential data, given that trainers and SME supervisors directly oversee and assess apprentice performance.

The strategy guarantees the inclusion of data-rich cases pertinent to the research objectives (Palinkas *et al.*, 2015). According to Nyimbili and Nyimbili (2024), to guarantee reliability and consistency, the inclusion criteria required institutions to have at least two years of experience in training apprentices and participants to have at least two to four years in their roles. The selected college, enlisted with the DHET, offers theoretical teaching and includes lecturers with applicable experience. The

QCTO-accredited training centre, which has been operating for more than three years, contributes trainers registered with NAMB as assessors and moderators alongside a manager overseeing the training program execution. The centre also meets new occupational qualifications standards, with specialised theoretical and hands-on training facilities.

Two SMEs were selected because they supply formal workplace-based training. Motar Machine Tools cc, the manager interviewed, has over forty years of experience directing and administering apprenticeship activities. Mbilipha Solutions (Pty) Ltd., which has been functioning for more than four years, contributes a manager and two trainers, all of whom are experienced in on-the-job training and collaboration with education providers. These meticulously nominated participants guarantee multiple practical insights into the functioning of apprenticeship training programs within the manufacturing industry.

Snowball sampling, also known as chain-referral sampling, was additionally utilised in this study as a strategic access method rather than a convenience technique, due to the networked and practice-based nature of apprenticeship stakeholders. In the South African manufacturing apprenticeship context, relevant participants such as experienced trainers, SME supervisors, and apprentices are not always easily identifiable through formal databases or institutional listings. As a result, initial purposively selected participants assisted in identifying additional information-rich participants through professional networks. Snowball sampling was retained but further justified as a strategic access mechanism required to reach networked apprenticeship stakeholders who are not fully accessible through formal institutional listings, while maintaining inclusion criteria and methodological rigour. The final sample of 12 participants was distributed across the three institutional contexts, comprising 3 participants from the TVET college, 5 from the QCTO-accredited training centre, and 4 from SMEs involved in apprenticeship training.

It is important to note that the three participants involved in the pilot study were not included in the main study sample of 12 participants. The pilot participants were selected separately through purposive sampling from the broader population of individuals involved in apprenticeship training within the selected institutions. Their selection was based on their direct relevance to the research context and their

availability during the early stages of data collection. This ensured that the pilot study served exclusively as an instrument testing phase and did not influence or contaminate the main study data set.”

Snowball sampling is a non-probability approach commonly utilised in qualitative research to access unreachable or expert groups through participant recommendations. Nyimbili and Nyimbili (2024) reported that this process was adopted in their study to distinguish more participants, such as skilled trainers, SME managers and apprentices, who were not easily accessible through structured channels but provided vital insights into apprenticeship practices. According to Nguyen and Thompson (2024), snowball sampling builds on current social networks, developing trust and rapport, a significant element when examining sensitive or context-specific matters in vocational education. As Bell and Harper (2023) explain, this process complements purposive sampling by granting access to insider viewpoints that might otherwise be missed, particularly in unstructured or resource-constrained environments. In alignment with the study’s interpretivist structure, snowball sampling supported a flexible, participant-led technique for data collection constructed in real-world contexts. Importantly, all referred participants were still screened against the study’s inclusion criteria to ensure relevance and maintain methodological rigour.

4.7.3 Sample Size

In qualitative research, sample size is guided by the principle of purposive sampling and the achievement of data saturation, rather than statistical representativeness. This study adopted a purposive, multi-case sampling strategy in which participants were selected based on their direct involvement in apprenticeship training within South African manufacturing SMEs, TVET college and a training centre. This ensured that only information-rich cases capable of providing in-depth insight into the phenomenon under investigation were included.

Although the study is framed within the broader South African manufacturing apprenticeship system, the actual empirical data was collected from selected provinces/regions within the country. The participating institutions therefore represent geographically situated case contexts rather than a nationally representative sample.

As such, the findings are not intended to be statistically generalisable to all provinces in South Africa, but instead provide context-specific, analytical insights into apprenticeship training within comparable manufacturing SME environments.

A total of 12 participants were included in the study. This sample size is consistent with established qualitative research guidance, which indicates that smaller, carefully selected samples are appropriate when the aim is to generate rich, detailed and context-specific understanding (Creswell & Creswell, 2022; Fusch & Ness, 2020). Given the multi-case structure of this study, participants were distributed across key stakeholder groups, allowing for comparative thematic analysis across institutional contexts. The 12 participants were evenly distributed across the three institutional settings, with 3 participants drawn from the TVET college, 5 from the QCTO-accredited training centre, and 4 from SMEs involved in apprenticeship training. Data collection and analysis were conducted iteratively, and sampling continued until data saturation was reached, that is, the point at which no new themes, codes, or conceptual insights emerged from additional interviews. At this stage, further data collection yielded redundancy rather than novel information, confirming that sufficient depth and variation had been achieved (Mwita, 2022).

In addition, qualitative methodological literature supports sample sizes in this range for studies seeking analytical depth rather than generalisability, particularly where participants are selected for their direct experiential relevance to the research problem (Marshall, 2021; Squire, Giombi, Amoozegar & Williams, 2024). Therefore, the sample size of 12 is methodologically justified, appropriate to the study design and aligned with the objectives of generating rich, cross-case insights into apprenticeship training within the manufacturing sector.

4.8 RESEARCH INSTRUMENT

A research instrument is an instrument used by researchers to gather, measure, and interpret data related to a specific area of study. It serves as a link between the researcher and participants, facilitating the collection of data that are pertinent to answering the research questions. According to Kumar and Singh (2023), the choice of a research tool must be compatible with the study's design, target population and

the type of data needed, whether subjective experiences, measurable outcomes, or outward behaviours.

4.8.1 Semi-Structured Interviews

To gather extensive, contextual information on apprenticeship training programs in South African manufacturing SMEs, this study used semi-structured interviews as the primary research tool. This process was appropriate for the study's interpretivist and qualitative orientation, providing both structure and flexibility for probing the first-hand knowledge of participants. As noted by Buys *et al.* (2022), semi-structured interviews enable researchers to examine core themes while also confirming participants' narratives, making them pertinent for exploring complex, human-centred phenomena such as vocational education.

The use of a single semi-structured interview guide across the different institutional contexts (TVET college, training centre and SMEs) was deliberate and methodologically justified. Although these institutions differ in mandate and operational focus, they share common functional responsibilities within the apprenticeship system, including curriculum delivery, workplace-based learning coordination, mentorship, and competency development. The standardised instrument ensured comparability of responses across cases, enabling systematic cross-case thematic analysis. However, the semi-structured nature of the tool allowed for contextual probing and adaptation of questions to suit each participant's institutional role, thereby preserving depth and contextual sensitivity. This approach is consistent with qualitative multiple-case study designs, where a unified data collection framework is used to identify shared patterns while still capturing contextual variation across different organisational settings.

Prior to data collection, participants will be presented with clear knowledge about the study's aims, methods and ethical considerations, guaranteeing informed consent and enhanced transparency throughout the interview method (Naz, Gulab & Aslam, 2022). This ethical grounding not only fosters transparency but also intensifies the reliability and trustworthiness of the data.

Importantly, all the participants were excellent in the language of the interviews, eliminating the need for interpreters. This contributes to effective communication and helps preserve the nuance of participants' perceptions, which is especially important in capturing the socio-cultural dynamics of work-based training, mentorship and institutional integration. To accommodate different schedules and increase collaboration, interviews were conducted both face-to-face and online. This dual format maximised accessibility and convenience while sustaining data quality. As Arntson and Yoon (2023) observe, online interviews are progressively more efficient in qualitative research in geographically dispersed or time-restricted contexts. Overall, semi-structured interviews allow extensive analysis of participants' viewpoints while providing the flexibility to clarify meanings, follow-up on developing themes, and adapt the conversation flow based on responses. This technique is aligned with the study's objective of revealing context-specific insights to inform the establishment of a responsive apprenticeship structure specific to the requirements of SMEs in the South African manufacturing industry.

4.9 DATA COLLECTION

Data collection includes the systematic gathering of information to respond to research questions, with procedures specific to the study's philosophical and methodological groundwork. According to Newhart and Patten (2023), research tools must align with the nature of the inquiry, whether quantitative, qualitative or mixed processes. It is an important element of any research thesis because it offers the evidence base from which outcomes are concluded. Without systematically collected data, a thesis cannot provide reliable responses to its research questions or contribute valuable observations to academic or hands-on fields. Given the study's qualitative orientation, a variety of data collection approaches were utilised to guarantee the extensive reliability and triangulation of the findings.

The primary data collection instrument used in this study was a semi-structured interview guide, which was developed through an extensive review of literature on apprenticeship training, vocational education and training, curriculum alignment, workplace-based learning, and skills development frameworks.

An interview is a data collection technique used by researchers to be directly involved with participants to collect extensive insights into their viewpoint or experiences. The interviews may be formal, semi-formal, or informal, with semi-structured interviews providing a balance between constant and flexibility (Furlong, 2020). Semi-structured interviews served as a core data collection instrument because of their flexibility and ability to examine the extensive participants' first-hand knowledge. As noted by Ehteshami (2020), such interviews are efficacious in capturing thoughts, behaviours and social contexts. The participants were given interview questions prior to the interview sessions to foster reflection, and with informed consent, all interview sessions were audio-recorded to guarantee accuracy. Open-ended questions directed the conversations, encouraging comprehensive, participant-driven responses. In line with Brink and van Rensburg (2023), interviews were conducted both face-to-face and virtually, maximising accessibility while maintaining contextual depth.

The interview guide was not directly adopted from a single source but was adapted and synthesised from multiple existing studies and frameworks to ensure contextual relevance to South Africa's manufacturing apprenticeship system. The instrument was further refined to align with the study's conceptual framework, particularly focusing on curriculum relevance, mentorship, trainer competence, workplace-based learning, and policy implementation. To ensure validity and clarity, the interview guide was reviewed against the research objectives and piloted prior to full data collection, with minor refinements made to improve question clarity and flow.

To enhance the trustworthiness of the data collection instrument, the interview guide was evaluated for credibility, dependability, and alignment with the study's conceptual framework. This was achieved through expert review whereby the draft interview guide was discussed with the training centre manager and two client liaison officers from a SETA. These experts assessed the questions for clarity, relevance, and alignment with the research objectives. Their feedback was then used to refine and finalise the instrument prior to data collection.

Furthermore, a pilot test was conducted with a small number of participants who were not part of the main study to assess the clarity, sequencing, and interpretability of the questions. Feedback from the pilot study was used to refine and improve the wording and structure of the interview guide before full data collection commenced.

These measures ensured that the instrument was suitable for generating rich, consistent, and contextually relevant data aligned with the study's aim of exploring apprenticeship training systems in South Africa's manufacturing sector.

4.10 PILOT STUDY

According to Sokolova and Kefi (2020), a pilot study is a preliminary inquiry carried out on a small scale to evaluate the feasibility, duration and financial implications of a full-scale study. In this study, a pilot study was carried out to assess the efficacy of the data gathering tools, as highlighted by Cartel *et al.* (2022). The pilot aided in pinpointing possible complexities and limitations within the instruments and protocols, permitting essential modifications before the main data collection stage. Additionally, the pilot stage familiarised the researcher with the methodological methods, underpinning an informed decision to continue with semi-structured interviews over questionnaires, as suggested by Almansour *et al.* (2019).

The selection of three participants was informed by the UNISA minimum ethical and methodological requirement for pilot testing in qualitative research, where a small number of participants is deemed sufficient to evaluate instrument clarity, sequencing, and feasibility prior to full-scale data collection. The participants were identified through purposive sampling from the broader study population, based on their direct involvement in apprenticeship training within the selected institutional contexts (SMEs, training centre and a college) and their availability during the early phase of fieldwork. The sample size was therefore not intended for analytical generalisation, but for instrument refinement and procedural testing. These participants served as an experimental group to test interview strategies, refine study tools and evaluate logistical considerations.

The pilot study offered meaningful observations that informed primary modifications to the main data collection method. This approach enhanced the clarity of the interview questions, confirmed the efficiency of the semi-structured format, and emphasised logistical concerns such as venue-related distractions and audio quality. To resolve these issues, necessities were introduced to pre-arrange quiet, private interview environments. When this was not applicable, the participants were interviewed via Zoom or Teams.

The pilot study yielded several key findings that confirmed the appropriateness and reliability of the research instrument. Participants indicated that the interview questions were generally clear, relevant, and aligned with their experiences in apprenticeship training. However, minor refinements were made to improve question sequencing and clarity, particularly to ensure smoother transitions between themes such as curriculum relevance, workplace-based learning, and mentorship. The average interview duration of 35–50 minutes was found to be appropriate, indicating that the instrument was neither overly lengthy nor restrictive. Furthermore, no major conceptual gaps were identified in the interview guide, suggesting that it was valid in capturing the core constructs of the study. Overall, the pilot findings demonstrated that the instrument was methodologically sound, contextually appropriate, and capable of generating rich qualitative data for the main study.

4.11 TRUSTWORTHINESS

According to Adomako *et al.* (2021), trustworthiness is the belief placed in the findings, the presentation and the methodological strategies adopted to guarantee the study's merit. Consequently, developing trustworthiness is significant, as it allows future research to develop following the findings and enables the study to function as reliable groundwork for underpinning decisions. The following section underlines four fundamental requirements, namely, credibility, dependability, transferability and confirmability, that guarantee the trustworthiness of the study. These components are important for developing confidence in research procedures and their outcomes. Each criterion exclusively has a unique function in fostering the merit and dependability of the study.

4.11.1 Credibility

Cloutier and Ravasi (2021) explain that credibility pertains to the authenticity of the data origin and serves as a crucial element of whether the research outcomes can be trusted. Therefore, giving precedence to credibility and developing trust with participants fosters the researcher's contribution to the field and guarantees that accurate, precise outcomes successfully improve the body of knowledge. Prolonged participation enabled the researcher to build trust and strengthen contextual insight, whereas the use of open-ended questions motivated participants to partake freely and

genuinely. Member checking was conducted by sharing recorded transcripts with participants for evaluation and verification, guaranteeing that interpretations were truthful. Triangulation of data origins through semi-structured interviews and observational checklists further enhanced the credibility of the outcomes. Additionally, the researcher defined their role and purpose at the outset, improving honesty and sincerity. Collectively, these steps developed the study's overall reliability and guaranteed that the outcomes were both trustworthy and founded on the experiences of the participants.

4.11.2 Dependability

Burlea-Schiopoiu and Mihai (2019) define dependability as the method whereby participants are invited to evaluate and assess the research outcome, guaranteeing that the data accurately mirror their viewpoint. For the purpose of this study, the researcher maintained a tracking record, documenting every phase of the research procedure from the development of the research questions to data collection, coding and analysis. This included clear descriptions of the methodological strategy, sampling techniques, interview processes, and thematic analysis methods used. A pilot study was performed prior to the main data collection to assess the instruments and modify them where needed, fostering the consistency of the tools. Additionally, member checking was adopted, enabling participants to evaluate and authenticate the accuracy of their transcripts and interpretations. These approaches guaranteed that the research method was translucent, logical, and replicable, offering solid groundwork for future researchers to follow and build upon.

4.11.3 Transferability

Cartel *et al.* (2022) explain that transferability, as a major quality criterion, needs each methodological phase in the research procedure to meet the required standards of rigour and applicability. To guarantee transferability, the study integrated multiple deliberate techniques to offer an extensive, thorough account of the research method and context. First, a comprehensive observation of the South African manufacturing industry, the theoretical education and training environment, and the framework of apprenticeship training programs was offered, including data on institutional types such as SETA-certified SMEs and DHET-enlisted colleges, their training functions,

and participant demographics. The sampling rationale was specified, with inclusion standards requiring at least two years of institutional experience in apprenticeship delivery and applicability and hands-on-based roles for participants. A multiple-case study design was adopted, including four institutions, a college, a training centre and two SMEs, enabling multiple viewpoints and experiences. This increased the variety of the generalisability of the outcomes to similar contexts. Methodological triangulation further intensified transferability, as the data were collected through semi-structured interviews, first observations and institutional documents. Each stage of the data collection and analysis methods was transparently reported, including interview modes, durations, instruments used, and thematic coding strategies, providing a clear roadmap for replication or adaptation in other studies. Finally, the inclusion of participant quotations enhanced credibility and contextual depth, allowing readers to be involved directly with the voices and realities of those engaged in the apprenticeship ecosystem.

4.11.4 Confirmability

Eze (2023) defines confirmability as the measures executed to guarantee that the gathered data and outcomes remain free from bias. To guarantee confirmability, various phases were implemented to reduce researcher bias and maintain the objectivity of the outcomes. The utilisation of an unambiguous coding structure promoted clarity in compiling and interpreting the data, guaranteeing that the outcomes were solidly rooted in participant narratives rather than researcher assumptions. Triangulation was employed by gathering data from diverse origins, such as semi-structured interviews, observations and institutional documents, to cross-verify insights and minimise dependence on any single viewpoint. Member checking was also adopted, allowing participants to assess their transcripts and elaborate their responses, thereby promoting data precision and validity. Data coding was conducted using ATLAS.ti Version 25 Scientific Software Development GmbH, which organises a methodical and translucent technique to establish themes and enables all interpretations to be traced back to specific data extracts. A sequence of evidence was maintained, integrating raw data, coding categories and final themes, which allows external reviewers to follow each analytical phase and evaluate the neutrality of conclusions. Additionally, pseudonymised data and systemic records were securely

stored and made available for potential review, supporting the integrity and verifiability of the research. Collectively, these techniques guaranteed that the study's findings were trustworthy, data-driven and free from unjustified researcher influence.

4.12 DATA ANALYSIS

According to Adomako *et al.* (2021), data analysis includes tabulating, exploring, and classifying evidence to establish research outcomes. Similarly, Assadinia, Boso, Hultman and Robson (2019) described it as organising gathered data into a logical form from which well-considered decisions can be made. software. Cloutier and Ravasi (2021) noted that ATLAS.ti Version 25 Scientific Software Development GmbH aids in managing, coding, and analysing qualitative data by creating thematic codes and visual network diagrams. In addition, the researcher used Microsoft Word and Excel to refine and classify the recurring themes presented in Chapter Five. These instruments supported the analysis of interview data aimed at establishing challenges to on-the-job training in manufacturing SMEs and exploring its effect on employment development and business profitability.

4.12.1 Thematic Analysis

This study adopted a contemporary thematic analysis structure as delineated by Nowell *et al.* (2017) and Castleberry and Nolen (2018), following an iterative, multifaceted process. The researcher first engaged in intensive data immersion through recurring readings of interview transcripts to establish an all-encompassing understanding. Systematic coding was then conducted, identifying significant data segments pertaining to apprenticeship training obstacles and experiences. Subsequently, 315 individual codes were organised into preliminary groupings by combining comparable codes based on shared meanings and designs. Through continuous analysis and enhancement, these classifications were synthesised into 21 distinct themes. These themes represent fundamental aspects such as curriculum applicability, mentorship, hands-on experience, and systemic obstacles in South Africa's manufacturing industry. Thematic analysis functions as the central analytical technique, providing a rigorous yet flexible process for distinguishing and analysing patterns within qualitative data. As noted by Burlea-Schiopoiu and Mihai (2019), this strategy allows an extensive exploration of developing themes, capturing nuanced

participant viewpoints and first-hand knowledge. Similarly, Furlong (2020) highlights its efficacy in revealing meaningful patterns aligned with research objectives, whereas Ehteshami (2020) emphasises its ability to elucidate connections between themes and facilitate wider interpretive understandings.

To improve analytical rigour and manage the amount of data effectively, the software ATLAS.ti Version 25 (Scientific Software Development GmbH) was utilised to support systematic coding, data organisation, and thematic visualisation. According to Williams and Patel (2023), software-assisted thematic analysis enhances openness and reproducibility by allowing meticulous monitoring of coding decisions and theme emergence. Carter *et al.* (2024) further argue that incorporating manual interpretive expertise with digital instruments strengthens analytical understanding and deepens methodological validity. This integrated technique aligns with the study's interpretivist paradigm, resulting in rich, credible, and context-dependent outcomes.

Table 4.1 below highlights the key themes and sub-themes that emerged from the thematic analysis, reflecting the study's objectives and the patterns identified in the participants' responses. These themes and sub-themes are discussed in chapter 5.

Table 4.1 Main Themes and Sub-Themes

MAIN THEMES	OBJECTIVES	SUB-THEMES
Theme 1: Misalignment Between Curriculum and Industry Needs	Objective 1	Minimal practical exposure significantly improves learner comprehension and confidence.
		Partnerships with industry are essential for reinforcing theoretical learning with hands-on experience.
		Site visits, excursions, and demonstrations enhance understanding and engagement.
		Limited collaboration restricts learners' ability to contextualise classroom knowledge.
Theme 2: Importance of Industry Collaboration and Practical Exposure		Partnerships with industry are essential for reinforcing theoretical learning with hands-on experience.
		Site visits, excursions, and demonstrations enhance understanding and engagement.
		Limited collaboration restricts learners' ability to contextualise classroom knowledge.
		Even minimal practical exposure significantly improves learner comprehension and confidence.

Theme 3: Barriers to Curriculum Responsiveness and Educator Autonomy		Educators are constrained by institutional management and national authorities in implementing changes.
		Lack of flexibility prevents integration of current industry examples and innovations.
		Requests for curriculum updates or partnerships are often ignored by policymakers.
		Limited autonomy reduces educators' motivation and the potential for adaptive teaching strategies.
Theme 1: Limited Government Support and Policy Ineffectiveness	Objective 2	Government policies are disconnected from the realities of teaching and learning environments.
		Lack of meaningful government intervention to improve the quality and relevance of technical training.
		Policy decisions (e.g., phasing out N1–N3 levels) undermine foundational technical preparation.
		Funding schemes such as NSFAS disproportionately favour public colleges, disadvantaging private institutions.
Theme 2: Structural Inequalities and Access Challenges		Students from disadvantaged backgrounds face barriers to accessing apprenticeship programs due to digital application systems.
		Inconsistent NSFAS support widens inequality between public and private institutions.

		Socio-economic disparities limit opportunities for technical and vocational education participation.
		Lack of targeted policy interventions perpetuates unequal access and outcomes in apprenticeship training.
Theme 1: Holistic Preparation of Apprentices in Technical, Soft Skills, and Professionalism	Objective 3	Apprentices must develop both technical competence and essential soft skills such as communication, reliability, and adaptability.
		Training should foster professionalism, work ethic, and self-sustainability beyond employment readiness.
		Soft skills are integral to employability and long-term career growth in manufacturing environments.
		Balanced preparation ensures apprentices are both skilled workers and responsible professionals.
Theme 2: Integrated Theory and Practice with Continuous, Formative Assessments		Theoretical knowledge must be consistently reinforced through practical application.
		Continuous (formative) assessments help track progress and identify learning gaps early.
		Combining theoretical and practical components within assessments ensures comprehensive learning.
		Regular evaluation supports competency-based learning and strengthens workplace readiness.

Theme 3: Personalised and Constructive Feedback Drives Apprentice Growth		Individualised feedback enhances apprentice motivation, confidence, and learning outcomes.
		Positive, constructive feedback after each assessment helps learners correct mistakes promptly.
		One-on-one discussions foster reflection and professional development.
		Feedback mechanisms mirror reflective learning strategies and continuous improvement models.
Theme 4: Alignment with Industry Standards, Practices and Real-World Contexts		Training content and assessments must reflect current industry technologies, tools, and safety standards.
		Collaboration with industry ensures up-to-date and contextually relevant learning materials.
		Regular site visits, benchmarking, and project-based learning keep training aligned with real-world practices.
		Maintaining consistency with national and industry standards enhances the transferability and quality of qualifications.
Theme 1: Trainer Competence, a Combination of Technical Expertise,		Effective trainers must combine technical mastery with practical industry experience.
		Strong communication and instructional skills are essential for translating complex concepts.

Industry Experience, and Pedagogical Skills	Objective 4	Trainers must adapt teaching strategies to suit different learner abilities and backgrounds.
Theme 2: Structured and Continuous Professional Development for Trainers		Continuous adaptability and contextual awareness enhance the quality of skills transfer.
		Ongoing professional development ensures trainers stay updated with new technologies and methods.
		Regular workshops, internal training, and seminars support professional growth.
		Development should include both technical updates and emotional intelligence training.
		Institutional planning and funding are vital for sustaining continuous learning among trainers.
Theme 3: Evaluation and Feedback Mechanisms to Enhance Trainer Quality		Trainer performance should be regularly reviewed through apprentice feedback and peer evaluation.
		Constructive evaluation identifies areas for improvement and supports accountability.
		External moderation and management oversight enhance training quality assurance.
		Transparent feedback systems foster reflective practice and professional growth.

Theme 4: Support Systems and Institutional Commitment to Trainer Development		Institutions must provide structured support such as career development pathways and access to resources.	
		Collaboration with national bodies (e.g., NAMB) promotes standardisation and professional networking.	
		Access to Learning Management Systems (LMS) and funding enables continuous upskilling.	
		Institutional investment in trainer wellbeing and development sustains long-term training quality.	
Theme 1: Mentor-Led Training Enhances Productivity and Efficiency	Objective 5	Direct mentorship accelerates skill acquisition and operational competence.	
		Mentors help apprentices avoid common mistakes, reducing downtime and rework.	
		Hands-on guidance allows quicker integration into workflow and higher performance.	
		Structured mentorship ensures consistent quality and adherence to standards.	
Theme 2: The Mentor–Apprentice Relationship is Central to Skills Development			
		Mentorship enables tailored learning at the apprentice’s pace.	
		Builds confidence and competence through personalised support.	
		Encourages knowledge transfer and retention, creating future skilled mentors.	

		Supports succession planning and continuity within the organisation.
Theme 3: Mentorship Drives Employee Motivation and Performance		Apprentices feel valued, recognised, and more engaged in their work.
		Encourages loyalty, job satisfaction, and professional growth.
		Mentorship nurtures social integration, goal-setting, and relational understanding.
		Confidence-building through mentorship translates to higher workplace performance.
		Mentored apprentices contribute to process improvements and adoption of new technologies.
Theme 4: Mentor-Guided Programs Promote Innovation and Internal Advancement		Encourages creative problem-solving and efficiency enhancements.
		Facilitates internal career progression and retention of skilled workers.
		Aligns training with broader industry and organisational innovation goals.
Theme 1: Strengthen Collaboration Between SMEs and Training Providers	Objective 6	Promote regular dialogue among SMEs, training institutions, and SETAs.
		Co-develop curricula that reflect current industry needs.
		Encourage passionate and skilled trainers who are responsive to apprentices' needs.
		Establish common ground and alignment across all stakeholders.
		Update outdated content and remove obsolete systems from training.
		Incorporate global trends, new technologies, and industry-specific skills.

Theme 2: Modernise Curriculum to Reflect Industry Trends and Needs		Ensure apprentices are job-ready and aligned with current market demands.
		Continuous review and iterative updates to maintain curriculum relevance.
Provide hands-on, workplace-based learning opportunities.		
Engage apprentices in real-world tasks under mentorship.		
Include apprentices in discussions and decision-making between SMEs and training providers.		
Introduce early engagement at school level to spark interest and build skills.		
Theme 3: Expand Apprentice's Exposure and Practical Experience		Strengthen mathematics, science, and technical drawing skills prior to apprenticeship.
		Provide early career guidance and SME engagement in schools.
		Address gaps in learners' foundational knowledge to ensure smooth transition into vocational training.
		Align school-level preparation with industry expectations for technical competence.

Source: Own creation

4.12.2 Coding Process and Development of Themes

The analysis of qualitative data followed a structured thematic analysis procedure as outlined by Nowell *et al.* (2017) and Castleberry and Nolen (2018). The process moved systematically from raw interview data to finalised themes through a multi-stage coding approach.

In the first stage, all interview recordings were transcribed verbatim and repeatedly reviewed to ensure familiarity with the data. This immersion process allowed the researcher to gain a comprehensive understanding of participants' experiences within apprenticeship training programmes. In the second stage, initial open coding was conducted. During this phase, meaningful segments of text were identified and labelled based on their relevance to the research questions. This process generated 315 initial codes, which captured a wide range of concepts such as mentorship quality, curriculum relevance, workplace exposure and policy challenges.

In the third stage, axial coding was used to examine relationships between initial codes. Similar or conceptually related codes were grouped together to form broader categories. For example, codes relating to "lack of equipment," "outdated machinery," and "limited practical exposure" were clustered under a broader category of "resource and infrastructure constraints." In the fourth stage, selective coding was applied, where categories were refined and consolidated into 21 overarching themes. These themes were reviewed against the original data to ensure accuracy, coherence, and alignment with the research objectives. This iterative process ensured that the final themes were grounded in participants' lived experiences rather than researcher assumptions.

ATLAS.ti Version 25 was used to support this process by organising transcripts, tracking codes, and visually mapping relationships between categories. However, the interpretive development of codes and themes remained primarily researcher-driven to maintain contextual sensitivity.

4.12.3 Justification of Thematic Analysis as the Analytical Approach

Thematic analysis was selected as the most appropriate method for this study due to its flexibility, accessibility, and suitability for interpretivist qualitative research. Unlike grounded theory, which aims to develop a formal theory, or content analysis, which

often focuses on frequency-based categorisation, thematic analysis allows for a rich, interpretive understanding of participants' lived experiences.

Given that this study seeks to explore perceptions, challenges and contextual realities of apprenticeship training in South African manufacturing SMEs, thematic analysis provides the necessary depth to identify patterns across diverse stakeholder narratives without imposing a rigid theoretical framework.

In light of the large volume of interview data (315 initial codes) and the need to identify patterns across multiple stakeholder groups (SMEs, trainers and apprentices), thematic analysis provided a structured yet flexible approach for cross-case comparison. Furthermore, as Braun and Clarke (2006) argue, thematic analysis is particularly effective in studies where the aim is to interpret meaning rather than generate quantifiable outcomes or test hypotheses. This aligns with the interpretivist philosophy underpinning the study, which emphasises socially constructed meanings and subjective experiences.

Compared to alternative methods:

- *Grounded theory* was not suitable because the study does not aim to build a new formal theory.
- *Content analysis* was not appropriate as the focus was not on counting occurrences of data but on interpreting meaning.
- *Narrative analysis* was also unsuitable because the study does not focus on individual life stories but rather on shared workplace experiences.

Therefore, thematic analysis was selected because it best supports the study's objective of developing a contextual and practice-oriented understanding of apprenticeship training systems within SMEs.

4.13 DATA STORAGE

As highlighted by Smith and Noble (2023), data storage involves the systematic safeguarding of research materials in physical and virtual formats to guarantee confidentiality, integrity and enduring accessibility. Similarly, Moser and Korstjens (2022) note that qualitative research needs meticulous handling of recordings, transcripts and consent forms to secure participant profiles and meet ethical

requirements. Similarly, Bender and Rieger (2022), in a German study on digital data management, emphasised the need for valid data security techniques to avoid unauthorised access or loss, especially when sensitive, human-related data are considered. Correspondingly, Australia's Houghton and McDermott (2023) assert that secure data storage is critical to ethical research methods in studies including sensitive or distinguishable populations.

Safeguarding data not only supports ethical responsibilities but also improves the openness of the research methods and enables possible re-examination or verification of outcomes in future studies. In alignment with the optimal procedure suggested by Liu and Barwick (2023), all recorded interviews were saved on password-protected external storage and stored safely. This also incorporates coding notes and other research files stored in a safe place with limited access, guaranteeing that data remain available only to the research team.

Moreover, rigorous confidentiality regulations were observed throughout the data lifecycle management. This involves pseudonymising transcripts and applying specific codes in ATLAS.ti Version 25 Scientific Software Development GmbH to guarantee that no personal identifiable data are uncovered. In line with the UNISA policy, all research data are stored safely for at least 15 years. After this duration, all digital data will be eradicated permanently via certified digital shredding instruments. Any hard-copy materials will be disposed of through safe shredding, as recommended by Smith and Noble (2023). This technique strengthens the dedication to ethical research while aligning with universally recognised data security protocols.

4.14 LIMITATIONS AND DELIMITATIONS OF THE STUDY

Nkosi and Mthembu (2023) emphasise that studies focusing on manufacturing SMEs within particular regions frequently encounter restrictions in generalisability due to their regional geographic and industry-specific scopes. Similarly, Johnson and Lee (2023) report comparable obstacles in US-based research on apprenticeship training programs, where outcomes may not easily extend beyond the studied landscape. Okafor (2023) notes that data gathered through semi-formal interviews can be impacted by social desirability bias or participants' unwillingness to reveal confidential data, a concern echoed in Ramirez's (2023) investigation of organisational behaviour.

Furthermore, ethical implications present intrinsic obstacles in maintaining participant confidentiality and guaranteeing fully informed consent, which can persuade the transparency and accuracy of responses (Mwangi & Abebe, 2023). Dlamini and Moyo (2024) argued that while incorporating physical and digital data collection processes enhanced accessibility, they introduced inadequacies in data richness and interaction quality, primarily where technological challenges such as restricted online connections exist, a common problem in many African contexts. Additionally, Harris and Mitchell (2023) acknowledge that time restrictions during data collection limit the depth of probing and the achievement of full data saturation. Moyo and Tshabalala (2023) highlighted that, regardless of the meticulous thematic analysis, qualitative research includes some subjective interpretations, so reflexivity and peer-review are critical to minimise bias and foster credibility.

With respect to delimitations, Nkala and Tshuma (2023) emphasise the importance of clearly defining participant boundaries, consistent with this study's focus on employees and managers directly involved in apprenticeship training within manufacturing SMEs, training centres, and TVET colleges. Participants were selected based on predefined inclusion criteria and their relevance to the research objectives, rather than convenience or proximity. Moreover, Nkosi and Mthembu (2023) support including only participants fluent in the interview language to preserve data integrity and avoid translation-related inconsistencies. The study's restricted sample size and participant variation may also impact the transferability of findings to wider populations, a recognised obstacle in qualitative research (Smith & Johnson, 2024). Furthermore, Harris and Mitchell (2023) emphasise the methodological practice of restricting data collection to recent years, which aligns with this study's aim in the last five years to reflect existing industrial standards; however, rapid transformations in industry and regulations could still affect the relevance of outcomes. Taken together, Brown and Davis (2023) note that there must be a balance between research practicability and depth, which is consistent with standard operating procedures in African and US qualitative research contexts, while acknowledging the inherent limitations of such studies.

4.15 ELIMINATION OF BIAS

Smith and Lee (2023) highlight that reflexivity, i.e., continuous self-reflection by the researcher, fosters objectivity and openness, thereby minimising bias and developing verifiability. Triangulation remains a primary technique for cross-validating outcomes through various data processes, reducing dependability on a single viewpoint and minimising bias (Johnson *et al.*, 2023). Additionally, Martinez and Roberts (2022) emphasise that peer debriefing and external audits offer independent reviews of the research method, assisting in distinguishing and correcting subjective interpretations. Furthermore, Chen and Zhao (2023) assert that member checking, whereby participants approve of findings, helps guarantee the precise representation of their perspectives and intensifies data reliability. Nguyen *et al.* (2022) highlight that maintaining a thorough audit trail of research decisions and data handling allows scrutiny and replication, promoting trustworthiness and minimising bias.

Nguyen and Patel (2023) recommend keeping memos and a critical journal to record decisions and biases, promoting openness throughout the research procedure. Williams and Garcia (2022) emphasise that purposive sampling of different participants minimises bias and fosters transferability by capturing diverse viewpoints. Moreover, explicitly acknowledging the study's constraints and potential sources of bias in reporting will add ethics meticulously and enable readers to significantly evaluate the findings (Brown & Davis, 2023). To further intensify ethical conduct, the researcher will attend UNISA's ethics workshop to guarantee proper training for unbiased transcription and data coding. Collectively, these meticulous and critical measures protect the study against bias and maintain the integrity of its findings.

4.16 ETHICAL CONSIDERATIONS

Ethical considerations are key concepts that regulate the conduct of research, guaranteeing that studies are executed with uprightness, respect and accountability. As Cartel *et al.* (2022) elucidate, these concepts serve as a guide for researchers, guiding them to maintain the rights and dignity of participants throughout the research procedure. Compliance with a strict code of conduct is crucial, as it not only protects participants but also promotes the reliability and trustworthiness of the study (Brixiová *et al.*, 2020). Disregarding these ethical concepts can discredit the validity of the

research and call into question the researcher's ethical standing (Adomako *et al.*, 2021).

To adhere to ethical requirements, the researcher applied for and obtained an ethical clearance letter from the institution's Ethics Committee before the commencement of data collection. Primary data collection commenced only after ethical approval had been officially granted, guaranteeing that the study met all ethical standards pertaining to participant consent, confidentiality and data security. Additionally, gatekeeper letters were requested and received from each of the four participating organisations, granting the researcher access to the employees and enabling the researcher to have interview sessions within their environment. These steps were critical to ensure that all participants participated voluntarily and that organisational permissions were protected in line with ethical research methods. In addition, participants were provided with an information sheet explaining the purpose of the study, data usage, and their rights prior to participation, and written informed consent was obtained before any interviews commenced.

4.16.1 Voluntary Participation

Assadinia *et al.* (2019) highlight that participants should volunteer to participate in a study willingly and without undue influence. This autonomy expands to the freedom to withdraw from research anytime, even if consent has been offered, without encountering any adverse outcomes (Maneesha, 2020). To maintain this concept, researchers must articulate to participants that they are not obligated to offer explanations for withdrawal and that their decision does not impact their relationship with the researcher or institution (Gong *et al.*, 2019). Moreover, it is important to guarantee that participants are not coerced to continue their involvement, as this could compromise their voluntariness. In this study, voluntary participation was ensured by verbally reiterating the voluntary nature of participation at the start of each interview, and by allowing participants to pause or terminate interviews at any point without consequence.

4.16.2 Informed Consent

Maneesha (2020) elucidate informed consent as providing participants with comprehensive information about a study to make informed decisions about whether to take part. The information must contain the study's objectives, processes, potential risks and advantages, the researcher's contact details and the ethics clearance letter (Brixiová *et al.*, 2020). Almansour *et al.* (2019) identify three significant principles of informed consent: first, the researcher must communicate all relevant information to facilitate an informed decision; second, the researcher must guarantee that participants understand the information provided, which may include clarifying written materials; and last, the researcher must state the participant's free choice to participate, highlighting that non-participation is equally acceptable. Accordingly, the researcher explained the study verbally before each interview, addressed any participant questions, and ensured comprehension before signing consent forms. Copies of signed consent forms were retained for record-keeping and audit purposes.

4.16.3 Confidentiality and Anonymity

Cloutier and Ravasi (2021) assert that maintaining privacy includes securing participants' profiles and guaranteeing that data are protected. In some cases, attaining absolute privacy may be impossible; however, researchers are compelled to safeguard participants' profiles and data through secure repository and limited access. Gong *et al.* (2019) suggest that researchers should only store data in safe restricted areas and limit access to authorised personnel. Additionally, when utilising interpreters, researchers must maintain confidentiality, as including third parties could weaken participants' anonymity. Anonymity was ensured through the use of pseudonyms and removal of identifying institutional or personal information during transcription. Audio recordings and transcripts were stored on a password-protected device accessible only to the researcher, and all data will be securely retained in accordance with institutional policy.

4.16.4 Potential Harm

Almansour *et al.* (2019) define potential harm as any risk associated with research that participants consider essential when choosing to partake in the study or not.

These risks may include a burden, inconvenience, or discomfort from the research procedures. Researchers must foresee and resolve diverse sources of harm, which may manifest as follows:

- Social harm: participation may lead to public humiliation or social risk.
- Physical harm: participants may sustain injuries during research procedures.
- Legal harm: Disclosing sensitive information could breach confidentiality agreements (Maneesha, 2020).
- Psychological harm: specific questions may trigger negative emotions.

To mitigate these risks, researchers must execute techniques to reduce potential harm and inform participants of any sensitive aspects of the study. If any risk is distinguished, the researcher must offer provisions for counselling and support services to resolve participants' requirements. Risk was minimised by avoiding sensitive or intrusive questions, conducting interviews in private and comfortable settings. Allowing participants to skip any question they felt uncomfortable answering. No incidents of harm were reported during data collection.

4.17 CHAPTER SUMMARY

Chapter 4 detailed the research methodology and processes used to explore apprenticeship training programs in South African manufacturing SMEs. A qualitative approach was adopted, with 12 purposively selected participants providing in-depth insights. Semi-structured interviews, conducted both face-to-face and online, were the primary data collection method, allowing participants to share their first-hand experiences freely. A pilot study was carried out to refine the interview questions and ensure feasibility. Data were analysed using thematic analysis supported by ATLAS.ti software, resulting in 21 themes that captured challenges such as curriculum misalignment, limited practical exposure, policy gaps, and access inequalities, as well as success factors including integrated theory and practice, continuous feedback, strong trainer competence, and mentor-led programs that enhance productivity, motivation, and innovation. The study also emphasised collaboration between SMEs and training providers, curriculum modernisation, practical exposure, and foundational skill development from the school level.

The chapter further highlighted measures taken to ensure trustworthiness, including credibility, dependability, transferability, and confirmability through triangulation, member checking, and audit trails. Data storage and security were rigorously maintained, with pseudonymised and securely stored data. Limitations included regional specificity, small sample size, potential social desirability bias, and technological constraints, while delimitations focused the study on employees and managers directly involved in apprenticeship programs. Ethical considerations were strictly observed, with informed consent, voluntary participation, confidentiality, and mitigation of potential risks to participants' wellbeing. Collectively, these methodological, analytical, and ethical measures ensured that the study's findings were credible, data-driven, and reflective of participants' real-world experiences.

CHAPTER FIVE: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

5.1 INTRODUCTION

Data analysis, including methodological organisation, coding and interpretation of gathered information to obtain significant and valid findings, is an important stage in qualitative research (Tehseen *et al.*, 2017; Liamputtong, 2020). As emphasised in Chapter Four, this study employed a thematic analysis structure advocated by ATLAS.ti Scientific Software Development GmbH, enabling the identification and analysis of patterns throughout participant feedback in line with the study's interpretivist paradigm (Nowell *et al.*, 2017; Cloutier & Ravasi, 2021). The analytical technique prioritised openness, self-examination and ethical data handling, as highlighted by Smith and Noble (2023) and Houghton and McDermott (2023). Trustworthiness was protected through meticulous compliance with the concepts of reliability, dependability, verifiability and transferability (Adomako *et al.*, 2021; Assadinia *et al.*, 2019), supported by the application of member checking, audit trails, triangulation and codebook implementation.

Although descriptive and inferential statistics are important in quantitative studies (Johnson & Lee, 2023; Martinez & Roberts, 2022), this chapter focuses on qualitative methodology. Therefore, the analysis focuses on examining first-hand knowledge through thematic patterns rather than statistics. The data presented herein resolve the study's primary objective: to explore the obstacles to on-the-job apprenticeship training among South African manufacturing SMEs and their influence on employment growth and profitability.

This chapter begins by explaining the data administration and management methods prior to presenting the themes developed through the coding and interpretation of the interview transcripts. Each theme is advocated by verbatim participant quotes and analysed in light of the current literature and the study's research questions.

5.2 DATA PREPARATION AND MANAGEMENT PROCESS

The data preparation and management process included systematically organising, transcribing, coding, and safeguarding the qualitative data gathered from participants

to guarantee precision, consistency, and ethical conformability. This method laid the groundwork for meticulous thematic analysis, allowing the identification of significant patterns and knowledge applicable to the study's objectives.

5.2.1 Data Collection Summary

As indicated in Table 5.1, semi-structured interviews were held with 12 deliberately targeted individuals from a training centre, two manufacturing SMEs, and one college, adhering to the sampling technique indicated in Chapter 4. Brink and van Rensburg (2023) noted that conducting interviews both in person and online guaranteed adaptability and accessibility, accommodating participants' hectic schedules and geographic limitations. All sessions were audio-recorded with informed consent. The data were gathered over a period of 2 months, with the duration of the interview ranging between 30 and 60 minutes. The participants from the college only afforded to spend a minimum of 30 minutes in the interview sessions. Questions were designed to examine participants' knowledge of and experience with on-the-job apprenticeship training programs, encountered obstacles, and perceived effects on employment enhancement and profitability.

5.2.2 Transcription Process

Assadinia *et al.* (2019) highlighted that verbatim transcription followed by member checking improves precision, minimises misinterpretation, and fosters reliability. The participants were reminded of their voluntary participation and freedom to withdraw at any time without consequence, which is consistent with ethical standards (Maneesha, 2020; Gong *et al.*, 2019). The researcher transcribed all the interviews manually, producing verbatim transcripts. Minor modifications for clarity, such as reducing filler words, were made without changing the participants' meaning. The transcripts were cross-checked by the participants during member checking to confirm their accuracy.

5.2.3 Data Cleaning

To maintain confidentiality, participants were requested not to reveal identifiable details, and pseudonyms were allocated for anonymity throughout the analysis process (Cloutier & Ravasi, 2021; Smith & Noble, 2023). However, logistical obstacles such as conflicting appointments and infrequent technical problems during online

interviews were experienced and prudently handled to uphold research ethics and participant involvement. Irrelevant feedback was removed during transcription. Unclear statements were clarified through follow-up questions where necessary. All personal details were anonymised to protect participant privacy.

5.2.4 Organisation of Data

Data storage etiquette followed best practices for ethical governance, with all online data protected on a password-protected external hard drive with limited access (Houghton & McDermott, 2023; Liu & Barwick, 2023). Data will be kept for 15 years per UNISA's policy and then permanently eradicated utilising certified procedures. Nguyen *et al.* (2022) and Martinez and Roberts (2022) emphasise that ATLAS.ti Version 25 Scientific Software Development GmbH enabled methodological data organisation, commencing with open coding of significant text units, followed by axial coding to distinguish relationships and establish themes. An audit trail and reflective journal supported verifiability and openness. Castleberry and Nolen (2018) and Furlong (2020) advocate iterative codebook establishment and memo documenting to guarantee coding consistency and strengthen thematic understanding. Triangulation throughout diverse organisational contexts supported transferability by capturing multiple viewpoints, improving the applicability of findings beyond the immediate sample (Cartel *et al.*, 2022). The data files were systematically stored in ATLAS.ti Version 25 Scientific Software Development GmbH, which uses folders organised by participant pseudonym, date of interview and thematic category. Codes were linked to the original transcripts to guarantee traceability and ease of reference during analysis.

5.2.5 Coding and Categorising

The coding method was conducted in various meticulous phases to guarantee analytical depth and precision. Primarily, codes were established inductively from the raw interview data rather than being pre-determined from the literature, enabling the analysis to remain grounded in participants' first-hand knowledge. The researcher continuously read the transcripts to distinguish meaningful statements and views, generating preliminary codes such as "skills mismatch," "lack of mentorship," "restricted resources," and "policy misalignment." While coding was initially inductive,

applicable theoretical constructs from the literature (Furlong, 2020; Cloutier & Ravasi, 2021) were referenced to maintain conceptual alignment.

Following open coding, common codes were classified into wider conceptual categories through axial coding, facilitating the identification of relationships throughout participants and organisational contexts. Overlapping or redundant codes were subsequently refined or merged through ongoing comparison, whereas memo writing assisted in preserving the rationale behind analytical decisions. This iterative method culminated in the establishment of eight comprehensive themes that encapsulated key dimensions of the obstacles and dynamics of on-the-job apprenticeship training programs. Throughout the process, multiple obstacles, including overlapping codes, semantic ambiguity, and the potential for researcher bias, were faced. These issues were resolved using memoing, consultation of the reflective journal. The visual mapping functions of ATLAS.ti Version 25 Scientific Software Development GmbH further assisted in distinguishing thematic boundaries and refining the interconnections between codes. Collectively, these systematic and transparent processes intensified the reliability, dependability, and verifiability of the data analysis method. Initial codes were established inductively from the data, while some deductive coding was employed to align with the applicable literature. The codes were reviewed regularly and integrated to form logical themes. Obstacles such as semantic uncertainty and overlapping codes were resolved through reflective journaling, peer debriefing, and ATLAS.ti Version 25 Scientific Software Development GmbH visual mapping tools.

5.2.6 Data Security and Ethics

All digital data were secured on password-protected external drives with restricted access to the researcher and supervisor. Ethical clearance and informed consent were received prior to data gathering. The participants were continually reminded of their right to withdraw at any time, and pseudonyms were used to guarantee confidentiality. Data handling adhered strictly to UNISA's ethical guidelines and policies.

5.2.7 Software and Instruments Used

Nguyen *et al.* (2022) and Martinez and Roberts (2022) highlight that ATLAS.ti Version 25 Scientific Software Development GmbH allows for methodological data organisation, starting with open coding of critical text units, followed by axial coding to identify relationships and develop themes. ATLAS.ti Version 25 Scientific Software Development GmbH was preferred for its robust coding, visualisation, and theme-mapping abilities, which facilitated systematic qualitative analysis and fostered openness and traceability of findings. Manual transcription and memo writing complemented the software usage for precision and analytical depth.

5.2.8 Sample Distribution of the Participants

The table below presents the sample distribution of the participants who were included in the study.

Table 5.1: Information of the participants.

Participant	Gender	Age group	Ethnic group	Years of experience	Position
Participant A	Male	40-49 yrs	African	13 yrs	Manager
Participant B	Male	60-69 yrs	White	21 yrs	Owner
Participant E	Male	30-39 yrs	African	5 yrs	Owner
Participant F	Male	50-59 yrs	African	8 yrs	Lecturer
Participant G	Female	30-39 yrs	African	9 yrs	Lecturer
Participant I	Male	30-39 yrs	African	5 yrs	Lecturer
Participant J	Female	30-39 yrs	African	4 yrs	Owner
Participant K	Male	50-59 yrs	White	12 yrs	Technical Training Manager

Participant L	Male	30-39 yrs	African	8 yrs	Trainer
Participant M	Male	40-49 yrs	African	8 yrs	Trainer
Participant N	Male	30-39 yrs	African	10 yrs	Trainer
Participant O	Male	50-59 yrs	Indian	3 yrs	Trainer

Source: Own creation

The participant pool in Table 5.1 demonstrates diverse integration of positions and skills levels, including managers, owners, lecturers, technical training managers and trainers, with first-hand experience ranging from 3 to 21 years. Representations across ethnic groups and age ranges are evident, encompassing African, White, and Indian participants aged between 30 and 70 years. This diversity guarantees that multiple viewpoints on on-the-job apprenticeship training within South African manufacturing SMEs are captured. The selection of participants aligns closely with the research objectives, as it includes individuals directly engaged in training, management, and operational decision-making, providing a comprehensive understanding of the obstacles and dynamics affecting apprenticeship training programs and their influence on employment enhancement and profitability.

5.3 PRESENTATION OF FINDINGS

This section highlights the key outcomes from the thematic interpretation of interviews with participants engaged in apprenticeship training programs within manufacturing SMEs and associated institutions. The findings are organised by major themes that developed while coding, reflecting the obstacles, possibilities, and effects of on-the-job training.

5.3.1 Themes Formulation Process

Thematic analysis was adapted to examine participants' knowledge and viewpoints on apprenticeship training programs within manufacturing SMEs. This process was chosen for its adaptability and resilience in distinguishing patterns throughout qualitative data (Braun & Clarke, 2006; Nowell *et al.*, 2017). The interview transcripts were reviewed continuously to guarantee proficient comprehension. Initial perceptions

and concepts were documented in analytic memos. Using ATLAS.ti Version 25 Scientific Software Development GmbH, important components of the text were allocated descriptive codes. Codes were grouped into wider classifications based on patterns. These classifications were analysed and compiled into emerging themes mirroring recurring ideas in the data.

Themes were analysed to guarantee internal consistency and individuality. Re-coding was performed where needed, and some key themes were developed. Each theme was well defined with a brief label and explained. Sub-themes were distinguished to obtain nuanced variances within main themes. Themes were introduced with demonstrative quotes from participants. The analysis concentrated on how these themes addressed the study's research questions.

Table 5.2 presents a logical summary of the study's main themes, objectives and sub-themes. It emphasises how each theme addresses unique elements of apprenticeship training programs, curriculum design and industry participation. The sub-themes offer nuanced understandings of the obstacles, techniques and best practices distinguished through participant viewpoints.

Table 5.2: Themes, Objectives and Sub-themes

MAIN THEMES	OBJECTIVES	SUB-THEMES
Theme 1: Misalignment Between Curriculum and Industry Needs	Objective 1	Minimal practical exposure significantly improves learner comprehension and confidence.
		Partnerships with industry are essential for reinforcing theoretical learning with hands-on experience.
		Site visits, excursions, and demonstrations enhance understanding and engagement.
		Limited collaboration restricts learners' ability to contextualise classroom knowledge.
Theme 2: Importance of Industry Collaboration and Practical Exposure		Partnerships with industry are essential for reinforcing theoretical learning with hands-on experience.
		Site visits, excursions, and demonstrations enhance understanding and engagement.
		Limited collaboration restricts learners' ability to contextualise classroom knowledge.
		Even minimal practical exposure significantly improves learner comprehension and confidence.

Theme 3: Barriers to Curriculum Responsiveness and Educator Autonomy		Educators are constrained by institutional management and national authorities in implementing changes.
		Lack of flexibility prevents integration of current industry examples and innovations.
		Requests for curriculum updates or partnerships are often ignored by policymakers.
		Limited autonomy reduces educators' motivation and the potential for adaptive teaching strategies.
Theme 1: Limited Government Support and Policy Ineffectiveness	Objective 2	Government policies are disconnected from the realities of teaching and learning environments.
		Lack of meaningful government intervention to improve the quality and relevance of technical training.
		Policy decisions (e.g., phasing out N1–N3 levels) undermine foundational technical preparation.
		Funding schemes such as NSFAS disproportionately favour public colleges, disadvantaging private institutions.
Theme 2: Structural Inequalities and Access Challenges		Students from disadvantaged backgrounds face barriers to accessing apprenticeship programs due to digital application systems.
		Inconsistent NSFAS support widens inequality between public and private institutions.

		Socio-economic disparities limit opportunities for technical and vocational education participation.
		Lack of targeted policy interventions perpetuates unequal access and outcomes in apprenticeship training.
Theme 1: Holistic Preparation of Apprentices in Technical, Soft Skills, and Professionalism	Objective 3	Apprentices must develop both technical competence and essential soft skills such as communication, reliability, and adaptability.
		Training should foster professionalism, work ethic, and self-sustainability beyond employment readiness.
		Soft skills are integral to employability and long-term career growth in manufacturing environments.
		Balanced preparation ensures apprentices are both skilled workers and responsible professionals.
Theme 2: Integrated Theory and Practice with Continuous, Formative Assessments		Theoretical knowledge must be consistently reinforced through practical application.
		Continuous (formative) assessments help track progress and identify learning gaps early.
		Combining theoretical and practical components within assessments ensures comprehensive learning.
		Regular evaluation supports competency-based learning and strengthens workplace readiness.

Theme 3: Personalised and Constructive Feedback Drives Apprentice Growth		Individualised feedback enhances apprentice motivation, confidence, and learning outcomes.
		Positive, constructive feedback after each assessment helps learners correct mistakes promptly.
		One-on-one discussions foster reflection and professional development.
		Feedback mechanisms mirror reflective learning strategies and continuous improvement models.
Theme 4: Alignment with Industry Standards, Practices and Real-World Contexts		Training content and assessments must reflect current industry technologies, tools, and safety standards.
		Collaboration with industry ensures up-to-date and contextually relevant learning materials.
		Regular site visits, benchmarking, and project-based learning keep training aligned with real-world practices.
		Maintaining consistency with national and industry standards enhances the transferability and quality of qualifications.
Theme 1: Trainer Competence, a Combination of Technical Expertise,		Effective trainers must combine technical mastery with practical industry experience.
		Strong communication and instructional skills are essential for translating complex concepts.

Industry Experience, and Pedagogical Skills	Objective 4	Trainers must adapt teaching strategies to suit different learner abilities and backgrounds.
Theme 2: Structured and Continuous Professional Development for Trainers		Continuous adaptability and contextual awareness enhance the quality of skills transfer.
		Ongoing professional development ensures trainers stay updated with new technologies and methods.
		Regular workshops, internal training, and seminars support professional growth.
		Development should include both technical updates and emotional intelligence training.
		Institutional planning and funding are vital for sustaining continuous learning among trainers.
Theme 3: Evaluation and Feedback Mechanisms to Enhance Trainer Quality		Trainer performance should be regularly reviewed through apprentice feedback and peer evaluation.
		Constructive evaluation identifies areas for improvement and supports accountability.
		External moderation and management oversight enhance training quality assurance.
		Transparent feedback systems foster reflective practice and professional growth.

Theme 4: Support Systems and Institutional Commitment to Trainer Development		Institutions must provide structured support such as career development pathways and access to resources.
		Collaboration with national bodies (e.g., NAMB) promotes standardisation and professional networking.
		Access to Learning Management Systems (LMS) and funding enables continuous upskilling.
		Institutional investment in trainer wellbeing and development sustains long-term training quality.
Theme 1: Mentor-Led Training Enhances Productivity and Efficiency	Objective 5	Direct mentorship accelerates skill acquisition and operational competence.
		Mentors help apprentices avoid common mistakes, reducing downtime and rework.
		Hands-on guidance allows quicker integration into workflow and higher performance.
		Structured mentorship ensures consistent quality and adherence to standards.
Theme 2: The Mentor–Apprentice Relationship is Central to Skills Development		Mentorship enables tailored learning at the apprentice’s pace.
		Builds confidence and competence through personalised support.
		Encourages knowledge transfer and retention, creating future skilled mentors.
		Supports succession planning and continuity within the organisation.

Theme 3: Mentorship Drives Employee Motivation and Performance		Apprentices feel valued, recognised, and more engaged in their work.
		Encourages loyalty, job satisfaction, and professional growth.
		Mentorship nurtures social integration, goal-setting, and relational understanding.
		Confidence-building through mentorship translates to higher workplace performance.
Theme 4: Mentor-Guided Programs Promote Innovation and Internal Advancement		Mentored apprentices contribute to process improvements and adoption of new technologies.
		Encourages creative problem-solving and efficiency enhancements.
		Facilitates internal career progression and retention of skilled workers.
		Aligns training with broader industry and organisational innovation goals.
Theme 1: Strengthen Collaboration Between SMEs and Training Providers	Objective 6	Promote regular dialogue among SMEs, training institutions, and SETAs.
		Co-develop curricula that reflect current industry needs.
		Encourage passionate and skilled trainers who are responsive to apprentices’ needs.
		Establish common ground and alignment across all stakeholders.
Theme 2: Modernise Curriculum to Reflect Industry Trends and Needs		Update outdated content and remove obsolete systems from training.
		Incorporate global trends, new technologies, and industry-specific skills.
		Ensure apprentices are job-ready and aligned with current market demands.

		Continuous review and iterative updates to maintain curriculum relevance.
Theme 3: Expand Apprentice's Exposure and Practical Experience		Provide hands-on, workplace-based learning opportunities.
		Engage apprentices in real-world tasks under mentorship.
		Include apprentices in discussions and decision-making between SMEs and training providers.
		Introduce early engagement at school level to spark interest and build skills.
Theme 4: Build Foundational Skills from the School Level		Strengthen mathematics, science, and technical drawing skills prior to apprenticeship.
		Provide early career guidance and SME engagement in schools.
		Address gaps in learners' foundational knowledge to ensure smooth transition into vocational training.
		Align school-level preparation with industry expectations for technical competence.

Source: Own creation

Table 5.3 below offers a consolidated summary of the study's main themes and their associated sub-themes. Each sub-theme is explained to capture fundamental understanding and nuances distinguished from participant viewpoints. This overview emphasises the relationships among the curriculum, training practices, mentorship, government legislation, and industry participation in apprenticeship enhancement.

Table 5.3: Summary of Sub-Themes

SUB-THEME	OBJECTIVE	DESCRIPTION
Minimal practical exposure significantly improves learner comprehension and confidence.	Objective 1	Hands-on experience complements classroom instruction. Practical engagement strengthens knowledge retention. Lack of industry input leads to outdated or irrelevant training. Learners quickly grasp concepts when exposed to real work environments.
Partnerships with industry are essential for reinforcing theoretical learning with hands-on experience.		
Site visits, excursions, and demonstrations enhance understanding and engagement.		
Limited collaboration restricts learners' ability to contextualise classroom knowledge.		
Partnerships with industry are essential for reinforcing theoretical learning with hands-on experience.		Hands-on experience complements classroom instruction. Practical engagement strengthens knowledge retention. Lack of industry input leads to outdated or irrelevant training. Learners quickly grasp concepts when exposed to real work environments.
Site visits, excursions, and demonstrations enhance understanding and engagement.		
Limited collaboration restricts learners' ability to contextualise classroom knowledge.		

Even minimal practical exposure significantly improves learner comprehension and confidence.		
Educators are constrained by institutional management and national authorities in implementing changes.		
Lack of flexibility prevents integration of current industry examples and innovations.		
Requests for curriculum updates or partnerships are often ignored by policymakers.		
Limited autonomy reduces educators' motivation and the potential for adaptive teaching strategies.		
Government policies are disconnected from the realities of teaching and learning environments.	Objective 2	Policies often fail to reflect on-the-ground classroom or workshop challenges. Minimal government action leaves institutions unsupported. Actions like phasing out N1–N3 levels weaken technical skill development. Inequitable financial support limits opportunities for some learners.
Lack of meaningful government intervention to improve the quality and relevance of technical training.		

Policy decisions (e.g., phasing out N1–N3 levels) undermine foundational technical preparation.		
Funding schemes such as NSFAS disproportionately favour public colleges, disadvantaging private institutions.		
Students from disadvantaged backgrounds face barriers to accessing apprenticeship programs due to digital application systems.		Online systems disadvantage those with limited internet access or digital literacy. Public college students have better funding access than private college students. Poverty and infrastructure gaps hinder entry into vocational programs. Systemic gaps continue without focused support for marginalised learners.
Inconsistent NSFAS support widens inequality between public and private institutions.		
Socio-economic disparities limit opportunities for technical and vocational education participation.		
Lack of targeted policy interventions perpetuates unequal access and outcomes in apprenticeship training.		

Apprentices must develop both technical competence and essential soft skills such as communication, reliability, and adaptability.	Objective 3	Competence in both areas ensures employability and workplace success. Beyond skills, apprentices learn responsibility and reliability. Communication, adaptability, and teamwork influence future opportunities. Integration of technical and personal development creates well-rounded apprentices.
Training should foster professionalism, work ethic, and self-sustainability beyond employment readiness.		
Soft skills are integral to employability and long-term career growth in manufacturing environments.		
Balanced preparation ensures apprentices are both skilled workers and responsible professionals.		
Theoretical knowledge must be consistently reinforced through practical application.		Theory is better understood when applied in real contexts. Frequent evaluations allow timely intervention. Integrated assessments develop both understanding and competence. Continuous feedback prepares learners for real-world demands.
Continuous (formative) assessments help track progress and identify learning gaps early.		

Combining theoretical and practical components within assessments ensures comprehensive learning.		
Regular evaluation supports competency-based learning and strengthens workplace readiness.		
Individualised feedback enhances apprentice motivation, confidence, and learning outcomes.		Tailored guidance supports learning. Encourages active engagement with learning. Personal interaction improves skill acquisition. Promotes continuous improvement and self-awareness.
Positive, constructive feedback after each assessment helps learners correct mistakes promptly.		
One-on-one discussions foster reflection and professional development.		
Feedback mechanisms mirror reflective learning strategies and continuous improvement models.		

Training content and assessments must reflect current industry technologies, tools, and safety standards.		Ensures relevance and employability. Industry input ensures curriculum relevance. Real-world experience enhances understanding. Ensures apprentices meet recognised competency levels.
Collaboration with industry ensures up-to-date and contextually relevant learning materials.		
Regular site visits, benchmarking, and project-based learning keep training aligned with real-world practices.		
Maintaining consistency with national and industry standards enhances the transferability and quality of qualifications.		
Effective trainers must combine technical mastery with practical industry experience.	Objective 4	Combines knowledge with workplace insights. Explaining concepts effectively supports learning. Tailored approaches improve comprehension. Trainers stay relevant in evolving industries.
Strong communication and instructional skills are essential for translating complex concepts.		
Trainers must adapt teaching strategies to suit different learner abilities and backgrounds.		

Continuous adaptability and contextual awareness enhance the quality of skills transfer.		
Ongoing professional development ensures trainers stay updated with new technologies and methods.		Workshops and seminars ensure skills remain current. Trainers improve both content knowledge and interpersonal skills. Structured support enables continuous trainer development.
Regular workshops, internal training, and seminars support professional growth.		Structured support enables continuous trainer development.
Development should include both technical updates and emotional intelligence training.		
Institutional planning and funding are vital for sustaining continuous learning among trainers.		
Trainer performance should be regularly reviewed through apprentice feedback and peer evaluation.		Encourages accountability and improvement. Guides trainers to enhance skills. Confirms training meets standards. Trainers learn from outcomes and adapt teaching methods.

Constructive evaluation identifies areas for improvement and supports accountability.		
External moderation and management oversight enhance training quality assurance.		
Transparent feedback systems foster reflective practice and professional growth.		
Institutions must provide structured support such as career development pathways and access to resources.		Career pathways, LMS access, and mentoring enhance trainer capacity. Promotes professional networking and benchmarking. Trainers can improve without financial barriers. Ensures trainers remain motivated and effective.
Collaboration with national bodies (e.g., NAMB) promotes standardisation and professional networking.		
Access to Learning Management Systems (LMS) and funding enables continuous upskilling.		

Institutional investment in trainer wellbeing and development sustains long-term training quality.		
Direct mentorship accelerates skill acquisition and operational competence.	Objective 5	Hands-on guidance improves competence. Apprentices learn faster and perform better. Mentored training aligns with standards.
Mentors help apprentices avoid common mistakes, reducing downtime and rework.		
Hands-on guidance allows quicker integration into workflow and higher performance.		
Structured mentorship ensures consistent quality and adherence to standards.		
Mentorship enables tailored learning at the apprentice's pace.		Personalised guidance improves learning outcomes. Close support helps apprentices master skills. Creates future mentors and ensures skill continuity. Strengthens internal workforce development.
Builds confidence and competence through personalised support.		

Encourages knowledge transfer and retention, creating future skilled mentors.		
Supports succession planning and continuity within the organisation.		
Apprentices feel valued, recognised, and more engaged in their work.		Boosts motivation and productivity. Mentorship improves retention and career progression. Supports holistic professional development. Effective mentorship improves overall output.
Encourages loyalty, job satisfaction, and professional growth.		
Mentorship nurtures social integration, goal-setting, and relational understanding.		
Confidence-building through mentorship translates to higher workplace performance.		
Mentored apprentices contribute to process improvements and adoption of new technologies.		Encourages innovation in operations. Apprentices apply knowledge practically. Skilled apprentices advance within the organisation. Mentorship supports strategic objectives.

Encourages creative problem-solving and efficiency enhancements.		
Facilitates internal career progression and retention of skilled workers.		
Aligns training with broader industry and organisational innovation goals.		
Promote regular dialogue among SMEs, training institutions, and SETAs.	Objective 6	Ensures curriculum relevance. Aligns education with market requirements. Improves learning outcomes. Reduces gaps between training and employment expectations.
Co-develop curricula that reflect current industry needs.		
Encourage passionate and skilled trainers who are responsive to apprentices' needs.		
Establish common ground and alignment across all stakeholders.		
Update outdated content and remove obsolete systems from training.		Remove obsolete systems from training. Ensures apprentices are prepared for modern workplaces. Align training with industry

Incorporate global trends, new technologies, and industry-specific skills.		expectations. Keeps curriculum up-to-date with evolving standards.
Ensure apprentices are job-ready and aligned with current market demands.		
Continuous review and iterative updates to maintain curriculum relevance.		
Provide hands-on, workplace-based learning opportunities.		Integrates practical experience with theoretical knowledge. Develops competence in actual working environments. Promotes understanding of industry needs. Sparks interest and builds foundational skills before apprenticeship.
Engage apprentices in real-world tasks under mentorship.		
Include apprentices in discussions and decision-making between SMEs and training providers.		
Introduce early engagement at school level to spark interest and build skills.		

Strengthen Maths, Science, and Technical Drawing skills prior to apprenticeship.		Prepares learners for vocational training. Helps students make informed choices. Reduces challenges entering apprenticeships. Guarantees readiness for technical and vocational pathways.
Provide early career guidance and SME engagement in schools.		
Address gaps in learners' foundational knowledge to ensure smooth transition into vocational training.		
Align school-level preparation with industry expectations for technical competence.		

Source: Own creation

This process was chosen to enable the researcher to elucidate participants' viewpoints on apprenticeship training programs within manufacturing SMEs in an organised and dependable manner. Following the transcription of the interview confirmed through member checking, the researcher started by plunging in the data through subsequent reading of each transcript to obtain familiarity and context (Furlong, 2020). This initial phase enabled the recognition of significant sections of text applicable to the research questions.

First-cycle coding was concluded utilising ATLAS.ti Version 25 Scientific Software Development GmbH, where descriptive and in vivo codes emerged to capture essential concepts or direct phrases utilised by participants. This coding procedure was inductive in nature, enabling themes to develop organically from the data instead of being established prematurely (Burlea-Schiopoiu & Mihai, 2019).

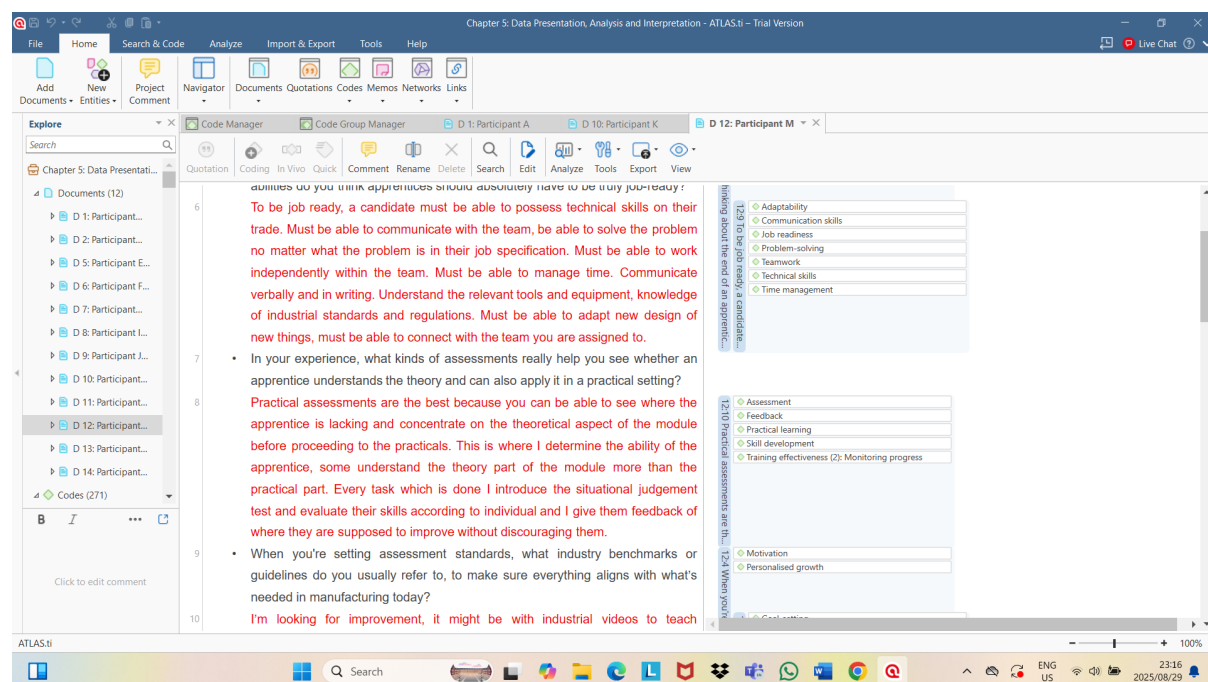


Figure 5.2: Coded document

Source: Own creation

Following the initial coding stage in Figure 5.2 above, the researcher continued in second-cycle coding, which included clustering the same codes together, enhancing classifications, and distinguishing relations between them. During this phase, pattern coding was administered to cluster the codes into wider themes that indicated the

inherent meanings and implications shared throughout the participants' accounts (Cloutier & Ravasi, 2021). To guarantee reliability and dependability, the researcher managed an evolving codebook throughout the analysis process. This incorporated descriptions for each code, decision regulations for coding, and analytical memos recording systemic decisions. Memos were written after each coding session to capture developing knowledge, questions, or avenues for further studies, suggesting the openness of the analytical method (Smith & Noble, 2023).

The emergent themes were analysed and enhanced according to their internal consistency and their arrangement with the study's objectives. The researcher guaranteed that each theme was advocated by diverse coded views throughout the participants, providing transferability and verifiability of the findings. Themes were then thoroughly defined and named, analysing the joint knowledge and obstacles related to on-the-job training and its effect on employment and SME performance, as outlined in Chapter Four. This meticulous technique for coding and theme establishment guarantees that the findings presented in this chapter are founded on participants' first-hand knowledge and contribute significantly to the insight of apprenticeship training programs in the South African manufacturing context.

5.4 INTERPRETATIONS OF FINDINGS

This section analyses the findings from the preceding section with respect to the study's research objectives, literature review and theoretical structure. It surpasses shallow analysis to reveal the underlying meanings, patterns, and findings within the data. As noted by Furlong (2020) and Cloutier and Ravasi (2021), interpretation combines raw data and scholarly comprehension by linking themes to wider academic and practical contexts. This section essentially explores how the developing themes align with the current literature and policy viewpoints on apprenticeship training program. Importantly, the interpretation is also guided by the study's theoretical framework, namely Cognitive Apprenticeship Theory, Communities of Practice, and Experiential Learning Theory, which provide the lens through which the findings are explained and conceptualised.

It examines how participants' experiences indicate the hands-on realities, obstacles, and possibilities of on-the-job training in manufacturing SMEs. The analysis evaluates

not only what was said but also why these viewpoints matter, both for the enhancement of theory and for instructing vocational training practice and legislation. Specifically, the findings are interpreted in terms of how they support, challenge, or extend these theoretical assumptions within the South African apprenticeship context.

Table 5.4 below provides a consolidated overview of the thematic findings derived from the study's fundamental objectives. It outlines the viewpoints of colleges, training centres, and SMEs, emphasising the main themes that emerged in relation to fostering the quality and efficacy of apprenticeship training program.

Table 5.4: Summary of Thematic Findings by Objective and Perspective

OBJECTIVE 1	THEMATIC FINDINGS	THEMES
Objective 1: Improving the Quality of Theoretical Training	College Perspective	Theme 1: Misalignment Between Curriculum and Industry Needs
		Theme 2: Importance of Industry Collaboration and Practical Exposure
		Theme 3: Barriers to Curriculum Responsiveness and Educator Autonomy
Objective 2: Impact of Government Policies on Apprenticeship Training		Theme 4: Limited Government Support and Policy Ineffectiveness
		Theme 5: Structural Inequalities and Access Challenges
Objective 3: Standards and Assessment Criteria for		Theme 1: Holistic Preparation of Apprentices in Technical, Soft Skills, and Professionalism

Apprenticeship Training	Training Centre Perspective	Theme 2: Integrated Theory and Practice with Continuous, Formative Assessments
		Theme 3: Personalised and Constructive Feedback Drives Apprentice Growth
		Theme 4: Alignment with Industry Standards, Practices and Real-World Contexts
Objective 4: Capacity for trainers to ensure quality outcomes		Theme 5: Trainer Competence, a Combination of Technical Expertise, Industry Experience, and Pedagogical Skills
		Theme 6: Structured and Continuous Professional Development for Trainers
		Theme 7: Evaluation and Feedback Mechanisms to Enhance Trainer Quality
		Theme 8: Support Systems and Institutional Commitment to Trainer Development
Objective 5: Significance of mentor-led apprenticeship training		Theme 1: Mentor-Led Training Enhances Productivity and Efficiency

	SME Perspective	Theme 2: The Mentor–Apprentice Relationship is Central to Skills Development
		Theme 3: Mentorship Drives Employee Motivation and Performance
		Theme 4: Mentor-Guided Programs Promote Innovation and Internal Advancement
Objective 6: Recommendations for improving apprenticeship training		Theme 5: Strengthen Collaboration Between SMEs and Training Providers
		Theme 6: Modernise Curriculum to Reflect Industry Trends and Needs
		Theme 7: Expand Apprentices’ Exposure and Practical Experience
		Theme 8: Build Foundational Skills from the School Level

Source: Own creation

5.4.1 Thematic Findings: College Perspective

This section presents insights from college-based participants, emphasising obstacles regarding curriculum applicability, government legislation and resource constraints in the TVET sector.

5.4.1.1 Objective 1: Improving the Quality of Theoretical Training

This objective examines techniques to foster the relevance, responsiveness, and efficacy of theoretical training in preparing apprentices for the emerging standards of the manufacturing industry.

5.4.1.1.1 Theme 1: Misalignment Between Curriculum and Industry Needs

The themes below are advocated with in vivo extracts from the transcripts. The interpretation of the interview replies from the college participants revealed three key themes, in line with the study's two objectives. Regardless of their diverse experiences, the participants reiterated common sentiments regarding the inactivity of classroom learning and inefficient policy application.

This misalignment is interpreted through Cognitive Apprenticeship Theory and Communities of Practice, which emphasise learning through situated practice, modelling, and progressive participation in authentic workplace contexts. In this study, the absence of current industry-aligned content suggests a breakdown in the “situated learning” process, where learners are unable to transition meaningfully from theoretical instruction to authentic participation in practice-based environments.

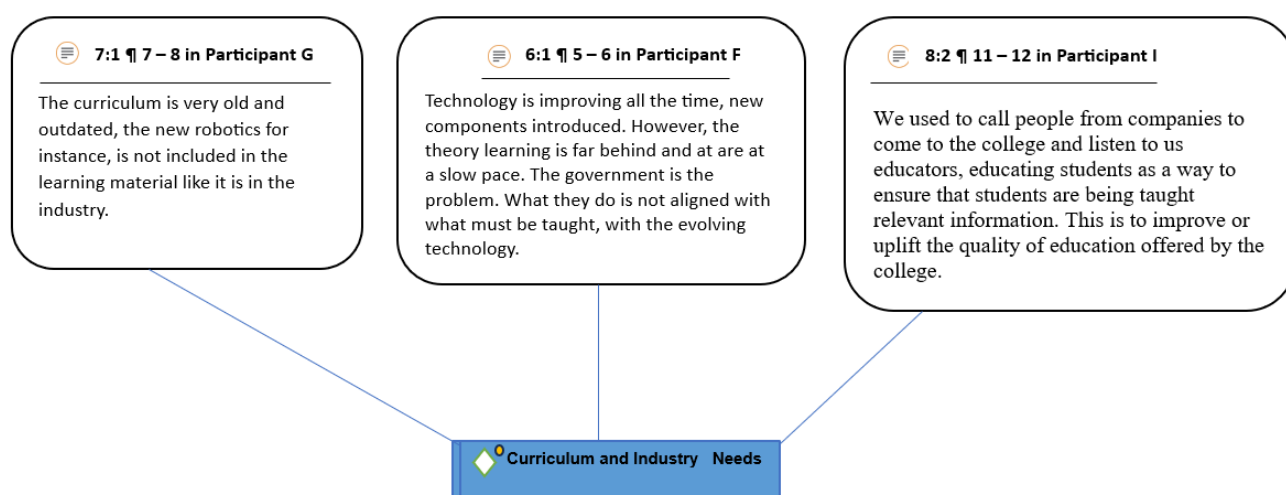


Figure 5.3: Misalignment Between Curriculum and Industry Needs

Source: Own creation

The thematic pattern illustrated in Figure 5.3 is interpreted through Cognitive Apprenticeship Theory and Communities of Practice, which emphasise learning through authentic participation, modelling, and gradual skill acquisition within real-world environments. The participants' experiences suggest a breakdown in situated learning processes, where curriculum content remains detached from evolving

industry practices, thereby limiting the transition from theoretical knowledge to workplace competence.

The participants strongly distinguished dissatisfaction between the college syllabus and the realities of technological enhancement in the manufacturing industry. This reflects concerns in Chapter Two regarding the antiquated curriculum and inefficient responsiveness to industry evolution (Nkala & Tshuma, 2023; Sokolova & Kefi, 2020). From a theoretical perspective, this misalignment reflects the limitations of curriculum responsiveness within vocational education systems, particularly where institutional structures restrict feedback loops between industry and training providers.

“The syllabus is very old... what is being taught today is exactly the same thing as years ago.” – Participant F

“The curriculum is very old and outdated... robotics is not included in the learning material.” – Participant G

This misalignment is not only an educational challenge but also a fundamental challenge. The participants attributed the inactive curriculum change to centralised control by DHET, Umalusi, and QCTO, confirming what Chapter Four distinguished as the absence of institutional autonomy (Newhart & Patten, 2023; Smith & Noble, 2023). Within the theoretical framework, this reflects the tension between centralised governance models and adaptive vocational systems, where reduced institutional autonomy limits the ability of colleges to respond to technological change.

“Everything is controlled by the DHET, Umalusi and QCTO... colleges do not have the capacity to make their own amendments.” – Participant F

“The government is the problem... what they do is not aligned with what must be taught.” – Participant G

These reflections align with Furlong’s (2020) view that unresponsive mechanisms prohibit educational development and establish graduates who are not ready for transforming workplace requirements. This also reinforces the study’s theoretical position that system rigidity weakens the alignment between knowledge production and workplace applicability, ultimately affecting apprenticeship effectiveness.

5.4.1.1.2 Theme 2: Importance of Industry Collaboration and Practical Exposure

In line with Cartel *et al.* (2022), participants emphasised the need for deeper collaboration between colleges and industry to improve on-the-job training. The lack of practical reinforcement for theoretical concepts was constantly emphasised. From a theoretical standpoint, this reflects the principles of situated learning, where knowledge acquisition is strengthened through participation in real-world contexts rather than abstract instruction alone.

“Collaboration with industry will be the best way... so students can see what they are being taught in theory.” – Participant G

“An excursion has been organised to go to Luthabo Power Station.” – Participant F

“It is pointless to memorise something that you haven’t even seen.” – Participant G

Participant I strengthened the advantages of even minimal hands-on training.

“The few components kept in the college align with the theory... it helps to show and tell.” – Participant I

This reinforces the study’s theoretical framing around experiential and constructivist learning approaches, where meaning is constructed through direct engagement with tools, environments and workplace practices.

These insights reiterate the recommendations in Chapter Four about combining the theory-hands-on shortage through triangulation, site visits, and industry-led teaching (Cloutier & Ravasi, 2021). Within the theoretical framework, such triangulation represents a mechanism for bridging the gap between abstract knowledge systems and applied competency development in vocational education.

5.4.1.1.3 Theme 3: Barriers to Curriculum Responsiveness and Educator Autonomy

Regardless of educators' willingness to transform, institutional limitations frequently prevent them from incorporating real-world examples or organising workplace visits. This restriction advocates the analysis in Chapter Three concerning rigorous educational frameworks (Brixiová *et al.*, 2020). Theoretically, this reflects structural

constraints within centralised vocational governance systems, where institutional agency is limited despite practitioner-level awareness of industry needs.

“Educators can only do this if management allows them to collaborate with a specific company.” – Participant G

“We used to call people from companies to come to the college and listen to us educating students.” – Participant I

The participants also noted that multiple proposed transformations had not been executed by policy makers.

“Requests have been made in previous meetings... but there was no positive response from custodians.” – Participant F

This reiterated Martinez and Roberts’ (2022) argument that disempowered frontline educators cannot effectively design responsive curricula without systemic support. This also aligns with governance theory in vocational education, which emphasises that decentralised decision-making structures are necessary for adaptive curriculum reform.

5.4.1.2 Objective 2: Impact of Government Policies on Apprenticeship Training

This objective explores how government legislation impacts the quality, accessibility, and overall efficacy of apprenticeship training program within the manufacturing industry.

5.4.1.2.1 Theme 4: Limited Government Support and Policy Ineffectiveness

The participants broadly expressed that existing government legislation does a minimum to support the applicability or quality of technical training. There was concern that policymakers were not considering the theoretical experience. Figure 5.4 illustrates the viewpoints of three college participants, who demonstrated concerns over restricted government support and the inefficiency of policies such as the NSFAS, which they noted primarily benefit public colleges, leaving private institutions at a disadvantage.

From a theoretical perspective, these perceptions reflect systemic misalignment between policy design and implementation realities, where top-down governance models struggle to account for differentiated institutional contexts within the TVET ecosystem.

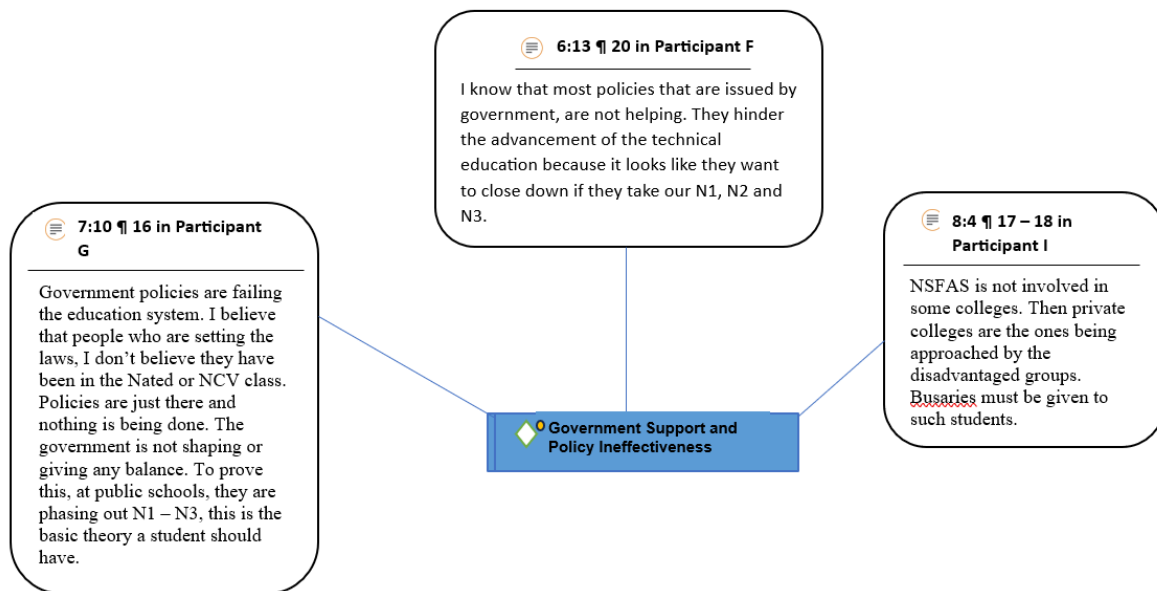


Figure 5.4: Limited Government Support and Policy Ineffectiveness

Source: Own creation

“Government is doing absolutely nothing to improve the quality of the education system.” – Participant F

“Government policies are failing the education system... the people setting the laws haven't been in the classroom.” – Participant G

The phasing out of foundational levels such as N1–N3 was criticised and viewed as undermining learner readiness for industry.

“Most colleges do not have N2 anymore... this is not a good idea as far as technical education is concerned.” – Participant F

“At public schools, they are phasing out N1–N3... this is the basic theory a student should have.” – Participant G

These perceptions strengthen the literature from Nkosi and Mthembu (2023) and Johnson and Lee (2023), who noted that ineffective communication or top-down policy reforms frequently lead to a deterioration in training quality and minimised industry applicability. From a theoretical perspective, these findings reflect a policy implementation gap within centralised governance systems, where limited feedback from practice environments weakens the alignment between curriculum design and labour market requirements.

5.4.1.2.2 Theme 5: Structural Inequalities and Access Challenges

The participants also emphasised socio-economic and infrastructural obstacles impacting student access to apprenticeships and training resources. For example, I noted that multiple students from underrepresented backgrounds scuffle with the digital systems needed for public college applications:

“Applications to public colleges are done online... students from disadvantaged backgrounds... don’t know how to manoeuvre the system.” – Participant I

In addition, inefficient NSFAS support adds to inequality between public and private institutions:

“NSFAS is not involved in some colleges... bursaries must be given to such students.” – Participant I

These findings support the claims made in Chapter 3 by Eze (2023), who emphasises that equitable access to education is significant for a functional apprenticeship ecosystem. Theoretically, this reflects structural inequality within human capital development systems, where access to training opportunities is shaped not only by policy design but also by digital and socio-economic capability constraints. Without tailored legislation responses, the gap between legislation intention and first-hand student knowledge is likely to increase.

5.4.2 Thematic Findings: Training Centre Perspective

The analysis of interviews from training centre personnel revealed major themes that emphasise both operational strengths and areas for improvement in apprentice

training delivery. The findings are informed by the most often referenced codes, grouped to reflect patterns in the data and aligned with study objectives.

5.4.2.1 Objective 3: Standards and Assessment Criteria for Apprenticeship Training

This objective explores the effectiveness requirements and evaluation criteria for guaranteeing constant, competency-based, and industry-aligned apprenticeship training outcomes.

5.4.2.1.1 Theme 1: Holistic Preparation of Apprentices in Technical, Soft Skills, and Professionalism

The participants strongly emphasised that successful apprentices must be workplace-ready not only with technical knowledge but also with critical soft skills such as credibility, adaptability, and professionalism. These findings strengthen the multi-dimensional skill set emphasised in earlier studies, where employability is perceived as an integration of both hard and soft competencies (Cartel *et al.*, 2022). Within the theoretical framework, this reflects a competency-based education approach, where employability is constructed as a combination of technical mastery and behavioural capability rather than technical skill alone.

“Apprentices must be prepared not just to be products of employment but products of self-sustainability.” – Participant L

“An apprentice needs to be able to communicate, perform their duties well... Be reliable and have a good attitude.” – Participant N

These viewpoints reiterated the call for industry-responsive training raised in Chapter Two and advocated that soft skills must be systematically incorporated into apprenticeship structures (Assadinia *et al.*, 2019).

5.4.2.1.2 Theme 2: Integrated Theory and Practice with Continuous, Formative Assessments

The participants constantly highlighted the need for a balanced combination of classroom learning with on-the-job training, which was supported by ongoing

evaluations. This affirms the educational practices elaborated in Chapter Two, where competency-based education and learning through application are perceived as central to efficacious vocational training (Castleberry & Nolen, 2018). Theoretically, this aligns with constructivist and experiential learning principles, where knowledge is reinforced through iterative application, reflection, and assessment in authentic contexts.

“You must set up an assessment that combines both the theory and the practical setting...” – Participant L

*“After each module... apprentices must be assessed... to see who is lacking behind.”
– Participant N*

Such evaluation methods, which highlight both formative and summative assessments, align with the best principles emphasised by Houghton and McDermott (2023). They stress that constant feedback loops are important for effectively tracking learner progress and guiding timely interventions.

5.4.2.1.3 Theme 3: Personalised and Constructive Feedback Drives Apprentice Growth

Feedback developed as a repeating theme, with participants emphasising the importance of individual, constructive discussions to foster apprentice performance. This technique improves learning and encouragement and resonates with the reflective learning techniques mentioned in Chapter Two (Furlong, 2020). This reflects the principles of formative assessment and feedback loops, where learning is continuously shaped through corrective guidance and iterative improvement. Figure 5.5 illustrates perceptions from the training centre participants, highlighting the critical role of regular, constructive feedback in advocating apprentices' enhancement and fostering their workplace readiness.

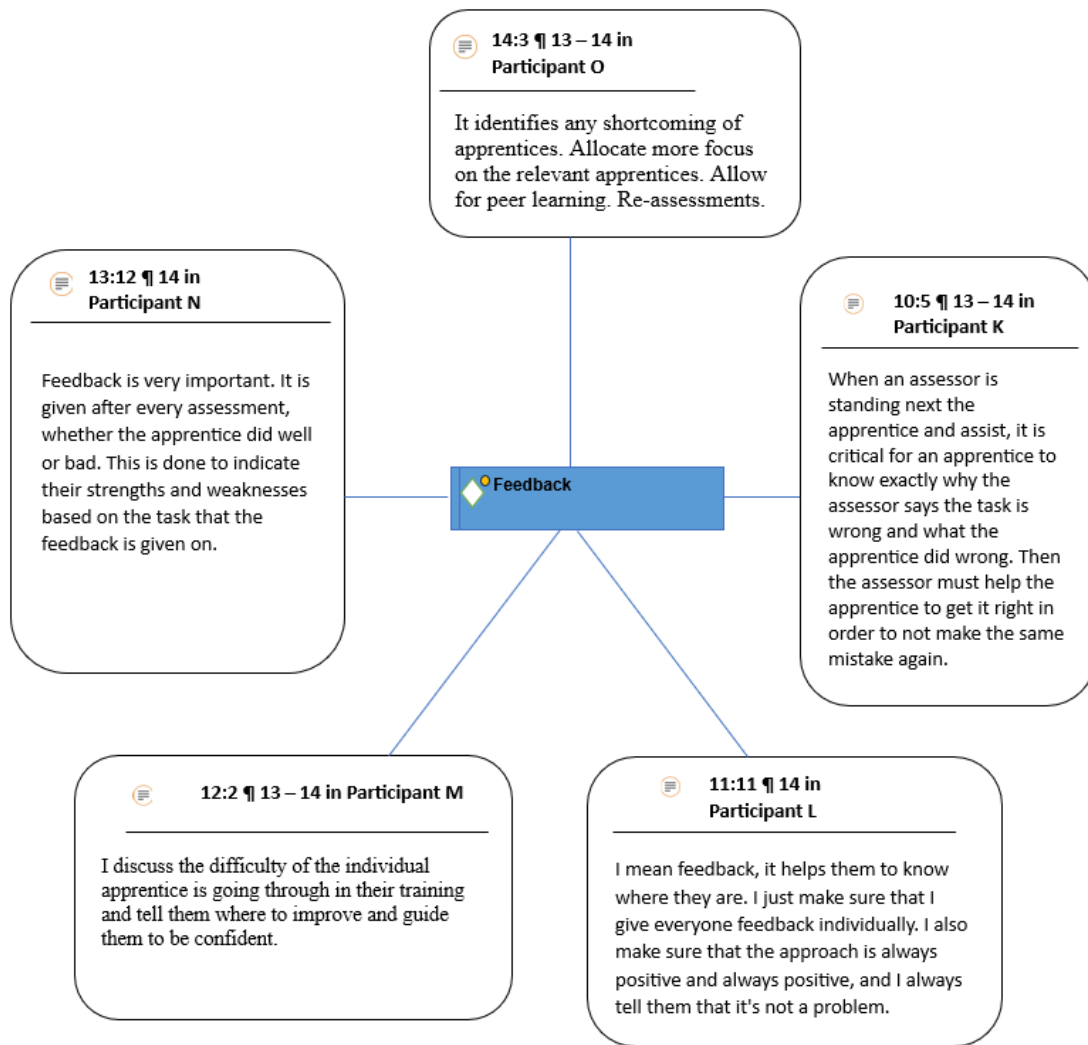


Figure 5.5: Personalised and Constructive Feedback Drives Apprentice Growth

Source: Own creation

“I give everyone feedback individually... the approach is always positive.” Participant L

“Feedback is very important... given after every assessment.” Participant N

This approach also integrates with the methodological rigour explained in Chapter Four, where memo documenting and reflective journaling were utilised to document emerging insights, paralleling how feedback is used in hands-on training settings to support learner improvement (Nguyen *et al.*, 2022). From a theoretical perspective, this reflects formative assessment theory, where feedback functions as an ongoing learning mechanism rather than a final evaluative judgement. It also aligns with

reflective learning theory, where continuous dialogue between assessor and learner supports iterative skill development.

5.4.2.1.4 Theme 4: Alignment with Industry Standards, Practices and Real-World Contexts

The participants affirmed that evaluations and learning material must reflect existing industry standards and safety protocols. Processes such as site visits, project-based learning, and benchmarking were distinguished as critical to sustaining relevance. Theoretically, this reflects situated learning principles, where knowledge acquisition is strengthened when learning occurs in authentic, practice-based environments rather than abstract instructional settings.

“Keeping up with industry standards... I always make sure my assessments align.” – Participant L

“Upon visits to industry... recommendations are applied.” – Participant O

These findings correspond with the necessity for contextualised learning and triangulation emphasised in Chapter Four (Cartel *et al.*, 2022). The consistency of standards throughout training providers further advocates transferability and quality assurance, as highlighted in Smith and Noble (2023). Within the theoretical framework, this also reflects competency-based education models, where assessment validity depends on alignment between training outcomes and real-world occupational standards.

5.4.2.2 Objective 4: Capacity for Trainers to Ensure Quality Outcomes

This objective explores the capacity of trainers to guarantee quality outcomes by exploring their competence, professional enhancement, assessment methods and institutional support mechanisms.

5.4.2.2.1 Theme 1: Trainer Competence, a Combination of Technical Expertise, Industry Experience, and Pedagogical Skills

Trainer expertise emerged as a crucial determinant of quality. The participants noted that trainers must have not only technical capabilities but also communication and training skills to effectively facilitate learning. This reflects the concept of pedagogical

content knowledge, where effective teaching requires integration of subject expertise and instructional capability.

“Trainers must have deep knowledge and experience... adaptability is key.” – Participant L

“Be a subject matter expert... adapt to the level of understanding of apprentices.” – Participant N

These understandings align with the ethical and professional expectations elaborated in Chapter Four, where participant skills and reliability are significant for data validity (Cloutier & Ravasi, 2021). Theoretically, this also supports human capital theory, where trainer capability is viewed as a direct determinant of training quality and workforce readiness outcomes.

5.4.2.2.2 Theme 2: Structured and Continuous Professional Development for Trainers

The participants noted that expertise enhancement must be planned and consistent, covering transforming technologies, teaching processes, and emotional intelligence. Institutional support through workshops, seminars, and in-house training workshops was perceived as important. From a theoretical standpoint, this reflects lifelong learning theory, where professional competence is maintained through continuous upskilling and adaptation to changing industrial environments.

“There must be technical training... in alignment with modern technology.” – Participant L

“Organise internal training... send trainers to seminars.” – Participant N

This advocates the wider claim in Chapter Two that the sustainability of apprenticeship methods relies heavily on enhancing educators' skills to meet evolving industrial requirements (Gong *et al.*, 2019; Liu & Barwick, 2023).

5.4.2.2.3 Theme 3: Evaluation and Feedback Mechanisms to Enhance Trainer Quality

Assessment of trainers through feedback, peer-review, and external moderation was noted as a fundamental technique for constant development. Theoretically, this reflects quality assurance and reflective practice frameworks, where continuous evaluation is used to enhance professional effectiveness and institutional accountability.

“Feedback from apprentices... helps identify areas to improve.” – Participant N
“Management interventions... based on apprentice evaluations.” – Participant O

These approaches reflect those discussed in Martinez and Roberts (2022), where openness and audit trails contribute to trust and verifiability in research and practice. In this study, similar methods were utilised to guarantee systemic soundness.

5.4.2.2.4 Theme 4: Support Systems and Institutional Commitment to Trainer Development

The participants described the significance of structured support, such as career enhancement plans, LMS access, and financing external courses. Partnership with national bodies such as the NAMB was also emphasised. It reflects institutional support theory, where organisational commitment and resource provision are essential enablers of sustained professional development and training quality.

“NAMB organises events... to iron out the standard of training.” – Participant N
“Career development... access to LMS and budgets for external courses.” – Participant O

These findings strengthen the significance of institutional liability in sustaining training quality, as discussed under ethical data management and research integrity in Chapter 4 (Houghton & McDermott, 2023).

5.4.3 Thematic Findings: SME Perspective

This section presents the emergent themes from the analysis of SME participants A, B, E, and J, focusing on their viewpoints of mentor-led apprenticeship training and

recommendations to foster skills enhancement in South Africa's manufacturing industry. The themes are organised to mirror the research objectives and provide practical understanding founded on real-world SME experiences. These findings are interpreted through the study's underpinning experiential learning and cognitive apprenticeship perspectives, which emphasise learning through guided participation, workplace immersion, and knowledge transfer from expert to novice within authentic work settings.

5.4.3.1 Objective 5: Significance of mentor-led apprenticeship training

This section explores the importance of mentor-led apprenticeship training in fostering skills enhancement, productivity, and learner progression within the manufacturing industry. This objective is grounded in cognitive apprenticeship theory, which positions mentorship, modelling, scaffolding, and coaching as central mechanisms through which tacit workplace knowledge is transmitted and internalised.

5.4.3.1.1 Theme 1: Mentor-Led Training Enhances Productivity and Efficiency

Figure 5.6 below emphasises understanding from SME participants, indicating how mentor-led training contributes to enhanced apprentice performance, maximised workplace efficacy, and smoother skill transfer within the organisation. This aligns with cognitive apprenticeship assumptions that learning becomes most effective when apprentices are actively guided within real production environments rather than receiving decontextualised instruction.

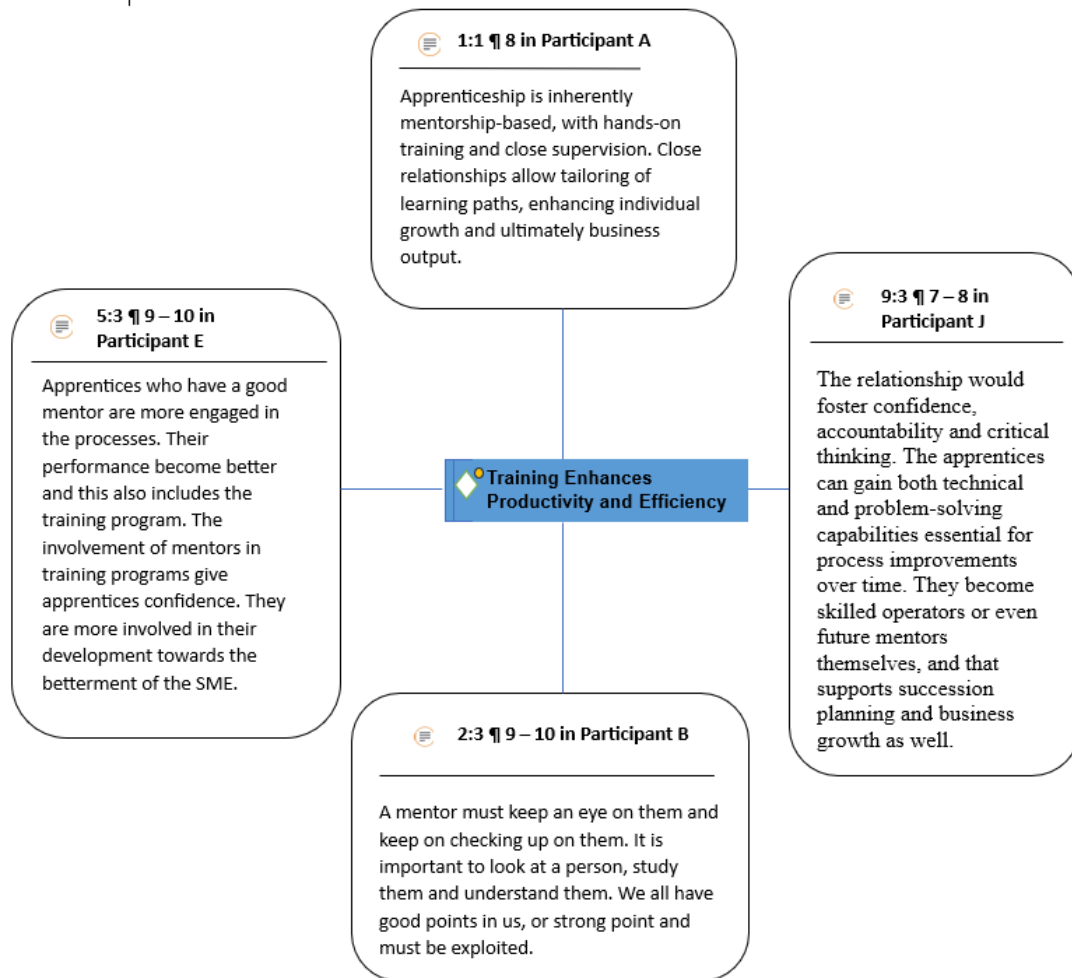


Figure 5.6: Mentor-Led Training Enhances Productivity and Efficiency

Source: Own creation

The participants unanimously agreed that mentor-led training significantly enhanced productivity by minimising errors and embedding context-specific skills. Participant A described how formal guidance allows apprentices to transition from observation to self-reliance, whereas Participant J highlighted mentor-driven best practices. Participant B emphasised the adaptation of training to mirror existing industry landscapes rather than antiquated processes, and Participant E noted that mentoring improves apprentices' confidence, resulting in smoother implementation of tasks.

“Mentorship transfers practical, job-specific skills more effectively than generic training.” – Participant J

“Some of the learning stuff is antiquated... I give them training that’s relevant to the current times.” – Participant B

These insights align with the cognitive apprenticeship theory described in Chapter 2, which highlights modelling, coaching and scaffolding Delprato and Antequera’s (2021) in Chapter 2. Chapter 4’s systemic highlights on mirrored practice and apprenticeship-style learning further highlight how these findings mirror intense immersion in workplace contexts. These findings demonstrate that skill acquisition in SMEs is not primarily formal or classroom-based, but rather emerges through guided participation and experiential learning, consistent with situated cognition principles.

5.4.3.1.2 Theme 2: The Mentor–Apprentice Relationship is Central to Skills Development

The mentor–apprentice dynamic was perceived as critical to involvement, skill acquisition, and long-term retention. Participant E described the relations as mutually advantageous, Participant B highlighted distinguishing and nurturing encouraged individuals, Participant A noted its function in tailoring learning to the apprentice’s pace, and Participant J emphasised its significance in succession planning.

“Anyone that shows an interest... I’m prepared to go out of my way to teach them the right way.” – Participant B

“They become skilled operators or even future mentors themselves.” – Participant J

This fortifies the concept of “communities of practice” from Chapter 2 (Silviana & Miftakh, 2021), where learning is intensified socially and identity-driven. Chapter Four’s interpretivist structure also highlights the importance of these interpersonal dynamics as part of data trustworthiness and contextual richness.

5.4.3.1.3 Theme 3: Mentorship Drives Employee Motivation and Performance

The participants mentioned maximising encouragement, loyalty, and job satisfaction through mentorship. Participant J attributed this to recognition and structured mentoring, Participant A highlighted social incorporation and setting goals, Participant B underlined relational understanding, and Participant E credited confidence-building for enhanced performance.

“If employees feel valued and seen, this leads to high engagement and loyalty.” – Participant J

“A good mentor is one that cares about development and is available to correct mistakes.” – Participant E

Chapter 3 discussed how emotional and encouraging factors critically influence apprenticeship results; these findings concretely demonstrate that theory. The methodology in Chapter 4, which includes member checking and reflective journaling, advocates genuine representation of these experiences.

5.4.3.1.4 Theme 4: Mentor-Guided Programs Promote Innovation and Internal Advancement

Mentorship was linked to evolution and internal development. Participant J saw enhancements in customer satisfaction and transformation employment. Participant A noted that production efficacy and dependence were maximised. Participant E observed retention and benefits of innovation, whereas Participant B added that encouragement and proper screening are fundamental.

“Train them for not just keeping them in the company, but for the industry.” – Participant B

“With SMEs being able to train apprentices... there are job opportunities for those who perform well.” – Participant E

These outcomes resonate with Chapter 3’s discussion of apprenticeship as a driver of organisational resilience and evolution. Chapter Four’s focus on triangulating practice, legislation, and participant data strengthens the validity of these mentor outcomes.

5.4.3.2 Objective 6: Recommendations for improving apprenticeship training

This section identifies and proposes practical recommendations for enhancing the effectiveness, applicability, and industry alignment of apprenticeship training programs.

5.4.3.2.1 Theme 1: Strengthen Collaboration Between SMEs and Training Providers

The participants emphasised the necessity of incorporating partnerships. Participants E and J called for consistent dialogue among training institutions, SETAs, and SMEs. Participant A suggested syllabus co-development. Participant B called for caring for trainers.

“There must be a common ground between stakeholders.” – Participant J

“There’s a disconnect between industry advancement and training institutions.” – Participant A

Chapter Two’s model of collaborative stakeholder design advocates this. Chapter Four’s methodology focused on stakeholder triangulation to improve transferability and gauge methodological alignment, which strengthens the call for industrial coherence.

5.4.3.2.2 Theme 2: Modernise Curriculum to Reflect Industry Trends and Needs

The participants criticised antiquated training material. Participant B referenced antiquated 1960s-era learning material. Participant A called for alignment with universal standards, and Participant J highlighted the need for constant updates. Figure 5.7 below shows SME participants calling for curriculum reform to better align with existing industry requirements, technologies, and skill requirements to guarantee that apprentices are job-ready upon completion.

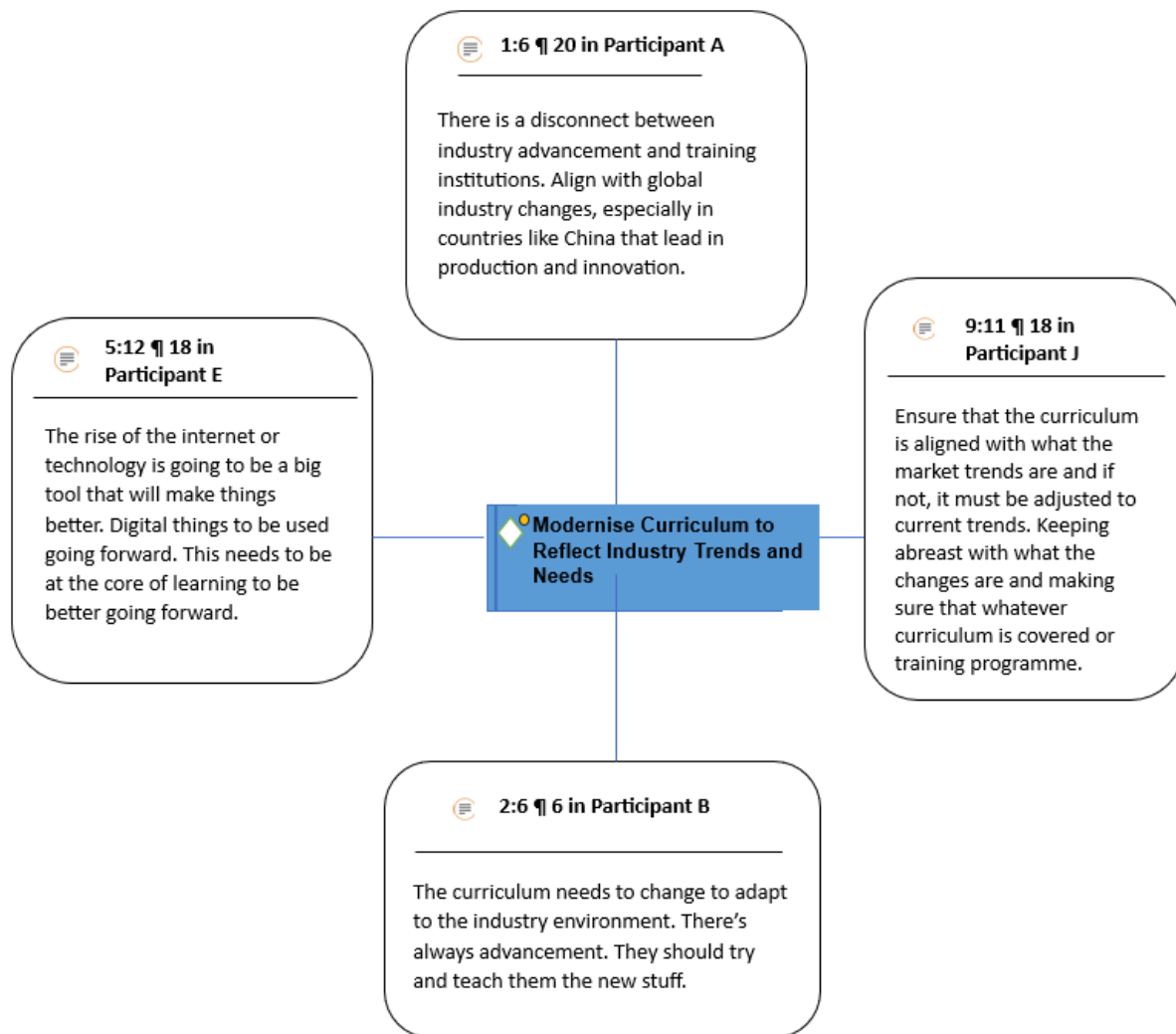


Figure 5.7: Modernise Curriculum to Reflect Industry Trends and Needs

Source: Own creation

“They should try and teach the new stuff... some learning comes from the 60s.” – Participant B

“Avoid training people for obsolete systems.” – Participant A

This is in line with the literature in Chapter Three, such as Brixiová *et al.* (2020) and Gong *et al.* (2019), who warn that unresponsive curricula increase skill disparities between vocational training and current industry requirements. Chapter Four’s focus on iterative thematic analysis validates these developed themes as continuous practical concerns. The findings reflect a breakdown in alignment between institutional

knowledge transmission and evolving industry knowledge systems, suggesting that curriculum rigidity limits adaptive learning within vocational education structures.

5.4.3.2.3 Theme 3: Expand Apprentices' Exposure and Practical Experience

The participants emphasised the critical function of on-the-job training. Participants B and A criticised the lack of hands-on experience. Participant J urged active engagement under mentorship, and Participant E advocated for early school-level participation.

“Apprentices must not only stand and watch – they must be hands-on.” – Participant B

“Apprentices should be included in discussions between SMEs and training providers.” – Participant E

This echoes the cognitive apprenticeship and situated learning theories of Chapter 2, which argues for learning in context (Hamilton *et al.*, 2021). Within this theoretical lens, learning is understood as a process of participation in authentic work practices rather than passive knowledge acquisition. The processes elaborated in Chapter 4, such as observations and triangulated data collection, underline the significance of contextual and experiential data. Therefore, SME practices in this study demonstrate how experiential learning environments operationalise cognitive apprenticeship principles in real manufacturing settings.

5.4.2.3.4 Theme 4: Build Foundational Skills from the School Level

The participants emphasised grounded shortfalls in secondary schooling, especially mathematics, physical science, and technical drawing, and suggested early career guidance and SME involvement.

“More engagements from SMEs in the development of learners.” – Participant E
“A 100% pass rate in which subjects? If they’re not applicable, it’s a waste of time.” – Participant B

The wider learning ecosystem mentioned in Chapter 3 advocates early intervention, whereas Chapter 4’s emphasis on contextual relevance suggests that input from diverse levels, such as schools and SMEs, is important for coherent skills pathways.

From a systems perspective, these findings indicate that apprenticeship effectiveness is not only determined at the point of training but is shaped by earlier stages of educational preparation, highlighting the need for an integrated education-to-employment pipeline.

5.5 CROSS-CASE ANALYSIS: SYNTHESIS OF COLLEGE, TRAINING CENTRE, AND SME PERSPECTIVES

This section synthesises findings across the three institutional contexts SMEs, colleges, and training centre to highlight key convergences and divergences in perspectives on apprenticeship training programs within the South African manufacturing industry. While each stakeholder group operates within distinct mandates, a cross-case analysis reveals shared challenges, complementary insights, and systemic constraints that collectively shape the quality and outcomes of apprenticeship training. This comparative approach enables a more integrated understanding of how institutional roles influence both the design and delivery of training.

5.5.1 Commonalities Across All Cases

This section emphasises fundamental themes that developed continuously throughout colleges, training centres, and SMEs. Regardless of operating in various contexts, participants shared multiple overlapping perceptions of obstacles and priorities in apprenticeship training programs.

5.5.1.1. Alignment Between Curriculum and Industry Needs

A consistent and pervasive concern across all stakeholder groups was the misalignment between training curricula and current industry requirements. Participants collectively indicated that existing learning materials are outdated and insufficiently responsive to rapidly evolving technologies such as robotics, automation, and CNC systems. This reflects a broader structural gap between educational provision and labour market demands.

For example, one college participant noted that *“the curriculum is very old and outdated... robotics is not included in the learning material,”* while an SME participant

highlighted that *“some of the learning stuff is antiquated... I give them training that’s relevant to the current times.”* These perspectives illustrate a shared recognition that formal curricula lag behind industry practice, compelling some stakeholders particularly SMEs to compensate through informal or supplementary training.

This finding aligns with previous studies that critique curriculum rigidity within the South African TVET system (Akoojee, 2019; Powell, 2019) and highlight limited employer involvement in qualification design (Wedekind, 2021). The persistence of this misalignment suggests systemic inefficiencies in curriculum development processes, reinforcing arguments by McGrath and Powell (2016) that educational institutions struggle to keep pace with technological and market changes.

5.5.1.2. Importance of Industry Exposure and Hands-On Learning

Across all cases, participants strongly emphasised the importance of experiential learning and direct industry exposure as central to effective apprenticeship training. A clear consensus emerged that theoretical instruction alone is insufficient without opportunities for practical application in real-world contexts.

This was reflected in statements such as *“apprentices must not only stand and watch – they must be hands-on”* and *“collaboration with industry will be the best way... so students can see what they are being taught in theory.”* These insights demonstrate a shared understanding that workplace-based learning enhances skill acquisition, confidence, and job readiness.

This emphasis is consistent with existing literature, which highlights the importance of integrating theory and practice in vocational education (Hlatshwayo, 2020; Bussemeyer & Trampusch, 2012). Furthermore, the findings echo international best practices observed in dual-training systems such as those in Germany and Switzerland (Euler, 2013), where structured workplace learning forms a core component of apprenticeship models. The strong alignment across stakeholder groups suggests that expanding industry-integrated learning opportunities remains a critical priority for improving training outcomes.

5.5.1.3. Soft Skills and Professional Readiness

In addition to technical competence, all stakeholder groups consistently highlighted the importance of soft skills including communication, reliability, adaptability, and time management as essential components of employability. Participants indicated that these attributes often determine whether apprentices successfully transition into and sustain employment.

For instance, one training centre participant observed that *“there are a lot of artisans sitting at home... not because they are unemployed, but because they are unemployable,”* while another emphasised that *“an apprentice needs to be able to communicate... be reliable.”* These statements reflect a shared concern that technical training alone is insufficient without the development of behavioural and interpersonal competencies.

This finding supports broader calls for more holistic approaches to apprenticeship training that integrate both technical and soft skills (Walker & Fongwa, 2017). It also aligns with international research demonstrating that soft skills are critical for long-term career progression and workplace integration (Moodie *et al.*, 2021; McKenzie & Sansom, 2019). The consistency of this theme across all cases highlights the need for training programs to adopt more comprehensive skill development frameworks.

5.5.2 Divergences in Perspectives and Institutional Roles

This section highlights the contrasting perceptions and liabilities expressed by colleges, training centres, and SMEs. These variances reflect the distinct institutional mandates, functional contexts, and requirements within the apprenticeship ecosystem.

5.5.2.1. Degree of Autonomy and Innovation

Figure 5.8 below demonstrates an increasing disconnection between the pace of industry development and the ability of training institutions. College participants emphasised that government monopoly limits curriculum reform, leaving colleges incapable of keeping up with universal standards such as robotics.

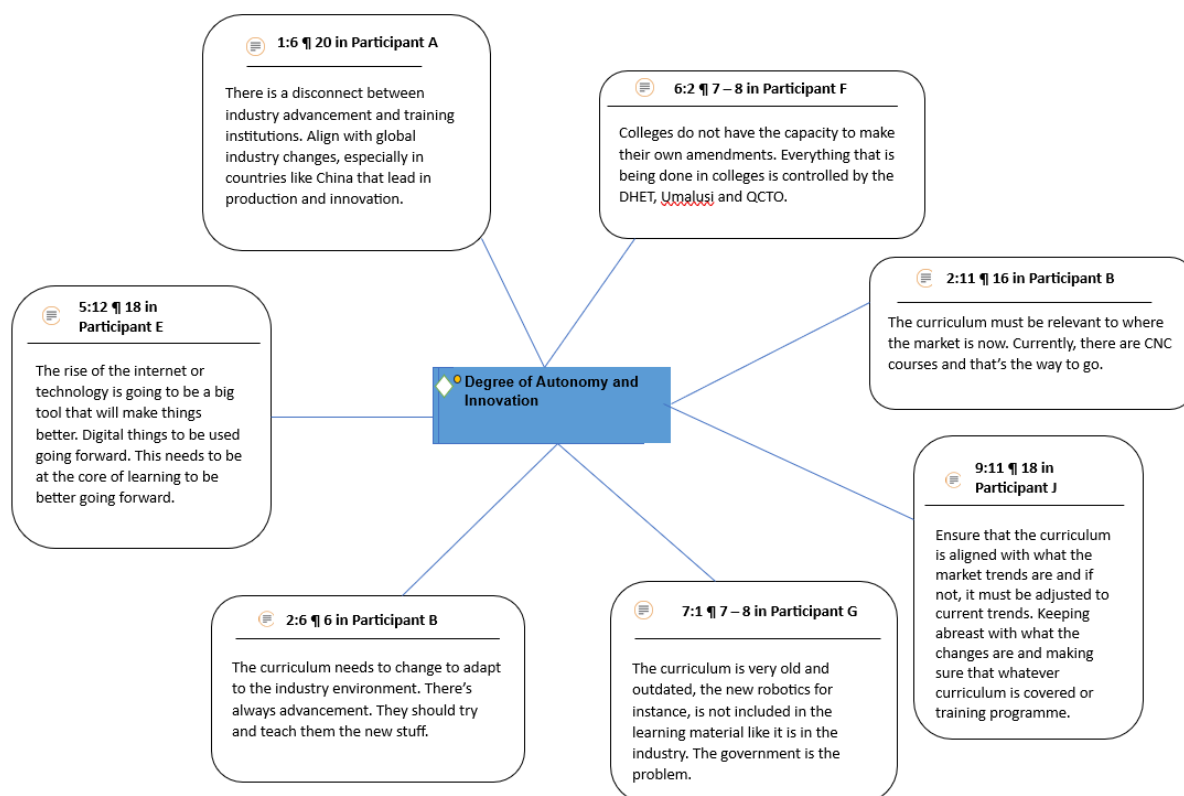


Figure 5.8: Degree of Autonomy and Innovation

Source: Own creation

A clear divergence was identified in the level of autonomy institutions possess in adapting curricula and implementing innovative training practices. Colleges consistently reported limited flexibility due to centralised regulatory control, whereas SMEs and training centres demonstrated greater responsiveness to industry changes.

College participants emphasised that institutional constraints imposed by regulatory bodies such as DHET, QCTO, and Umalusi restrict their ability to modify curricula. In contrast, SMEs highlighted their capacity to adapt training content to reflect current industry practices. For example, one college participant stated that “*colleges do not have the capacity to make their own amendments,*” while an SME participant noted that “*I give them training that’s relevant to the current times.*”

This divergence suggests that governance structures significantly influence institutional responsiveness and innovation. These findings align with Allais and Ngcwangu (2023) and Needham and Papier (2011), who argue that bureaucratic

control within vocational education systems constrains adaptability and limits alignment with labour market needs. The results therefore highlight a structural imbalance, where flexibility is concentrated in industry settings rather than formal education institutions.

5.5.2.2. View on Government Policy and Support

Differences were also evident in stakeholder perceptions of government policy and support. College participants expressed strong dissatisfaction, describing policies as disconnected from the realities of teaching and learning. In contrast, SMEs and training centres placed less emphasis on policy critique and focused more on internal strategies for improving training outcomes.

For example, a college participant stated that “*government is doing absolutely nothing to improve the quality of the education system.*” This reflects a broader perception of policy-practice misalignment within institutional contexts.

This divergence suggests that colleges, as policy-implementing institutions, are more directly affected by regulatory constraints, whereas SMEs operate with greater independence from formal policy structures. This finding mirrors Powell and Reddy’s (2015) observation that national policies often fail to translate effectively into institutional and workplace practices, resulting in gaps between policy intent and implementation.

5.5.2.3. Mentorship and Individualised Feedback

Another key divergence emerged in the emphasis and implementation of mentorship and individualised feedback. SMEs and training centres consistently highlighted mentorship as a critical mechanism for skill transfer and learner development, whereas colleges reported limitations in implementing such practices due to time and policy constraints.

Participants from SMEs and training centres described mentorship and personalised feedback as essential for improving performance, confidence, and workplace readiness. For example, one participant noted that “*mentorship transfers practical, job-*

specific skills more effectively than generic training,” while another emphasised that “I give everyone feedback individually... the challenge has a solution.”

In contrast, colleges indicated that structural and institutional limitations restrict their ability to provide similar levels of individualised support. This suggests a disparity in learner support mechanisms across institutional contexts.

These findings are consistent with apprenticeship literature, which highlights the effectiveness of mentor–apprentice relationships in enhancing learning outcomes, confidence, and skill retention (Fuller & Unwin, 2017; ILO, 2020). The results therefore underscore the need to strengthen mentorship structures within formal education settings to improve training quality.

5.5.3 Systemic Challenges and Access Barriers

Systemic challenges related to access and equity were primarily highlighted by college participants, indicating that these issues are more visible within formal education environments. Key barriers included difficulties with digital application processes, funding limitations such as NSFAS exclusions, and the broader digital divide affecting learners from disadvantaged backgrounds.

For example, one participant noted that *“students from disadvantaged backgrounds... don’t know how to manoeuvre the system.”* This reflects broader structural inequalities that limit access to apprenticeship opportunities.

These findings reinforce concerns raised in Chapter Three regarding systemic inequalities within South Africa’s post-school education and training system (DHET, 2017). They also align with research highlighting the persistent underrepresentation of disadvantaged groups in technical and vocational fields (Bhorat *et al.*, 2021). The concentration of these concerns within colleges suggests that formal institutions play a critical role in mediating access, but are simultaneously constrained by systemic limitations.

5.6 CHAPTER SUMMARY

This chapter presents the detailed findings from the study, exploring perspectives from colleges, training centres, and SMEs regarding apprenticeship training programs in

South Africa's manufacturing sector. The chapter begins by visualising the frequency of key terms from stakeholder interviews, emphasising areas of concern such as apprentices, training, trainers, and skills. Through systematic coding and thematic analysis, the researcher identified themes reflecting challenges in curriculum relevance, industry alignment, government policy support, and the capacity of trainers to deliver quality outcomes. Across colleges, training centres, and SMEs, common issues included outdated curricula, insufficient practical exposure, and the need for holistic skill development encompassing both technical and soft skills. The chapter also underscores the critical role of mentor-led training and individualised feedback in enhancing apprentice performance and workplace readiness.

The findings further reveal divergences between stakeholder groups, particularly regarding institutional autonomy, innovation, and perceptions of government policies. Colleges were constrained by centralised governance and limited resources, while SMEs and training centres showed more flexibility in adapting training to industry needs. Mentorship and practical exposure were emphasised most strongly by SMEs, whereas colleges struggled to implement these due to policy and structural barriers. Systemic challenges, including inequitable access, funding limitations, and digital divides, were also highlighted as significant barriers to effective apprenticeship training. Overall, Chapter 5 synthesises these insights to provide a comprehensive understanding of the strengths, gaps, and opportunities within the apprenticeship ecosystem, setting the foundation for recommendations to enhance alignment, quality, and inclusivity in training programs.

CHAPTER SIX: SUMMARY CONCLUSION AND RECOMMENDATION

6.1 INTRODUCTION

This final chapter presents a comprehensive conclusion to the study by synthesising the fundamental conclusions from the perspectives of the college, training centre and SMEs regarding apprenticeship training programs within South Africa's manufacturing industry. It mirrors how these conclusions align with the study's research objectives and theoretical structure, providing comprehensive insight into the existing state and barriers of apprenticeship training programs. The chapter also elaborates on the wider implications of these conclusions for legislation, practice, and future studies. Building on the understanding gained through analysis, the chapter proposes hands-on recommendations to enhance the applicability, efficacy, and equity of apprenticeship training programs. Finally, this chapter acknowledges the limitations of the study and presents concluding reflections on the potential for apprenticeship methods to contribute to skills enhancement and industrial development in the South African context.

6.2 SUMMARY OF KEY FINDINGS

This study examined the viewpoints and experiences of fundamental stakeholders, colleges, training centres, and SMEs associated with the apprenticeship training program within South Africa's manufacturing industry. The conclusions reveal multiple crucial themes that illuminate the strengths, obstacles, and possibilities within the existing apprenticeship system.

6.2.1 Curriculum Relevance and Alignment with Industry Needs

A pervasive concern throughout all stakeholder groups was the antiquated and obsolete syllabus, which struggles to compete with continuously evolving industry technologies such as automation, robotics and CNC systems. While colleges face legislative restrictions on syllabus reform, SMEs and training centres have demonstrated enhanced resilience in adapting training content to real-world applications. This misalignment prohibits apprentices' workplace readiness and contributes to increasing skill mismatch in the manufacturing industry.

6.2.2 Importance of Practical, Hands-On Learning

Each participant emphasised the critical function of on-the-job training, i.e., experiential learning, in fostering qualified artisans. Mentorship, site visits, and project-based evaluations were highlighted as essential techniques for infusing hands-on training and contextual insight. This aligns with universal best practices that highlight learning within authentic work settings to improve skill retention and self-assurance.

6.2.3 Mentorship and Feedback as Drivers of Growth and Motivation

Mentor–apprentice relationships, especially within SMEs, are invariably linked to heightened morale, loyalty, and enhanced performance. Training centres also described the importance of personalised, productive feedback in advocating apprentice development. However, colleges emphasised obstacles in maintaining mentorship due to time limitations and legislation structures, emphasising an institutional shortfall in learner support.

6.2.4 Soft Skills and Professional Readiness

In addition to technical competence, soft skills such as communication, credibility, adaptability, and teamwork have developed as critical for employability and long-term career success. The participants highlighted that soft skills frequently establish whether qualified apprentices obtain and retain employment, emphasising the necessity for comprehensive training strategies.

6.2.5 Institutional Capacity and Systematic Barriers

Discrepancies were observed in institutional independence and attentiveness. Colleges explicitly stated their frustration with centralised legislation monopoly that constrain syllabus reform and development, whereas SMEs and training centres functioned with greater agility but encountered resource constraints. Moreover, systemic bias, such as infrastructural roadblocks and funding exclusions were emphasised by colleges as critical challenges impacting equitable access to apprenticeship possibilities.

6.2.6 Trainer Development and Support

The competent trainers were not only technically skilled but also adaptable and psychologically intelligent and capable of involving apprentices. Ongoing professional enhancement was considered essential; however, support systems varied across institutions, with colleges encountering greater barriers in training trainers to meet evolving industry standards. These integrated conclusions emphasise the need for a correlated, multi-stakeholder technique to evolve apprenticeship training programs. Aligning the syllabus with industry standards, enhancing hands-on learning opportunities, intensifying mentorship, and addressing systemic discrimination are key to establishing a strong and inclusive skills enhancement ecosystem in South Africa's manufacturing industry.

6.3 Achievement of the Study Objectives

This section demonstrates how each research objective of the study was achieved based on the key findings presented in Chapter 5. It provides a clear linkage between the empirical results and the original aims of the study, ensuring that each objective is systematically addressed.

Objective 1: Improving the Quality of Theoretical Training

The study found that the quality of theoretical training is limited by outdated curricula, weak alignment with industry needs, and insufficient integration of practical exposure. These challenges were consistently highlighted by college participants and confirmed through cross-case analysis. The objective is therefore achieved through evidence showing the need for curriculum modernisation and strengthened industry collaboration to enhance relevance and learner comprehension.

Objective 2: Impact of Government Policies on Apprenticeship Training

Findings indicate that government policies significantly influence apprenticeship training, particularly through centralised curriculum control, limited institutional autonomy, and inequitable access to funding such as NSFAS. The objective is achieved by demonstrating how policy implementation gaps and structural inequalities affect access, quality, and responsiveness of training systems.

Objective 3: Standards and Assessment Criteria for Apprenticeship Training

The study established that effective apprenticeship training requires integrated theoretical and practical assessment approaches, continuous formative evaluation, and alignment with industry standards. These findings confirm that competency-based and feedback-driven assessment practices are essential for improving apprentice readiness and performance.

Objective 4: Capacity of Trainers to Ensure Quality Outcomes

The findings show that trainer effectiveness depends on technical expertise, industry experience, pedagogical ability, and continuous professional development. Institutional support systems such as training programmes, feedback mechanisms, and access to resources were also identified as critical. This objective is achieved through evidence highlighting the central role of trainer competence and development in training quality.

Objective 5: Significance of Mentor-Led Apprenticeship Training

The study confirms that mentor-led training enhances productivity, accelerates skill acquisition, and improves apprentice confidence and workplace integration. Strong mentor–apprentice relationships were found to be central to effective skills transfer, motivation, and retention. This objective is achieved through evidence supporting mentorship as a key driver of workplace-based learning.

Objective 6: Recommendations for Improving Apprenticeship Training

The findings highlight the need for strengthened collaboration between SMEs and training providers, curriculum modernisation, expanded workplace exposure, and early foundational skills development at school level. These recommendations directly emerge from stakeholder perspectives and provide actionable strategies to improve the apprenticeship system.

6.4 DISCUSSION OF FINDINGS

The findings of this study provide a significant understanding of the intricate dynamics of designing apprenticeship training programs within South Africa's manufacturing industry. Interpreted within the wider apprenticeship ecosystem, these findings emphasise both systemic obstacles and emerging advancements that impact the quality and outcomes of skills enhancement.

6.4.1 Systemic Challenges in the Apprenticeship Ecosystem

One of the most crucial challenges is the misalignment between the syllabus and rapidly advancing industry standards. The obsolete, antiquated syllabus, especially within colleges, hinders the development of the skills necessary for a technologically evolving manufacturing industry. This echoes the findings of previous studies (Akoojee, 2019; Powell, 2021), which have evaluated South African college systems for their sluggish reactions to market evolution. The outcomes of this misalignment manifest in a developing skills mismatch, whereby apprentices complete training inadequately prepared for the realities of contemporary workplaces, subverting both employability and industry aggression.

Access impediments developed as a crucial concern, particularly for learners from underprivileged backgrounds. A digital literacy shortage, exclusion from funding schemes such as the NSFAS, and systemic bias in rural areas hinder equitable engagement in apprenticeship training programs. This finding echoes national reports on educational inequalities (DHET, 2017; Bhorat *et al.*, 2021) and stresses the need for tailored strategies to bridge divisions and foster inclusivity within the skill enhancement structure.

Policy limitations further compound obstacles. Centralised control over syllabus design and restricted institutional independence constrain colleges' ability to advance and respond strategically to industry evolution. This bureaucratic inflexibility fosters exasperation among educators and hinders meaningful participation among educational institutions and employers. Such tensions are well documented in the literature on vocational education governance (Allais & Ngcwangu, 2023; Needham &

Papier, 2011), highlighting the broader structural hindrances that South Africa's apprenticeship system encounters.

6.4.2 Strengths and Innovations Within the Apprenticeship Framework

Despite systemic constraints, various strengths and advanced practices have been developed throughout stakeholder groups. The primary function of mentorship within SMEs stands out as a viable process for skills transfer, learner inspiration, and workplace collaboration. This aligns with cognitive apprenticeship theory (Fuller & Unwin, 2017) and universal evidence (ILO, 2020), which highlights the significance of social learning and embedded practice in vocational training. Similarly, personalised and positive feedback offered in training centres represents a significant support approach that promotes mirrored learning and consistent enhancement. These formative evaluation practices align with the best practices explored in Chapter Four and make crucial contributions to learner development and confidence.

Trainer enhancement was emphasised as a critical area for maintaining quality apprenticeship delivery. The call for consistent professional development that integrates technical, pedagogical, and emotional intelligence skills mirrors contemporary perspectives on educator competence as versatile and progressive. This emphasis aligns with arguments made by Gong *et al.* (2019) and Liu and Barwick (2023) on the need for upskilling trainers to meet modern industrial standards.

6.4.3 Integration with Existing Literature and Theoretical Frameworks

The findings support the theoretical structures previously discussed, especially the cognitive apprenticeship methods, which accentuate the significance of mentorship, scaffolding, and practical learning. The illustrated importance of on-the-job experience, introspective review, and socialising in apprentices' skill enhancement affirms this system's relevance in South Africa's manufacturing context.

Moreover, the study's understanding of systemic challenges aligns with important viewpoints on educational fairness and policy execution obstacles confirmed in Chapters Two and Three. The continuous digital exclusion, funding disparities, and procedural rigidity identified mirror a wider analysis of tertiary education in South Africa and resonate with calls for systemic transformation to guarantee inclusive and

responsive skills pathways. This discussion positions the study's insights within the broader South African apprenticeship ecosystem, emphasising the urgent need to address systemic limitations while building on current strengths. Improving engagement among stakeholders, revising curricula to reflect industry realities, and investing in mentorship and trainer development emerge as strategic priorities for enhancing apprenticeship outcomes and supporting sustainable manufacturing industry development.

6.5 FRAMEWORK DEVELOPMENT

This section presents a comprehensive framework developed from the cross-case thematic findings discussed in Chapter Five. The framework integrates insights from the college, training centre and SMEs and is informed by the study's theoretical and empirical foundations. It provides a strategic framework for enhancing the relevance, responsiveness, and efficacy of apprenticeship training programs within the South African manufacturing context. The framework directly addresses the key challenges identified in the study, including curriculum misalignment, restricted practical exposure, weak collaboration, inadequate trainer and mentor capacity, and systemic inequities, and offers interlinked strategies for sustainable skills development.

6.5.1 Framework Orientation

The proposed framework is underpinned by three guiding theoretical principles derived from the study's conceptual and empirical insights:

- Cognitive Apprenticeship Theory (Delprato & Antequera, 2021): emphasising learning through modelling, coaching, and scaffolding within authentic contexts.
- Communities of Practice (Silviana & Miftakh, 2021): viewing learning as a social process embedded in mentor–apprentice relationships and collective workplace engagement.
- Systems Theory of Vocational Education (Busemeyer & Trampusch, 2012): positioning apprenticeship as an interdependent system involving policy, institutions, and industry.

Together, these foundations inform a multilevel framework consisting of six interconnected pillars:

- Curriculum Responsiveness and Alignment
- Experiential and Industry-Integrated Learning
- Trainer and Mentor Professional Capacity
- Feedback, Assessment and Quality Assurance
- Stakeholder Collaboration and Policy Coherence
- Access, Equity and Foundational Skills Development

6.5.1.1 Pillar 1: Curriculum Responsiveness and Alignment

Objective:

To ensure that apprenticeship curricula remain industry-relevant, technology-driven, and adaptable to the evolving demands of manufacturing.

Key Techniques:

- Establish joint curriculum committees involving DHET, SETAs, training providers and SMEs to co-design and periodically review learning content.
- Integrate emerging technologies such as robotics, automation, and digital manufacturing into training modules.
- Introduce modularised and competency-based curricula that allow flexible updates without complete syllabus overhauls.
- Promote institutional autonomy for colleges to contextualise learning materials in line with regional industry needs.

Expected Outcome:

A responsive, future-oriented curriculum that bridges the gap between educational provision and labour market realities.

6.5.1.2 Pillar 2: Experiential and Industry-Integrated Learning

Objective:

To strengthen the practical application of theory through authentic, workplace-based experiences.

Key Techniques:

- Formalise industry partnerships to facilitate apprentices' structured workplace rotations, site visits, and project-based assignments.
- Develop dual-training models that combine institutional theory and industry practice in alternating cycles.
- Encourage industry-led demonstrations and guest lectures to reinforce theoretical learning with real-world examples.
- Implement school-to-work bridging programs connecting final-year learners to SMEs for practical immersion.

Expected Outcome:

Apprentices acquire relevant, contextualised competencies and workplace adaptability through continuous experiential learning.

6.5.1.3 Pillar 3: Trainer and Mentor Professional Capacity

Objective:

To enhance the pedagogical, technical, and emotional competence of trainers and mentors, who facilitate apprenticeship learning.

Key Techniques:

- Introduce structured Continuous Professional Development (CPD) programs for trainers, focusing on teaching methods, assessment design, and digital pedagogy.

- Establish industry secondment schemes for trainers to update technical knowledge through short-term industrial exposure.
- Develop mentor certification pathways in partnership with SETAs to professionalise mentoring within SMEs.
- Incorporate emotional intelligence and coaching skills training to improve relational engagement with apprentices.

Expected Outcome:

A professionalised, well-supported training and mentoring workforce capable of nurturing both technical and interpersonal competencies among apprentices.

6.5.1.4 Pillar 4: Feedback, Evaluation and Quality Assurance

Objective:

To create a robust evaluation ecosystem that supports formative learning, reflective growth, and consistent quality standards.

Key Techniques:

- Replace exclusive reliance on summative testing with continuous formative assessments aligned with practical milestones.
- Establish standardised feedback templates and digital tracking systems for apprentices' progress and performance.
- Introduce peer and apprentice feedback loops for trainer and mentor evaluation to promote accountability.
- Align assessment instruments with QCTO competency frameworks and industry certification standards.

Expected Outcome:

An evidence-based, learner-centred assessment culture that promotes mastery, transparency, and continuous improvement.

6.5.1.5 Pillar 5: Stakeholder Engagement and Legislation Coherence

Objective:

To foster cohesive collaboration and shared accountability among colleges, training centres, SMEs, and policy actors.

Key Techniques:

- Form local apprenticeship councils to coordinate regional training efforts, resource sharing, and joint monitoring.
- Align policy instruments (DHET, QCTO, SETAs, and NSFAS) to remove overlaps and address funding inequalities.
- Create data-sharing platforms to enable real-time reporting of learner progress, employment outcomes, and institutional performance.
- Encourage public–private partnerships (PPPs) for infrastructure, equipment, and co-funded innovation projects.

Expected Outcome:

A harmonised apprenticeship ecosystem characterised by mutual accountability, transparent communication, and aligned policy implementation.

6.5.1.6 Pillar 6: Access, Equity and Foundational Skills Development

Objective:

To widen participation and ensure equitable access to apprenticeship programs, especially for disadvantaged and rural learners.

Key Techniques:

- Reintroduce and strengthen foundational technical subjects (mathematics, science, and technical drawing) at the school level.
- Expand digital literacy and application support programs for online enrolment in public colleges.

- Ensure NSFAS inclusivity across both public and private accredited training institutions.
- Introduce career guidance and pre-apprenticeship bridging courses for early skill orientation and learner readiness.

Expected Outcome:

A more inclusive and equitable apprenticeship pipeline that builds foundational competencies and promotes social mobility.

6.5.2 Framework Integration and Operational Logic

Figure 6.1 below illustrates the interrelationships among the six pillars. The framework of the apprenticeship training program operates as a cyclical system of reinforcement, where curriculum reform (Pillar 1) feeds into practical learning (Pillar 2), which is sustained by trainer and mentor competence (Pillar 3) and quality feedback (Pillar 4). These are enabled by collaborative governance (Pillar 5) and anchored in equity and foundational access (Pillar 6).

The proposed Six Pillar Model differs from existing apprenticeship and TVET frameworks in South Africa, which are often characterised by fragmented implementation, centralised control, and a primary focus on compliance with regulatory standards. In contrast, this framework adopts an integrated and systems-based approach that explicitly links curriculum design, workplace learning, mentorship, assessment, stakeholder collaboration, and equitable access within a single cyclical structure. Unlike conventional models that treat these components as separate or sequential processes, the framework emphasises their interdependence and continuous reinforcement. Furthermore, while existing frameworks tend to prioritise policy alignment, this model is empirically grounded in cross-case findings from colleges, training centres, and SMEs, ensuring practical relevance to real training environments. It also places stronger emphasis on mentorship, soft skills development, and formative feedback as central drivers of apprenticeship effectiveness, rather than as peripheral elements. Importantly, the inclusion of access and equity as a foundational pillar directly addresses systemic challenges such as funding disparities and the digital divide, which are often underemphasised in

traditional frameworks. As a result, the model represents a shift from a compliance-driven system toward a more adaptive, collaborative, and industry-responsive apprenticeship ecosystem.

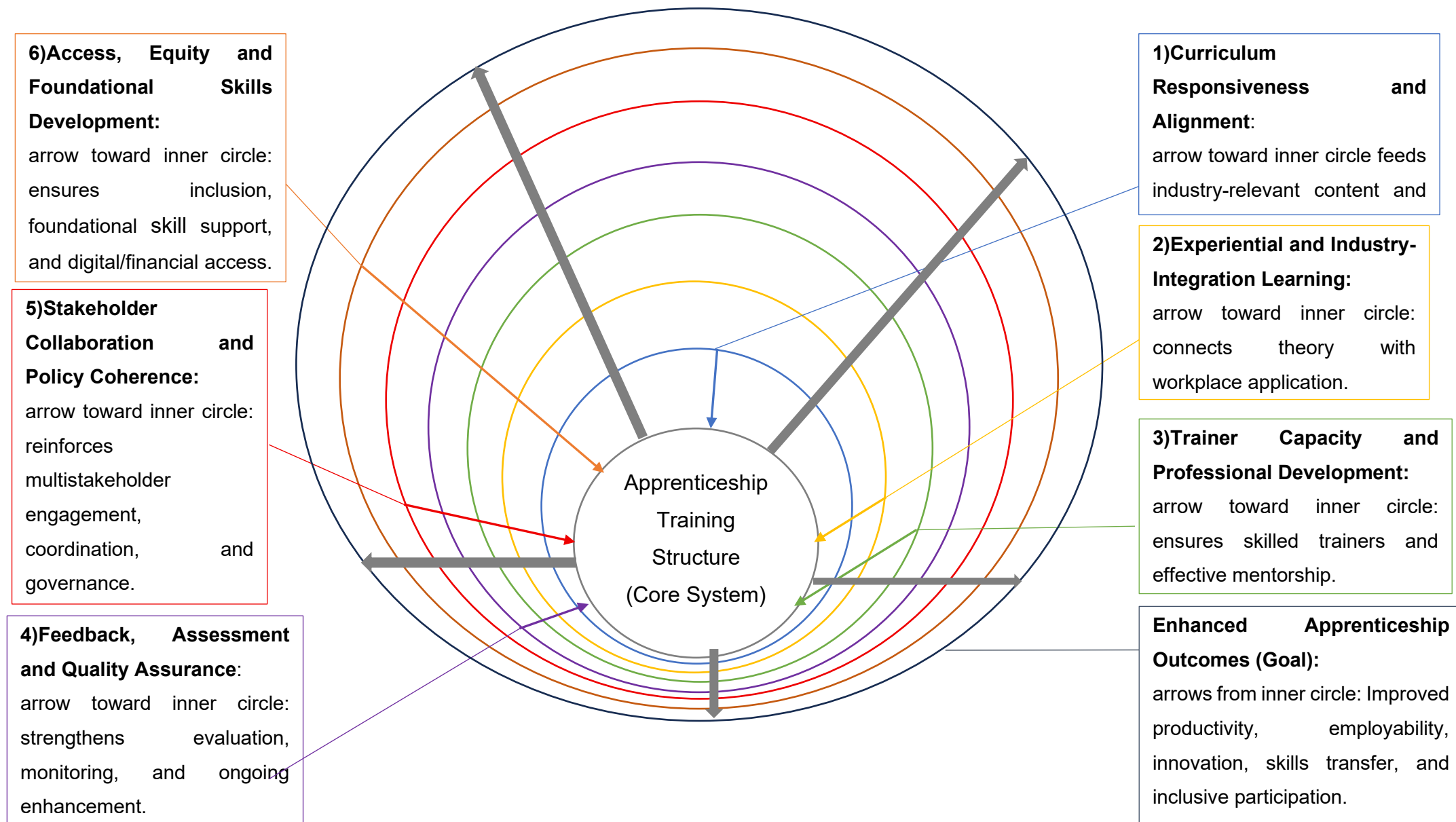


Figure 6.1: Six Pillar Model

Source: Own creation

6.5.3 Framework Implementation Considerations

To operationalise the framework effectively, the following actions are recommended:

- Policy Level:
 - DHET and QCTO to revise qualification standards in consultation with industry clusters.
 - NSFAS to extend financial support mechanisms to accredited private training institutions.
- Institutional Level:
 - Colleges and training centres to establish formal Memoranda of Understanding (MoUs) with SMEs for workplace integration.
 - Develop institutional monitoring tools aligned with SETA reporting systems.
- Industry Level:
 - SMEs to embed structured mentorship schemes and allocate time for mentor development.
 - Encourage collaborative R&D projects to pilot curriculum innovations based on emerging technologies.

6.5.4 Anticipated Impact of the Framework

Building on its clearly defined distinction from existing South African apprenticeship frameworks which are often fragmented, linear in operation, compliance-driven, and weakly supported by real-time industry feedback the proposed six-pillar model introduces an integrated, cyclical, and feedback-driven system. Unlike conventional approaches where curriculum design, workplace learning, assessment, and governance operate in silos, the proposed framework establishes continuous interaction between all six pillars, ensuring that improvements in one area reinforce system-wide effectiveness.

If effectively implemented, the proposed framework is expected to generate the following outcomes:

- Reduce the skills mismatch between training output and industry needs, through Pillar 1 (Curriculum Responsiveness and Alignment) supported by Pillar 5 (Stakeholder Collaboration and Policy Coherence). This occurs through structured curriculum–industry co-design processes, where SMEs, training centres, and regulatory bodies jointly review occupational standards, and where workplace feedback from apprentices is systematically fed back into curriculum revision cycles. This continuous loop ensures that training content remains responsive to technological advancements such as automation, robotics, and modern manufacturing systems.
- Enhance apprentice employability through stronger practical and soft skills development, driven by Pillar 2 (Experiential and Industry-Integrated Learning) and Pillar 4 (Feedback, Assessment and Quality Assurance). In this mechanism, apprentices are not only exposed to workplace environments but are also assessed against occupational standards in real operational contexts. Continuous formative feedback from both workplace mentors and training providers ensures iterative skills improvement, while reflective assessment practices strengthen problem-solving, communication, and adaptability required in modern workplaces.
- Promote sustainable trainer and mentor competence, through Pillar 3 (Trainer and Mentor Professional Capacity). This is achieved via mandatory continuous professional development, structured industry secondments, and formal mentor recognition systems. These mechanisms ensure that trainers and workplace mentors remain actively engaged with current manufacturing technologies, production systems, and industry practices, thereby improving the relevance and quality of instruction delivered to apprentices.
- Strengthen policy coherence and institutional accountability, through Pillar 5 (Stakeholder Collaboration and Policy Coherence). The framework introduces structured multi-stakeholder coordination platforms that bring together DHET, QCTO, SETAs, TVET colleges, training centres, and SMEs into a unified

governance and communication system. This reduces duplication of efforts, improves transparency in reporting learner outcomes, and ensures that policy implementation is aligned with workplace realities and labour market demands.

- Broaden equitable access to technical training opportunities, through Pillar 6 (Access, Equity and Foundational Skills Development). This is achieved by addressing structural barriers such as inadequate foundational education, digital exclusion, and uneven funding access. Targeted bridging programmes, community-based digital access hubs, and expanded funding inclusion for diverse training institutions ensure that disadvantaged learners are better integrated into apprenticeship pathways, thereby improving participation and progression rates.

Overall, the cyclical design of the framework ensures that outcomes are not isolated but mutually reinforcing. For example, improvements in curriculum alignment (Pillar 1) enhance workplace readiness in Pillar 2, while feedback from workplace learning feeds back into curriculum refinement. Similarly, enhanced trainer competence strengthens both teaching quality and assessment reliability, which in turn improves employability outcomes. This systemic integration distinguishes the proposed model from conventional apprenticeship frameworks in South Africa.

In essence, the framework provides a strategic shift from a compliance-oriented apprenticeship system to an adaptive, collaborative and industry-responsive ecosystem. In this model, curriculum design, workplace practice, assessment, and governance operate as an interconnected and continuously improving system.

6.5.5 Anticipated Challenges and Mitigation Strategies in Framework Implementation

While the proposed framework offers a comprehensive roadmap for strengthening apprenticeship training within South Africa's manufacturing industry, its successful implementation depends on institutional capacity, policy alignment, and sustained collaboration across stakeholders. This subsection outlines potential challenges

associated with each framework pillar and proposes corresponding strategies to address them.

6.5.5.1 Pillar 1: Curriculum Responsiveness and Alignment

Potential Obstacles

- Bureaucratic rigidity: Centralised control by DHET, QCTO, and Umalusi may delay curriculum reforms and approval processes.
- Limited industry consultation: SMEs and training centres are often excluded from curriculum development committees.
- Resource constraints: Updating teaching materials and acquiring new technology (e.g., robotics kits, CNC machines) requires funding that most colleges lack.

Mitigation Techniques

- Advocate for decentralised curriculum adaptation through regional review panels, allowing contextual updates without national delays.
- Institutionalise curriculum co-design forums with SETAs, SMEs, and training providers every two years.
- Establish public and private funding models to co-finance modern training equipment and digital learning tools.
- Introduce modular updating systems, allowing sections of the curriculum to be revised independently.

6.5.5.2 Pillar 2: Experiential and Industry-Integrated Learning

Potential Obstacles

- Restricted availability of workplace placements in SMEs due to production demands or safety concerns.

- Lack of formal agreements between colleges/training centres and industry partners.
- Inconsistent supervision during workplace learning, leading to uneven skill exposure.

Mitigation Techniques

- Formalise MoUs with SMEs and industry bodies to guarantee minimum placement quotas.
- Implement shared supervision models where both academic and industry mentors jointly evaluate apprentices' progress.
- Provide financial incentives or tax rebates for SMEs that host apprentices.
- Develop virtual simulations and project-based tasks for instances where physical placement is unavailable.

6.5.5.3 Pillar 3: Trainer and Mentor Professional Capacity

Potential Obstacles

- Outdated trainer expertise: Many trainers have limited exposure to current industrial technologies.
- Insufficient CPD opportunities due to funding and time constraints.
- The lack of formal recognition for mentors, leading to inconsistent-quality guidance.
- High staff turnover in SMEs, which disrupts continuity in mentoring relationships.

Mitigation Techniques

- Introduce mandatory CPD credits for trainers, linked to re-accreditation requirements.

- Establish industry secondment programs where trainers spend short sabbaticals in manufacturing firms.
- Create a national mentor certification and recognition framework through SETAs to standardise mentorship quality.
- Provide succession mentoring models within SMEs to maintain institutional knowledge despite staff changes.

6.5.5.4 Pillar 4: Feedback, Assessment, and Quality Assurance

Potential Obstacles

- Overreliance on summative assessments continues due to entrenched institutional norms.
- Inconsistent evaluation tools across training providers and industries.
- Limited feedback literacy among trainers and mentors, reducing the value of reflective learning.
- Insufficient digital infrastructure for tracking learner progress.

Mitigation Techniques

- Introduce standardised formative assessment rubrics aligned with QCTO occupational standards.
- Conduct training workshops on feedback and reflective practice for trainers and mentors.
- Develop centralised e-portfolios or digital logbooks accessible to both providers and industry mentors.
- Conduct external moderation and benchmarking through SETAs to ensure uniformity in assessment standards.

6.5.5.5 Pillar 5: Stakeholder Collaboration and Policy Coherence

Potential Obstacles

- Fragmented governance: A lack of coordination among DHET, QCTO, SETAs, and NSFAS leads to duplication or policy misalignment.
- Limited trust between public institutions and private industry.
- Communication gaps are causing delays in implementing joint initiatives.

Mitigation Techniques

- Establish Local Apprenticeship Coordination Councils representing all stakeholders for regional planning and review.
- Create shared digital data platforms to report learner progression and employment outcomes in real time.
- Encourage policy alignment workshops between government departments and industry associations annually.
- Promote Public and Private Partnerships to co-fund infrastructure and curriculum modernisation initiatives.

6.5.5.6 Pillar 6: Access, Equity and Foundational Skills Development

Potential Obstacles

- Digital divide and lack of internet access for online applications and learning.
- Weak foundational education in mathematics, science and technical subjects.
- Inequitable funding mechanisms exclude private or rural training providers from NSFAS support.
- Gender disparities in traditionally male-dominated trades.

Intervention Techniques

- Expand community-based digital access hubs in partnership with municipalities and NGOs.

- Introduce bridging and foundation programs in technical high schools to strengthen prerequisite skills.
- Advocate for NSFAS policy revision to include accredited private and rural institutions.
- Implement gender-inclusive recruitment campaigns and mentorship for women in manufacturing apprenticeships.

6.5.6 Cross-Cutting Systemic Risks

In addition to pillar-specific challenges, several overarching risks could impede framework success:

Table 6.1: Cross-Cutting Systemic Risks

Systemic Risk	Description	Mitigation Approach
Legislation Inertia	Delays in transforming TVET governance structures.	Foster pilot projects under SETAs to illustrate effectiveness and inform national roll-out.
Funding Restrictions	Inadequate budgets for training infrastructure and stipends.	Mobilise industry levies, donor funds and private sponsorships.
Institutional Resistance	Stakeholders may resist changes disrupting entrenched practices.	Apply change management principles and engage inclusively with stakeholders.
Monitoring Gaps	Lack of data on learner outcomes and program quality.	Create unified reporting dashboards linked to SETA databases.

Source: Own creation

Table 6.1 above highlights a set of systemic risks that operate across all six pillars of the proposed apprenticeship framework. Unlike pillar-specific challenges, these risks

are structural in nature and have the potential to undermine implementation at the national, institutional, and industry levels. They represent the broader environmental and governance constraints that shape the TVET landscape and determine how effectively colleges, training centres, and SMEs can adopt the framework.

6.5.7 Summary of Implementation Feasibility

In summary, while the framework offers a coherent and practical structure for improving apprenticeship training, its sustainability depends on institutional agility, stakeholder commitment, and policy harmonisation. The identified challenges are not insurmountable but require collaborative governance, capacity building, and evidence-based monitoring. With these mitigation strategies in place, the framework can function as a realistic and adaptable model for transforming South Africa's manufacturing apprenticeship ecosystem.

Table 6.2 below summarises the core implementation risks and associated mitigation strategies for each framework pillar, as informed by cross-case perspectives from SMEs, TVET colleges and training centres. By integrating these measures, the framework is positioned to be both theoretically grounded and practically executable, supporting the development of effective skills, workplace readiness, and systemic alignment within South Africa's manufacturing apprenticeship ecosystem.

The table provides a consolidated overview of the primary risks, implications, and mitigation strategies associated with each pillar of the proposed apprenticeship framework. This summary translates the broader conceptual model into concrete operational considerations, demonstrating how the framework can be realistically applied within South Africa's diverse manufacturing apprenticeship environments. Drawing on insights from SMEs, TVET colleges, and training centres, the table highlights that while each pillar contributes uniquely to strengthening apprenticeship quality, they are all susceptible to specific systemic and institutional constraints that must be proactively managed.

Table 6.2: Summary of Structure Pillars, Associated Risks and Mitigation Techniques

Framework Pillar	Potential Risks/Challenges	Implications	Mitigation Strategies
Curriculum Responsiveness	Bureaucratic rigidity in DHET/QCTO control, outdated materials and limited academic-industry collaboration	Continued skill mismatch and outdated qualifications	Foster curriculum review committees with SME and SETA engagement; periodic updates every 2–3 years; incentivise industry involvement through SETA funding.
Experiential Learning Integration	Limited access to workplaces; inadequate resources for site visits; poor coordination between colleges and firms	Apprentices lack contextual and technical experience	Expand dual-placement schemes; develop virtual simulations; incentivise SMEs to host apprentices via tax rebates.
Trainer Capacity and Professional Development	Lack of ongoing upskilling; outdated pedagogy; insufficient funding	Training quality deterioration; trainers disengaged from industrial trends	Mandatory CPD credits for trainers; industry-led upskilling programs; digital training hubs.
Feedback and Quality Assurance	Inconsistent assessment standards; lack of transparent monitoring systems	Ineffective evaluation and learning stagnation	National QA framework; peer-review and moderation systems; digital performance dashboards.

Stakeholder Collaboration and Policy Alignment	Fragmented communication between DHET, SETAs, SMEs, and TVETs	Policy-practice disconnection and duplication of efforts	Multi-stakeholder coordination platforms, regional industry boards, and clear communication protocols.
Access and Equity	Digital divide; funding constraints (NSFAS exclusions); poor foundational education	Exclusion of underprivileged learners; persistent inequality	Targeted bursaries; blended learning platforms; school-level STEM strengthening and career guidance.

Source: Own creation

6.5.8 Novelty and Contribution of the Proposed Structure

The structure developed in this study illustrates several unique contributions to the field of apprenticeship training in South Africa's manufacturing industry. While elements of curriculum alignment, experiential learning, mentorship and stakeholder collaboration are discussed in the current literature, the integration and operationalisation of these aspects in a single, context-specific structure are distinctive. The key elements of its novelty include the following:

6.5.8.1 Multi-Stakeholder Integration

Unlike most prior studies that focus on a single institutional type, this structure synthesises insights from colleges, training centres, and SMEs, recognising their distinct mandates, restrictions and complementary roles. This cross-contextual approach ensures a comprehensive understanding of apprenticeship training dynamics and enhances practical relevance.

6.5.8.2 Six-Pillar Structure with Explicit Strategies

The framework is structured around six interrelated pillars: curriculum alignment, experiential learning, trainer capacity, feedback and quality assurance, collaboration and policy coherence, and access and equity. Each pillar includes clearly defined strategies, providing actionable guidance for stakeholders and enhancing the framework's operational utility.

6.5.8.3 Integration of Risk and Mitigation Measures

Each pillar is accompanied by identified risks and feasible mitigation strategies, ensuring that potential implementation challenges are anticipated and addressed. This risk-focused approach enhances the framework's robustness and distinguishes it from most theoretical frameworks that lack practical operationalisation guidance.

6.5.8.4 Contextual Tailoring to South African Manufacturing SMEs

The framework is grounded in the realities of South African SMEs, addressing unique local challenges such as skill mismatches, which creates a need for industry education collaboration, funding limitations (NSFAS), digital access barriers, and outdated curricula. This context-specific focus enhances the relevance and applicability of policy and practice within the country's manufacturing sector.

6.5.8.5 Holistic Focus Beyond Technical Skills

While technical competency remains central, the framework equally emphasises soft skills, mentorship, institutional autonomy, and stakeholder alignment, reflecting the multifaceted nature of employability and workforce development. This holistic approach is less common in existing frameworks, which often focus narrowly on either technical skills or mentorship alone.

By integrating these features, the proposed framework not only advances the theoretical understanding of apprenticeship training but also provides a practically implementable guide for enhancing skills development, productivity, and employability outcomes in South Africa's manufacturing industry. This can be accomplished by integrating both theory and experiential learning with continuous formative assessments.

6.6 CONTRIBUTIONS OF THE STUDY

This study provides essential contributions throughout the academic, hands-on training, and legislation domains, improving insights and enhancing apprenticeship training programs within the South African manufacturing industry. A fundamental strength of this study is the establishment of the conceptual structure discussed in Chapter 2, which links mentorship, feedback and hands-on training with apprentice development outcomes, offering a structured lens for insight and enhancing apprenticeship training programs.

6.6.1 Academic Contribution

From a theoretical viewpoint, this study advances the relevance of cognitive apprenticeship theory, as emphasised in Chapter 2, and critical learning structures, highlighted in Chapter 2, in a South African context. It offers factual data that advocates for and extends these methods within the manufacturing apprenticeship ecosystem. By merging diverse stakeholder viewpoints from colleges, training centres and SMEs, this study provides more nuanced insight into how mentorship, feedback and practical training interact to enhance the establishment of apprentices. Methodologically, the study illustrates the importance of a multi-case qualitative strategy elucidated in Chapter 4, which is integrated with iterative thematic analysis and triangulated data gathering. This meticulous design improves the credibility and validity of findings while providing a replicable structure for future studies in VET. The integration of reflective journaling and member checking, emphasised in Chapter 4, deepens the reliability of the data, aligning with optimal methods in interpretivist research paradigms. The resulting conceptual framework can guide both theoretical exploration and hands-up application in similar contexts.

6.6.2 Practical Contributions

Practically, this study provides comprehensive insights into the realities and complexities of apprenticeship training programmes within South Africa's manufacturing industry. It highlights critical areas such as curriculum applicability, the effectiveness of mentorship, and the integration of soft skills, offering a clear understanding of the factors that either support or constrain learner development and

workplace readiness. These findings equip trainers, institutional managers, and industry stakeholders with evidence-based guidance to inform programme design, instructional approaches, and learner support mechanisms. In doing so, the study presents a practical structure for apprenticeship implementation, as outlined in Chapter Two, which emphasises collaborative engagement between training providers and SMEs. This structure bridges educational theory and workplace practice, enabling training delivery processes that are more responsive, adaptive, and aligned with labour market requirements.

Building on this, the study makes a substantive practical contribution by proposing an empirically grounded framework for strengthening apprenticeship training programmes. Drawing on the findings presented in Chapter Five, the framework is underpinned by key practical pillars, including curriculum–industry alignment, meaningful on-the-job training, mentor-led skills development, trainer competence and capacity, and the integration of both technical and soft skills. Collectively, these pillars offer a structured, practice-oriented guide for enhancing learner preparedness, employability, and long-term workforce sustainability. The framework further demonstrates how collaboration between training institutions, SMEs, and regulatory bodies can be operationalised through shared responsibility, continuous feedback mechanisms, and adaptive curriculum practices. As such, the study bridges the gap between policy intent and implementation, offering a scalable and contextually relevant model to support more effective, inclusive, and industry-responsive apprenticeship training in the manufacturing sector.

6.6.3 Policy Implications

This study significantly impacts legislation formulation and execution in South Africa’s vocational education setting. It distinguishes important systemic challenges such as syllabus inflexibility, funding disparities, and restricted institutional independence, which prohibit the effectiveness of apprenticeship training program. These insights call for legislation transformation that fosters versatility, evolution, and inclusivity within the colleges and apprenticeship systems. Moreover, the findings suggest robust government–industry involvement and support mechanisms that promote mentorship programs, constant trainer enhancement, and equal opportunity to apprenticeships, especially for underprivileged learners. By offering a research base founded on

stakeholder experiences, this study advises policymakers seeking to align skills enhancement techniques with the realities of a rapidly transforming manufacturing industry and an evolving labour market.

6.7 LIMITATIONS OF THE STUDY

While this study provides significant insight into apprenticeship training programs within South Africa's manufacturing industry, several limitations should be acknowledged, which may impact the extent and applicability of the findings.

6.7.1 Methodological Limitations

The study's qualitative, multi-case design provided rich, contextualised data from principal stakeholders; however, the relatively small sample size limits the ability to generalise conclusions throughout all apprenticeship landscapes nationwide. The participants were essentially drawn from a select number of colleges, training centres, and SMEs, which partially represent the variety of experiences in different industries. Additionally, the reliance on self-reported data through interviews introduces possible biases, such as favourable presentation or information bias, which could impact the legitimacy of participants' views, regardless of the use of triangulation and member checking. Data gathering was also limited by time and resource constraints, which impacted the depth and recurrence of interactions with participants. While actions were undertaken to incorporate diverse viewpoints, some opinions, such as those of government policymakers, were inadequately presented, restricting a more comprehensive perspective of the apprenticeship ecosystem.

6.7.2 Contextual Limitations

The study's aim in the manufacturing industry in South Africa, while important, means that conclusions may not be directly transferable to other industries with diverse apprenticeship frameworks, labour market conditions, or legislative landscapes. Moreover, the transforming nature of industry innovations and educational regulations indicates that some observations may become obsolete as changes and innovations emerge. The intricate socio-political environment of South Africa, characterised by persistent disparities and systemic challenges, also informs the study's findings.

These contextual factors may restrict the relevance of recommendations in settings with diverse educational frameworks.

Regardless of these restrictions, the study contributes essential fundamental knowledge and offers a platform for further studies to build upon and resolve these shortfalls.

6.8 RECOMMENDATIONS

This section underscores actionable suggestions derived from the study's findings. These recommendations are focused on resolving systemic deficiencies, amplifying current strengths, and enlightening future studies to enhance the quality, applicability, and accessibility of apprenticeship training programs in South Africa's manufacturing industry.

6.8.1 Policy Makers

The section below illustrates the significance of legislation makers in allowing an agile, comprehensive, and cooperative apprenticeship ecosystem through tailored transformation and supportive structures.

6.8.1.1 Curriculum Reform and Flexible Frameworks

There is an urgent need to modernise the college's syllabus to align with existing and transforming industry standards, including digital advancements, automation, and robotics. Policymakers should implement mechanisms that enable constant syllabus evaluation and modification, informed by industry insight and local labour market standards. Decentralising certain facets of curriculum enhancement could improve institutional receptiveness and creativity.

6.8.1.2 Enhanced Funding and Equity Measures

To enhance access and inclusivity, tailored financial structures such as the NSFAS must be expanded equitably to both public and private training institutions. Additionally, funding and digital services should be prioritised for students from underprivileged backgrounds to overcome application challenges, network issues and learning resource shortages.

6.8.1.3 Support for Systemic Collaboration

Government departments, SETAs, and quality councils must reinforce deeper partnerships among training institutions and industry. Regulatory structures should foster stakeholder engagement, integrated planning, and holistic quality management structures to guarantee coherence throughout the skills enhancement pipeline.

6.8.2 Training Institutions (Colleges and Training Centres)

This following subsection emphasises that training institutions must be versatile, incorporating mentorship, a flexible curriculum, and constant trainer enhancement to meet transforming industry standards.

6.8.2.1 Increasing Autonomy and Responsiveness

Colleges demand more institutional independence to adapt delivery processes, incorporate industry-relevant content, and tailor learning experiences to local needs. Training centres must be empowered to collaborate with SMEs to design practical elements of training jointly and guarantee alignment with transforming standards.

6.8.2.2 Integrating Mentorship and Formative Feedback

Training institutions must integrate structured mentorship systems and consistent feedback structures within their curriculum design. This improves learner inspiration, enables monitoring progress in real time, and enhances employability. Feedback should be individualised, constructive, and growth oriented, as emphasised in the training centre data.

6.8.2.3 Continuous Professional Development for Trainers

Consistent upskilling possibilities for educators and trainers must be institutionalised. This involves technical upgrades, pedagogical techniques, and emotional competency training. In-house workshops, industry secondments, and national enhancement forums such as NAMB conferences should be extended to guarantee that trainers maintain proficiency, existing and versatile.

6.8.3 SMEs and Industry

This section emphasises that SMEs are crucial in apprenticeship training and should actively enhance mentorship, syllabus alignment, and hands-on training opportunities.

6.8.3.1 Strengthening Mentorship Programs

SMEs should formalise mentor–apprentice structures that surpass unstructured instruction. Formal mentorship enhances productivity, improves apprentice aspirations, and cultivates long-term skills competency transfer. Mentors must be skilled with basic training in mentoring and providing feedback to enhance outcomes.

6.8.3.2 Active Participation in Curriculum Development

SMEs must be engaged in designing the content and findings of apprenticeship training programs. Their field observations on technological advancement, workplace capabilities, and soft skill demands are significant for standardising training with reality. This can be attained through advisory boards, SETA forums, and co-developed curricula.

6.8.3.3 Enhancing Workplace-Based Learning Opportunities

The industry should offer more formal, hands-on training exposure, such as site visits, shadowing, and experiential learning. These possibilities can assist learners in implementing conceptual knowledge in context and enhancing their preparedness for the challenges of contemporary workplace environments.

6.8.4 Future Research

This section examines long-term outcomes and the adaptability of mentorship frameworks for a profound comprehension of efficacious apprenticeship training programs.

6.8.4.1 Longitudinal Studies on Apprenticeship Outcomes

Further research is needed to monitor apprentices' long-term career progression and the enduring effects of mentorship, soft skills training, and on-the-job training

experience. Longitudinal studies could uncover designs in retention, practicability, and workplace incorporation that are not captured in interim assessments.

6.8.4.2 Scalability of Mentorship Models

While mentorship has proven mostly efficacious in SMEs, a deeper examination of how such methods can be modified and employed in larger training institutions and public–private collaborations is needed. Research could examine expenses, trainer capabilities, and learner outcomes throughout various industries.

6.8.4.3 Policy Implementation and Institutional Readiness

Future studies should explore how national legislation is analysed and implemented at the institutional level, including challenges to execution, institutional agency, and capability shortages. Comparative studies across industries could generate insights into standard procedures for policy interpretation.

6.8.4.4 Integration of Digital Learning Tools in Vocational Training

Given the digital transformation of the workplace, more studies are needed on how digital learning, simulations, and online platforms can improve apprenticeship delivery in resource-restricted settings.

6.9.5 Theoretical Implications

This study makes an important contribution to theory by extending the application of apprenticeship and vocational learning frameworks within a developing country context, specifically South Africa’s manufacturing sector. It strengthens the relevance of cognitive apprenticeship theory by demonstrating how learning is not only acquired through observation and practice, but also through structured workplace mentorship. It further shows that iterative feedback and institutional collaboration are essential mechanisms in reinforcing effective learning within apprenticeship systems.

The findings further refine experiential learning theory by showing that effective skill acquisition in apprenticeship systems depends on continuous interaction between formal instruction and real workplace practice, rather than treating these as separate

learning phases. This study therefore reinforces the view that learning is cyclical, socially constructed, and context-dependent within vocational education systems.

In addition, the proposed six-pillar framework advances conceptual understanding by integrating previously fragmented theoretical elements curriculum design, workplace learning, mentorship, assessment, governance, and equity into a single interconnected system. This contributes to systems thinking in vocational education by demonstrating how improvements in one dimension of the apprenticeship ecosystem generate reinforcing effects across other dimensions. Overall, the study extends existing theoretical models by providing a context-specific, empirically grounded framework that explains how apprenticeship systems function in practice within resource-constrained and structurally unequal environments.

6.10 FINAL REFLECTION

The study examined the viewpoints of fundamental stakeholders engaged in apprenticeship training programs in South Africa's manufacturing industry. Focusing on comprehending how mentorship, institutional processes and systemic elements impact skills enhancement. The findings mirror not only the operational mechanisms in colleges, training centres and SMEs but also deeper systemic obstacles and possibilities that affect the efficacy of the national apprenticeship system. At its core, the study highlights the crucial role of on-the-job training, mentorship, and industry-aligned programs in preparing apprentices for real-world applications. The mutual emphasis on hands-on training, soft skills and tailored support throughout all the stakeholder groups clearly demonstrates what a successful apprenticeship training program should look like: contextual, vigorous and human-centred. However, this vision is frequently limited by an obsolete syllabus, restricted institutional independence, policy disintegration, and unequal access for learners from underprivileged backgrounds.

The wider importance of the study is in its ability to outline a more integrated and reactive competency enhancement system, one that links the disconnect between industry and education, values academic enhancement, and upholds constant innovation in training delivery. By revealing the opinions of practitioners at the ground

level, this study emphasises the hands-on knowledge and agency of those directly engaged in designing the future of South Africa's workforce. If executed thoughtfully, the study's recommendations restructure apprenticeship pathways, enhance graduate employability, and improve proficiency throughout the manufacturing industry. More essentially, they can provide a comprehensive and proactive vocational training ecosystem that upholds economic development and social equity.

In closing, the study proclaims that while structural transformation is needed, considerable advancement is possible through partnerships, tailored support, and realising that skills enhancement is not only a policy imperative but also a national priority with significant consequences for industry reform and youth development.

6.11 CHAPTER SUMMARY

This final chapter offered a synthesis and clarification of the fundamental findings concerning apprenticeship training programs in the South African manufacturing industry. It commenced by summarising key themes that emerged from the viewpoints of colleges, training centres, and SMEs, with a focus on syllabus misalignment, access obstacles, policy limitations, and the significance of hands-on, mentor-led training. The discussion of findings situated these findings within the wider academic and legislative structure, underscored in previous chapters, emphasising how mentorship, feedback processes, and trainer enhancement serve as hands-on transformations that partially offset systemic weaknesses. The chapter also highlighted the study's contributions theoretically, hands-on, and in terms of legislative insight while acknowledging restrictions such as sample size, scope, and contextual limitations. A set of specific recommendations was proposed for policymakers, training institutions, SMEs, and future researchers, with a view toward intensifying the apprenticeship ecosystem. The chapter concluded with a reflective commentary on the broader significance of the study and its potential impact on skills enhancement and industrial development in South Africa.

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APPENDICES

Appendix A – Interview Guide



INTERVIEW GUIDE

The semi-structured interview schedule consists of an initial stage in which the participant is prepared for the interview as well as the interview itself:

1. PREPARING THE INTERVIEWER TO CONDUCT THE INTERVIEWS

- Ensure to have a counsellor and the supervisor on standby should any adverse event occur (where applicable).
- Be mindful of the typical signs of distress that can inform the presence of stress or uncomfortableness with the participants (where applicable).

2. INITIAL STAGE OF PREPARING THE PARTICIPANT

In this stage the female paramedics are prepared for the interview by setting them at ease, as well as informing them of the following:

- 2.1. Their rights as participants in the research.
- 2.2. The purpose of the interview.
- 2.3. The reason for their selection.
- 2.4. The anticipated duration of the interview.
- 2.5. That consent must be of their own free will.
- 2.6. Should the participant feel uncomfortable at any point in the interview, they should please notify the researcher so that the cause of the uncomfortableness can be addressed.
 - 2.6.1. The researcher will have a counsellor on standby should the participant need support services (if applicable);
 - 2.6.2. The interview location, if in person, will be the choice of the participant;
 - 2.6.3. The researcher will be very sensitive and will ensure the participants video is on whilst conducting the interviews so that the researcher can observe their behaviour and detect any possible signs of discomfort or distress. The researcher will also frequently check in with the participants if they are still fine and ready to continue with the interviews;
 - 2.6.4. The researcher will have their supervisor on standby should any instance occur, for an additional source to refer to, to ascertain the best course of action to protect the participant, the researcher and to ensure data is collected ethically;



- 2.6.5. If the interview is done in person, the researcher will always have refreshments such as water and tissues available;
- 2.6.6. The researcher will make it clear that the participant may take a break when needed and if the participant prefers that the interview be sectioned in shorter sessions;
- 2.6.7. The researcher will strive to develop a positive regard throughout the interview.

3. INTERVIEW ITSELF

Objective 1 and 2 are interview questions are for College

Objective 1: Improving the quality of theoretical training offered in colleges by ensuring it is aligned with current industry trends, technological advancements and evolving needs of the manufacturing sector, through regular curriculum updates and industry collaboration.

- In your experience, what are some of the best ways colleges can build strong, ongoing relationships with industry leaders, especially to make sure what students are learning really keeps pace with new technologies and industry shifts?
- How do you think colleges could stay agile and responsive when it comes to updating their curriculum as new technologies and industry needs emerge?
- From your perspective, how can educators bring more real-world manufacturing challenges or case studies into classroom teaching?
- What evaluation systems do you think are most effective in helping colleges check whether their training is still meeting the needs of employers in manufacturing?

Objective 2: Investigate government policies and regulations shaping apprenticeship training programs and how these policies hinder or support the development of apprenticeships.

- From what you've seen, how do government policies help ensure that what students learn in theory actually lines up with what the industry expects?
- In your experience, how do government policies shape the way curriculum is designed, when it comes to finding balance between on-the-job training and classroom learning?



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- Have you come across any challenges when trying to align theoretical teaching with what government policies require? How do these policies affect the overall quality of education for apprentices?

Objective 3 and 4 are interview questions are for Training Centre

Objective 3: Establish clear standards and assessment criteria for apprenticeship training.

- Thinking about the end of an apprenticeship program, what specific skills or abilities do you think apprentices should absolutely have to be truly job-ready?
- In your experience, what kinds of assessments really help you see whether an apprentice understands the theory and can also apply it in a practical setting?
- When you're setting assessment standards, what industry benchmarks or guidelines do you usually refer to, to make sure everything aligns with what's needed in manufacturing today?
- How often do you typically assess apprentices during their training, and what types of assessments do you find most meaningful?
- What kind of role does feedback play in your assessment process and how do you usually deliver it to help apprentices grow and meet the required standards?

Objective 4: Establishing capacity for trainers to ensure quality outcomes in the training process.

- What specific competencies and subject matter expertise are required for trainers to effectively deliver apprenticeship programs within the manufacturing sector?
- How can a professional development program be structured to provide trainers with both advanced technical knowledge and effective instructional techniques?
- What approaches can be used to evaluate trainers' current skill levels and identify areas where further development is needed?
- What strategies can be implemented to keep trainers informed about the latest industry trends, technological advancements, and best practices in training?
- What support mechanisms are available to facilitate the ongoing professional growth and skill enhancement of trainers?



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Objective 5 and 6 are interview questions are for **SMEs**

Objective 5: Evaluating the significance of mentor-led apprenticeship training and its impact on productivity, innovation, and performance within SMEs.

- In what ways does mentor-led apprenticeship training support improvements in productivity and operational efficiency within SMEs?
- What is the significance of the mentor-apprentice relationship in developing apprentices' skills and capabilities and how does this development contribute to overall business growth?
- How does the involvement of mentors in training programs affect employee engagement, motivation and job performance?
- What measurable outcomes related to innovation have SMEs experienced as a result of implementing mentor-guided apprenticeship programs?

Objective 6: Provide recommendations for improving apprenticeship training programs in South African manufacturing SMEs, focusing on enhancing skills development, employer engagement, and alignment with industry needs, based on the findings from the study.

- What approaches can be used to strengthen employer engagement in apprenticeship training, particularly to foster more effective collaboration between SMEs and training providers?
- Which strategies would be most effective in aligning apprenticeship training programs with both current and emerging skill demands in South Africa's manufacturing sector?
- What specific recommendations could help enhance the quality, relevance and impact of skills development within apprenticeship programs in the manufacturing industry?

The following guidelines are recommended by UNISA to ensure the safety of the researcher and participant(s):

- Do not proceed with the intended contact data collection visit or meeting if the researcher and/or participant is feeling unwell.



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- Telephonic pre-screening before the visit is advised, as well as keeping a register of participants that were involved in face-to-face data collection activities.
- The researcher and members of the research team must also be screened before any human participant contact. Keep evidence of the screening data signed by a witness.

4. FINAL STAGE

In the final stage the interview is concluded by asking the participants if they would like to add anything (if applicable)

The participant will also be asked if they feel they need to speak to a professional counsellor as a result of perhaps reliving certain experiences that might have been discussed during the interviews. Participants will be referred toshould they feel they need counselling or further support.



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Appendix B – Consent Form



CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interview.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname..... (please print)

Participant Signature..... Date.....

Researcher's Name & Surname..... (please print)

Researcher's signature..... Date.....



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Appendix C – Gatekeeper Letters

1



**GATEKEEPER RESEARCH PERMISSION
APPLICATION FORM**

A. GATEKEEPER CONTACT INFORMATION

TO:

Name of organisation/company/stakeholder/community leader - referred to as the 'gatekeeper':

Anitec College

Contact person (name and surname):

Ntshengedzeni Executive Tombani

Designation/position within company/organisation/community:

Principal

Email:

tombanintshengedzeni@gmail.com

Contact number:

073 177 3284



Open Rubric

2

B. APPLICANT INFORMATION

FROM:

Name and surname of applicant/student/researcher:

Suzan Nkosi

Degree registered for or research for non-degree purposes:

Doctor of Philosophy in Management Studies

Department and College:

College of Economic and Management Sciences Department of Business Management

Email:

54765366@mylife.unisa.ac.za

Contact number:

073 675 4313

Address:

Details of supervisor (if applicable):

Prof Ntsheni Ramasimu

Email of supervisor (if applicable):

ramasimf@unisa.ac.za

3

Supervisor's position, e.g. lecturer/senior lecturer/professor, etc.:

Associate Professor

Supervisor's Department:

Business Management

Funding Body (if applicable):

N/A

Reason for funding (if applicable):

N/A

C. REQUEST FOR SUPPORT/ ACCESS TO DATA/INFORMATION/ PARTICIPANTS

I/We are requesting your assistance in a study entitled:

Framework for Apprenticeship Training Programs: A Case Study of Manufacturing

Overview of study: (100-200 words)

- What, how and why of the study
- Objectives, time and resources used/required
- Deadline/timelines for the project - possibility of follow up interviews? If further information will be required

The research purpose is to bridge the gap in the existing body of discipline regarding the framework for apprenticeship training programs: a case study for manufacturing small and medium companies in South Africa. The intention of the research is to create new understanding of on-the-job training and add to current and future on-the-job training published works in South African manufacturing SMEs. To understand the value that SMEs invest in apprentices by exposing apprentices to real work situations and learn about their future work fields.

Feedback procedure will entail a summary of the key findings will be prepared, highlighting significant themes and insights related to apprenticeship training programs. Organize sessions, either virtually or face to face, to share the findings with participants. Once the report is finalized, it will be distributed to all participants, relevant stakeholders, and organizations involved in the study, along with recommendations for improving apprenticeship training programs. This will guarantee transparency, encourages participant engagement, and enhances the credibility of the research findings.

4

My/our request is/are for: (Tick appropriate options and/or add additional information.)

☒ Permission and/or support to conduct a study about or within the organisation/company/stakeholder group/community

☐ Access to possible participants and assistance for recruitment and identification purposes

☐ Assistance in the recruitment process of possible participants via internal communication

☐ Permission to distribute questionnaire/survey/research information to potential participants

☐ Access to organisational data - not in the public domain

☐ Other (specify below):

Provide a full description of the intended research sample. Motivate why the data must be gathered from the specific stakeholder group/organisation/company/community.

Your company has been selected for participation in this study because it is recognized as one of the key institutions that provide technical theory lessons to learners. Additionally, your involvement in applying for funding to facilitate training at a training center and to support on-the-job training for learners seeking qualification as artisans makes your insights particularly valuable. Your experience will contribute significantly to understanding the dynamics of apprenticeship training and funding processes.

Participants will be motivated by open ended questions and they will be encouraged to be more involved in the interviews. Participants will be handed interview questions before being interviewed, to prepare themselves. This will ensure that thoughtful answers are given to the researcher and reduce being given limited responses. The interview will be recorded, with permission from participants.

5

Explain how the participant identification and recruitment process of your research adhere to the Protection of Personal Information Act 4 of 2013.

Participation in this study is entirely voluntary, and you are under no obligation to consent to participate. If you choose not to participate, there will be no penalty or loss of benefits to you in any capacity. Should you decide to take part, you will receive an information sheet outlining the details of the study, and you will be asked to sign a written consent form. Please know that you have the right to withdraw from the study at any time and without providing a reason. Your comfort and autonomy are paramount, and your decision to participate or not will be respected without any repercussions.

To safeguard your identity and ensure confidentiality throughout this study, the researcher will ensure that collected data will be anonymized to remove any personally identifiable information. Participants will be assigned unique codes, and names will not be associated with any data reported in the findings. All recordings, transcripts, and related materials will be stored securely on password-protected devices. Access to these materials will be limited to the researcher only. When presenting the results of the study, data will be aggregated to ensure that no individual participant can be identified. Care will be taken to avoid including any information that might inadvertently reveal a participant's identity. Participants will be informed that their de-identified data may be used for research-related purposes, including publication in journal articles.

Provide a description of the data collection tools (e.g. interview, questionnaire, questions).

The study will entail a qualitative method of collecting data which requires the researcher to identify and recruit participants, such as trainers and industry partners. This may involve outreach through institutions, training centers, and networks. The researcher will conduct semi-structured interviews with participants to gather in-depth insights about their experiences, challenges, and perceptions related to apprenticeship training. Ensure that all data collected is stored securely and anonymized to protect participant identities. This includes recording interviews and securely managing digital files. Analyze the collected data using appropriate methods, such as thematic analysis for qualitative data or statistical analysis for quantitative data, to identify patterns and draw conclusions. Obtain informed consent from participants, ensuring they understand the purpose of the study, their right to withdraw, and how their data will be used. Compile the findings into a report or academic paper, highlighting key insights, challenges, and recommendations for improving apprenticeship training programs.

7

Describe the potential benefits of the study to the organisation/company/stakeholder group/community.

There are no direct personal benefits in partaking. Your involvement will contribute to a deeper understanding of apprenticeship training and its funding dynamics. By sharing your insights, you will be helping to create a collective understanding of the challenges and successes in apprenticeship training. This information will lead to enhanced collaboration and development of best practices within the industry. The findings from this research will contribute to the academic literature on apprenticeship training, offering valuable data and perspectives that may inform future studies and initiatives.

How will risks be mitigated and managed? (Keeping national disasters and relevant protocol in mind.)

Raw data, both during transmission and storage, should be encrypted to protect it from unauthorized access. This ensures that even if the data is intercepted or accessed without authorization, it remains unreadable. Whenever possible, raw data should be anonymized or de-identified before use or sharing, ensuring that personal identifiers (e.g., names, addresses, IDs) are removed. This greatly reduces the risk of privacy violations.

Explain the extent and processes to which confidentiality of information will be maintained by the researcher.

A code of conduct will always be adhered to by the researcher when collecting data. The researcher is obligated to safeguard the right of all participants, magnify the credibility of the study. The names of participants will be replaced by pseudonyms so that individual identities cannot be easily traced. Confidentiality will be maintained by limiting the collection and retention of data to only what is necessary for the research objectives. Establish and adhere to data retention policies according to UNISA policies, which is five years for possible future analysis. Any physical copies will be shredded, while digital data will be permanently deleted from both local and cloud storage systems using secure data destruction tools.

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Provide a description of the data gathering process that will be followed. (What will be expected of the research participants and exactly how will the data be collected?)

The study will entail a qualitative method of collecting data which requires the researcher to identify and recruit participants, such as trainers and industry partners. This may involve outreach through institutions, training centers, and networks. The researcher will conduct semi-structured interviews with participants to gather in-depth insights about their experiences, challenges, and perceptions related to apprenticeship training. Ensure that all data collected is stored securely and anonymized to protect participant identities. This includes recording interviews and securely managing digital files. Analyze the collected data using appropriate methods, such as thematic analysis for qualitative data or statistical analysis for quantitative data, to identify patterns and draw conclusions. Obtain informed consent from participants, ensuring they understand the purpose of the study, their right to withdraw, and how their data will be used. Compile the findings into a report or academic paper, highlighting key insights, challenges, and recommendations for improving apprenticeship training programs.

Indicate who will have access to the raw data and in what formats?

Only the researcher will access to the raw material of the research. The researcher will protect the security of data by storing all information on password-protected and encrypted devices, restricting access to authorized personnel only, regularly backing up data, and using secure methods for data transmission, such as making use of firewalls and up-to-date antivirus software to protect devices from malware and unauthorized access. Removing personally identifiable information before data analysis to protect participant identity. Regularly backing up data using secure and reliable backup solutions to prevent data loss.

Provide a full description of the perceived and actual risks of the study to participants and the organisation/company/stakeholder group/community. (Keeping national disasters in mind.)

Participating in the study requires a time commitment of approximately 30 minutes to 1 hour. If your schedule is already tight, this could create added stress or inconvenience. Discussing your experiences related to apprenticeship training might evoke emotional discomfort or stress, especially if it involves challenges or difficulties faced in your role. The severity of this risk varies by individual, but it is something to consider when deciding to participate. There is a small possibility of an unintended leak of your identity or personal information. Despite measures taken to anonymize data, there is always a risk that your identity could be inferred from the information shared. The severity of this risk is considered low, as data will be securely stored and access will be restricted.

8

List the expected deliverables of the study. (For example, a research report, journal articles and/or conference proceedings. Also indicate how privacy will be protected in any publication of the information.)

A comprehensive research report that includes the study objectives, methodology, results, discussion, and conclusions. This document may also include recommendations based on the findings. The report will ensure that all personally identifiable information (PII) is anonymized or de-identified. Any references to individual participants will be removed or generalized. Results will be presented in aggregated form, ensuring no individual's data can be traced back to them. The report will be shared securely with stakeholders, and access will be restricted to authorized individuals only.

Peer-reviewed articles published in academic or professional journals that communicate the study's key findings, methodology, and implications to the broader research community. The publication will adhere to ethical standards for data protection as outlined in the study's institutional ethics committee approval, and informed consent procedures will be clearly referenced.

The summary will present findings in such a way that participants cannot be identified. Personal or sensitive data will not be included, and any case examples will be sufficiently anonymized. It will state explicitly how privacy was protected during the research and will assure the reader that no identifiable information is included in the summary.

How will the organisation/company/stakeholder group/community be informed of the results or outcomes? (If applicable.)

A formal written report or executive summary can be prepared that includes the research findings, implications, and recommendations. These documents can be shared with both internal and external stakeholders.

Attach a copy of the research instrument (questionnaire/interview schedule/focus group questions) to your email and mark as Annexure A

9

C. OFFICIAL USE ONLY - TO BE COMPLETED BY COMPANY/ORGANISATION/COMMUNITY

Decision:
☒ Permission granted.
☐ Permission with conditions is granted.
☐ No permission could be granted at this time.

Special Conditions (if any - Expectations of the outcomes of the study must be stated. For example: Will feedback/a report be required before submission of the publication?):

The following person and/or department/and or committee has been appointed to assist the researcher in the data collection process (if applicable):

Mr Netshi, Mr Linda, Miss Helepi
Mr Ntshaba.

By signing this form, you are indicating that you have read the description of the study, have the legal and delegated authority to grant permission for the study on behalf of the company/organisation/stakeholder/community and that the company/organisation/stakeholder/community in principle agrees to the terms as described in the short questionnaire that follows:

1. I/We have reviewed the application form and received a copy of it. The purpose and nature of this study are clear, and all questions and issues of concern have been answered to satisfaction.
☒ Yes
☐ No

2. I/We (name of the person responsible and/or name of company/organisation/stakeholder/community)

Ntshongedzeni

10

agree to support this study and hereby grant permission for the data generated from this research to be used in the researcher's publications on this topic.
☒ Yes
☐ No

Signature: *Gambi*

Name and surname of the person with delegated authority to grant permission on behalf of the company/organisation/stakeholder/community

Ntshongedzeni Tambani

Designation/Position

Principal

Email:

tambanintshongedzeni@gmail.com

Contact number:

073 177 3284

Date:

27/01/25

Official stamp (if available):



1

UNISA | 
 university of south africa

GATEKEEPER RESEARCH PERMISSION APPLICATION FORM

A. GATEKEEPER CONTACT INFORMATION

TO:

Name of organisation/company/stakeholder/community leader - referred to as the 'gatekeeper':

Actom Training Centre

Contact person (name and surname):

Kobus Swanepoel

Designation/position within company/organisation/community:

Technical Training Manager

Email:

kobus.swanepoel@actom.co.za

Contact number:

010 448 8671 / 064 757 8474

Open Rubric

2

B. APPLICANT INFORMATION

FROM:

Name and surname of applicant/student/researcher:

Suzan Nkosi

Degree registered for or research for non-degree purposes:

Doctor of Philosophy in Management Studies

Department and College:

College of Economic and Management Sciences Department of Business Management

Email:

54765366@mylife.unisa.ac.za

Contact number:

010 448 8672

Address:

Parkdene, Borgeburg

Details of supervisor (if applicable):

Prof Ntsieni Ramasimu

Email of supervisor (if applicable):

ramasnf@unisa.ac.za

3

Supervisor's position, e.g. lecturer/senior lecturer/professor, etc.:

Associate Professor

Supervisor's Department:

Business Management

Funding Body (if applicable):

N/A

Reason for funding (if applicable):

N/A

C. REQUEST FOR SUPPORT/ ACCESS TO DATA/INFORMATION/ PARTICIPANTS

I/We are requesting your assistance in a study entitled:

Framework for Apprenticeship Training Programs: A Case Study of Manufactu

Overview of study: (100-200 words)

- What, how and why of the study
- Objectives, time and resources used/required
- Deadline/timelines for the project – possibility of follow up interviews? If further information will be required

The research purpose is to bridge the gap in the existing body of discipline regarding the framework for apprenticeship training programs: a case study for manufacturing small and medium companies in South Africa. The intention of the research is to create new understanding of on-the-job training and add to current and future on-the-job training published works in South African manufacturing SMEs. To understand the value that SMEs invest in apprentices by exposing apprentices to real work situations and learn about their future work fields.

Feedback procedure will entail a summary of the key findings will be prepared, highlighting significant themes and insights related to apprenticeship training programs. Organize sessions, either virtually or face to face, to share the findings with participants. Once the report is finalized, it will be distributed to all participants, relevant stakeholders, and organizations involved in the study, along with recommendations for improving apprenticeship training programs. This will guarantee transparency, encourages participant engagement, and enhances the credibility of the research findings.

4

My/our request is/are for: (Tick appropriate options and/or add additional information.)

☒ Permission and/or support to conduct a study about or within the organisation/company/stakeholder group/community

☐ Access to possible participants and assistance for recruitment and identification purposes

☐ Assistance in the recruitment process of possible participants via internal communication

☐ Permission to distribute questionnaire/survey/research information to potential participants

☐ Access to organisational data – not in the public domain

☐ Other (specify below):

Provide a full description of the intended research sample. Motivate why the data must be gathered from the specific stakeholder group/organisation/company/community.

Your company has been selected for participation in this study because it is recognized as one of the key institutions that provide technical theory lessons to learners. Additionally, your involvement in applying for funding to facilitate training at a training center and to support on-the-job training for learners seeking qualification as artisans makes your insights particularly valuable. Your experience will contribute significantly to understanding the dynamics of apprenticeship training and funding processes.

Participants will be motivated by open ended questions and they will be encouraged to be more involved in the interviews. Participants will be handed interview questions before being interviewed, to prepare themselves. This will ensure that thoughtful answers are given to the researcher and reduce being given limited responses. The interview will be recorded, with permission from participants.

5

Explain how the participant identification and recruitment process of your research adhere to the Protection of Personal Information Act 4 of 2013.

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Provide a description of the data collection tools (e.g. interview, questionnaire, questions).

The study will entail a qualitative method of collecting data which requires the researcher to identify and recruit participants, such as trainers and industry partners. This may involve outreach through institutions, training centers, and networks. The researcher will conduct semi-structured interviews with participants to gather in-depth insights about their experiences, challenges, and perceptions related to apprenticeship training. Ensure that all data collected is stored securely and anonymized to protect participant identities. This includes recording interviews and securely managing digital files. Analyze the collected data using appropriate methods, such as thematic analysis for qualitative data or statistical analysis for quantitative data, to identify patterns and draw conclusions. Obtain informed consent from participants, ensuring they understand the purpose of the study, their right to withdraw, and how their data will be used. Compile the findings into a report or academic paper, highlighting key insights, challenges, and recommendations for improving apprenticeship training programs.

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There are no direct personal benefits in partaking. Your involvement will contribute to a deeper understanding of apprenticeship training and its funding dynamics. By sharing your insights, you will be helping to create a collective understanding of the challenges and successes in apprenticeship training. This information will lead to enhanced collaboration and development of best practices within the industry. The findings from this research will contribute to the academic literature on apprenticeship training, offering valuable data and perspectives that may inform future studies and initiatives.

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Explain the extent and processes to which confidentiality of information will be maintained by the researcher.

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List the expected deliverables of the study. (For example, a research report, journal articles and/or conference proceedings. Also indicate how privacy will be protected in any publication of the information.)

How will the organisation/company/stakeholder group/community be informed of the results or outcomes? (If applicable.)

A formal written report or executive summary can be prepared that includes the research findings, implications, and recommendations. These documents can be shared with both internal and external stakeholders.

Attach a copy of the research instrument (questionnaire/interview schedule/focus group questions) to your email and mark as Annexure A

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C. OFFICIAL USE ONLY – TO BE COMPLETED BY COMPANY/ORGANISATION/COMMUNITY

Decision:

☒ Permission granted.

☐ Permission with conditions is granted.

☐ No permission could be granted at this time.

Special Conditions (if any – Expectations of the outcomes of the study must be stated. For example: Will feedback/a report be required before submission of the publication?):

N/A

The following person and/or department/and or committee has been appointed to assist the researcher in the data collection process (if applicable):

TEBOHO MMLUSI
POPI MADALANE

By signing this form, you are indicating that you have read the description of the study, have the legal and delegated authority to grant permission for the study on behalf of the company/organisation/stakeholder/community and that the company/organisation/stakeholder/community in principle agrees to the terms as described in the short questionnaire that follows:

1. I/We have reviewed the application form and received a copy of it. The purpose and nature of this study are clear, and all questions and issues of concern have been answered to satisfaction.

☒ Yes

☐ No

2. I/We (name of the person responsible and/or name of company/organisation/stakeholder/community)

JACOBUS NICOLAAS SWANEPOEL

10

agree to support this study and hereby grant permission for the data generated from this research to be used in the researcher's publications on this topic.

☒ Yes

☐ No

Signature

Jacobus Nicolaas Swanepoel

Name and surname of the person with delegated authority to grant permission on behalf of the company/organisation/stakeholder/community

JACOBUS NICOLAAS SWANEPOEL

Designation/Position

TECHNICAL TRAINING MANAGER

Email:

kubus.swanepoel@actom.co.za

Contact number:

064 751 8474 / 010 448 8671

Date:

11 NOVEMBER 2024

Official stamp (if available):

ACTOM (PTY) LTD
Training Centre
2 MAGNET ROAD KNIGHTS 1419
P.O. BOX 13024 KNIGHTS 1419
TEL: (011) 820 5021

1



**GATEKEEPER RESEARCH PERMISSION
APPLICATION FORM**

A. GATEKEEPER CONTACT INFORMATION

TO:

Name of organisation/company/stakeholder/community leader - referred to as the 'gatekeeper':

Otmar Machine Tools

Contact person (name and surname):

Dietmar Otmar

Designation/position within company/organisation/community:

Manager

Email:

dietmar@otmar.co.za

Contact number:

011 864 5140

Open Rubric

2

B. APPLICANT INFORMATION

FROM:

Name and surname of applicant/student/researcher:

Suzan Nkosi

Degree registered for or research for non-degree purposes:

Doctor of Philosophy in Management Studies

Department and College:

College of Economic and Management Sciences Department of Business Management

Email:

54765366@mylife.unisa.ac.za

Contact number:

073 675 4313

Address:

Parkdene, Borgeburg

Details of supervisor (if applicable):

Prof Ntsieni Ramasimu

Email of supervisor (if applicable):

ramasnf@unisa.ac.za

3

Supervisor's position, e.g. lecturer/senior lecturer/professor, etc.:

Associate Professor

Supervisor's Department:

Business Management

Funding Body (if applicable):

N/A

Reason for funding (if applicable):

N/A

C. REQUEST FOR SUPPORT/ ACCESS TO DATA/INFORMATION/ PARTICIPANTS

I/We are requesting your assistance in a study entitled:

Framework for Apprenticeship Training Programs: A Case Study of Manufacturing

Overview of study: (100-200 words)

- What, how and why of the study
- Objectives, time and resources used/required
- Deadline/timelines for the project - possibility of follow up interviews? If further information will be required

The research purpose is to bridge the gap in the existing body of discipline regarding the framework for apprenticeship training programs: a case study for manufacturing small and medium companies in South Africa. The intention of the research is to create new understanding of on-the-job training and add to current and future on-the-job training published works in South African manufacturing SMEs. To understand the value that SMEs invest in apprentices by exposing apprentices to real work situations and learn about their future work fields.

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☐ Access to possible participants and assistance for recruitment and identification purposes

☐ Assistance in the recruitment process of possible participants via internal communication

☐ Permission to distribute questionnaire/survey/research information to potential participants

☐ Access to organisational data - not in the public domain

☐ Other (specify below):

Provide a full description of the intended research sample. Motivate why the data must be gathered from the specific stakeholder group/organisation/company/community.

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Provide a full description of the perceived and actual risks of the study to participants and the organisation/company/stakeholder group/community. (Keeping national disasters in mind.)

Participating in the study requires a time commitment of approximately 30 minutes to 1 hour. If your schedule is already tight, this could create added stress or inconvenience. Discussing your experiences related to apprenticeship training might evoke emotional discomfort or stress, especially if it involves challenges or difficulties faced in your role. The severity of this risk varies by individual, but it is something to consider when deciding to participate. There is a small possibility of an unintended leak of your identity or personal information. Despite measures taken to anonymize data, there is always a risk that your identity could be inferred from the information shared. The severity of this risk is considered low, as data will be securely stored and access will be restricted.

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List the expected deliverables of the study. (For example, a research report, journal articles and/or conference proceedings. Also indicate how privacy will be protected in any publication of the information.)

A comprehensive research report that includes the study objectives, methodology, results, discussion, and conclusions. This document may also include recommendations based on the findings. The report will ensure that all personally identifiable information (PII) is anonymized or de-identified. Any references to individual participants will be removed or generalized. Results will be presented in aggregated form, ensuring no individual's data can be traced back to them. The report will be shared securely with stakeholders, and access will be restricted to authorized individuals only.

Peer-reviewed articles published in academic or professional journals that communicate the study's key findings, methodology, and implications to the broader research community. The publication will adhere to ethical standards for data protection as outlined in the study's institutional ethics committee approval, and informed consent procedures will be clearly referenced.

The summary will present findings in such a way that participants cannot be identified. Personal or sensitive data will not be included, and any case examples will be sufficiently anonymized. It will state explicitly how privacy was protected during the research and will assure the reader that no identifiable information is included in the summary.

How will the organisation/company/stakeholder group/community be informed of the results or outcomes? (If applicable.)

A formal written report or executive summary can be prepared that includes the research findings, implications, and recommendations. These documents can be shared with both internal and external stakeholders.

Attach a copy of the research instrument (questionnaire/interview schedule/focus group questions) to your email and mark as Annexure A

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C. OFFICIAL USE ONLY - TO BE COMPLETED BY COMPANY/ORGANISATION/COMMUNITY

Decision:
☒ Permission granted.
☐ Permission with conditions is granted.
☐ No permission could be granted at this time.

Special Conditions (if any - Expectations of the outcomes of the study must be stated. For example: Will feedback/a report be required before submission of the publication?):

N/A

The following person and/or department/and or committee has been appointed to assist the researcher in the data collection process (if applicable):

Dietmar Naat

By signing this form, you are indicating that you have read the description of the study, **have the legal and delegated authority to grant permission for the study on behalf of the company/organisation/stakeholder/community** and that the company/organisation/stakeholder/community in principle agrees to the terms as described in the short questionnaire that follows:

1. I/We have reviewed the application form and received a copy of it. The purpose and nature of this study are clear, and all questions and issues of concern have been answered to satisfaction.
☒ Yes
☐ No

2. I/We (name of the person responsible and/or name of company/organisation/stakeholder/community)

Otmarm Machine Tools cc

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agree to support this study and hereby grant permission for the data generated from this research to be used in the researcher's publications on this topic.
☒ Yes
☐ No

Signature

D. Naat

Name and surname of the person with delegated authority to grant permission on behalf of the company/organisation/stakeholder/community

DIETMAR NAST

Designation/Position

OWNER

Email:

dietmar@otmar.co.za

Contact number:

011-8645140

Date:

7 November 2024

Official stamp (if available):

OTMAR MACHINE TOOLS CC
 5 BASALT STREET ALRODE EX.7
 TEL: 011 864 5140 FAX: 011 864 5144
 P.O. BOX 124172 ALRODE 1451
 EMAIL: accounts@otmar.co.za

1

UNISA 
 university of south africa

GATEKEEPER RESEARCH PERMISSION APPLICATION FORM

A. GATEKEEPER CONTACT INFORMATION

TO:

Name of organisation/company/stakeholder/community leader - referred to as the 'gatekeeper':

Phambili Solutions (Pty) Ltd

Contact person (name and surname):

Lucia Ntwampe

Designation/position within company/organisation/community:

Director

Email:

lucia@phambilis.co.za

Contact number:

072 337 1043

Open Rubric

2

B. APPLICANT INFORMATION

FROM:

Name and surname of applicant/student/researcher:

Suzan Nkosi

Degree registered for or research for non-degree purposes:

Doctor of Philosophy in Management Studies

Department and College:

College of Economic and Management Sciences Department of Business Management

Email:

54765366@mylife.unisa.ac.za

Contact number:

073 675 4313

Address:

Details of supervisor (if applicable):

Prof Ntsieni Ramasimu

Email of supervisor (if applicable):

ramasimf@unisa.ac.za

3

Supervisor's position, e.g. lecturer/senior lecturer/professor, etc.:

Associate Professor

Supervisor's Department:

Business Management

Funding Body (if applicable):

N/A

Reason for funding (if applicable):

N/A

C. REQUEST FOR SUPPORT/ ACCESS TO DATA/INFORMATION/ PARTICIPANTS

I/We are requesting your assistance in a study entitled:

Framework for Apprenticeship Training Programs: A Case Study of Manufactur

Overview of study: (100-200 words)

- What, how and why of the study
- Objectives, time and resources used/required
- Deadline/timelines for the project - possibility of follow up interviews? If further information will be required

The research purpose is to bridge the gap in the existing body of discipline regarding the framework for apprenticeship training programs: a case study for manufacturing small and medium companies in South Africa. The intention of the research is to create new understanding of on-the-job training and add to current and future on-the-job training published works in South African manufacturing SMEs. To understand the value that SMEs invest in apprentices by exposing apprentices to real work situations and learn about their future work fields.

Feedback procedure will entail a summary of the key findings will be prepared, highlighting significant themes and insights related to apprenticeship training programs. Organize sessions, either virtually or face to face, to share the findings with participants. Once the report is finalized, it will be distributed to all participants, relevant stakeholders, and organizations involved in the study, along with recommendations for improving apprenticeship training programs. This will guarantee transparency, encourages participant engagement, and enhances the credibility of the research findings.

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My/our request is/are for: (Tick appropriate options and/or add additional information.)

☒ Permission and/or support to conduct a study about or within the organisation/company/stakeholder group/community

☐ Access to possible participants and assistance for recruitment and identification purposes

☐ Assistance in the recruitment process of possible participants via internal communication

☐ Permission to distribute questionnaire/survey/research information to potential participants

☐ Access to organisational data – not in the public domain

☐ Other (specify below):

Provide a full description of the intended research sample. Motivate why the data must be gathered from the specific stakeholder group/organisation/company/community.

Your company has been selected for participation in this study because it is recognized as one of the key institutions that provide technical theory lessons to learners. Additionally, your involvement in applying for funding to facilitate training at a training center and to support on-the-job training for learners seeking qualification as artisans makes your insights particularly valuable. Your experience will contribute significantly to understanding the dynamics of apprenticeship training and funding processes.

Participants will be motivated by open ended questions and they will be encouraged to be more involved in the interviews. Participants will be handed interview questions before being interviewed, to prepare themselves. This will ensure that thoughtful answers are given to the researcher and reduce being given limited responses. The interview will be recorded, with permission from participants.

Explain how the participant identification and recruitment process of your research adhere to the Protection of Personal Information Act 4 of 2013.

Participation in this study is entirely voluntary, and you are under no obligation to consent to participate. If you choose not to participate, there will be no penalty or loss of benefits to you in any capacity. Should you decide to take part, you will receive an information sheet outlining the details of the study, and you will be asked to sign a written consent form. Please know that you have the right to withdraw from the study at any time and without providing a reason. Your comfort and autonomy are paramount, and your decision to participate or not will be respected without any repercussions.

To safeguard your identity and ensure confidentiality throughout this study, the researcher will ensure that collected data will be anonymized to remove any personally identifiable information. Participants will be assigned unique codes, and names will not be associated with any data reported in the findings. All recordings, transcripts, and related materials will be stored securely on password-protected devices. Access to these materials will be limited to the researcher only. When presenting the results of the study, data will be aggregated to ensure that no individual participant can be identified. Care will be taken to avoid including any information that might inadvertently reveal a participant's identity. Participants will be informed that their de-identified data may be used for research-related purposes, including publication in journal articles.

Provide a description of the data collection tools (e.g. interview, questionnaire, questions).

The study will entail a qualitative method of collecting data which requires the researcher to identify and recruit participants, such as trainers and industry partners. This may involve outreach through institutions, training centers, and networks. The researcher will conduct semi-structured interviews with participants to gather in-depth insights about their experiences, challenges, and perceptions related to apprenticeship training. Ensure that all data collected is stored securely and anonymized to protect participant identities. This includes recording interviews and securely managing digital files. Analyze the collected data using appropriate methods, such as thematic analysis for qualitative data or statistical analysis for quantitative data, to identify patterns and draw conclusions. Obtain informed consent from participants, ensuring they understand the purpose of the study, their right to withdraw, and how their data will be used. Compile the findings into a report or academic paper, highlighting key insights, challenges, and recommendations for improving apprenticeship training programs.

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Provide a description of the data gathering process that will be followed. (What will be expected of the research participants and exactly how will the data be collected?)

The study will entail a qualitative method of collecting data which requires the researcher to identify and recruit participants, such as trainers and industry partners. This may involve outreach through institutions, training centers, and networks. The researcher will conduct semi-structured interviews with participants to gather in-depth insights about their experiences, challenges, and perceptions related to apprenticeship training. Ensure that all data collected is stored securely and anonymized to protect participant identities. This includes recording interviews and securely managing digital files. Analyze the collected data using appropriate methods, such as thematic analysis for qualitative data or statistical analysis for quantitative data, to identify patterns and draw conclusions. Obtain informed consent from participants, ensuring they understand the purpose of the study, their right to withdraw, and how their data will be used. Compile the findings into a report or academic paper, highlighting key insights, challenges, and recommendations for improving apprenticeship training programs.

Indicate who will have access to the raw data and in what formats?

Only the researcher will access to the raw material of the research. The researcher will protect the security of data by storing all information on password-protected and encrypted devices, restricting access to authorized personnel only, regularly backing up data, and using secure methods for data transmission, such as making use of firewalls and up-to-date antivirus software to protect devices from malware and unauthorized access. Removing personally identifiable information before data analysis to protect participant identity. Regularly backing up data using secure and reliable backup solutions to prevent data loss.

Provide a full description of the perceived and actual risks of the study to participants and the organisation/company/stakeholder group/community. (Keeping national disasters in mind.)

Participating in the study requires a time commitment of approximately 30 minutes to 1 hour. If your schedule is already tight, this could create added stress or inconvenience. Discussing your experiences related to apprenticeship training might evoke emotional discomfort or stress, especially if it involves challenges or difficulties faced in your role. The severity of this risk varies by individual, but it is something to consider when deciding to participate. There is a small possibility of an unintended leak of your identity or personal information. Despite measures taken to anonymize data, there is always a risk that your identity could be inferred from the information shared. The severity of this risk is considered low, as data will be securely stored and access will be restricted.

Describe the potential benefits of the study to the organisation/company/stakeholder group/community.

There are no direct personal benefits in partaking. Your involvement will contribute to a deeper understanding of apprenticeship training and its funding dynamics. By sharing your insights, you will be helping to create a collective understanding of the challenges and successes in apprenticeship training. This information will lead to enhanced collaboration and development of best practices within the industry. The findings from this research will contribute to the academic literature on apprenticeship training, offering valuable data and perspectives that may inform future studies and initiatives.

How will risks be mitigated and managed? (Keeping national disasters and relevant protocol in mind.)

Raw data, both during transmission and storage, should be encrypted to protect it from unauthorized access. This ensures that even if the data is intercepted or accessed without authorization, it remains unreadable. Whenever possible, raw data should be anonymized or de-identified before use or sharing, ensuring that personal identifiers (e.g., names, addresses, IDs) are removed. This greatly reduces the risk of privacy violations.

Explain the extent and processes to which confidentiality of information will be maintained by the researcher.

A code of conduct will always be adhered to by the researcher when collecting data. The researcher is obligated to safeguard the right of all participants, magnify the credibility of the study. The names of participants will be replaced by pseudonyms so that individual identities cannot be easily traced. Confidentiality will be maintained by limiting the collection and retention of data to only what is necessary for the research objectives. Establish and adhere to data retention policies according to UNISA policies, which is five years for possible future analysis. Any physical copies will be shredded, while digital data will be permanently deleted from both local and cloud storage systems using secure data destruction tools.

List the expected deliverables of the study. (For example, a research report, journal articles and/or conference proceedings. Also indicate how privacy will be protected in any publication of the information.)

A comprehensive research report that includes the study objectives, methodology, results, discussion, and conclusions. This document may also include recommendations based on the findings. The report will ensure that all personally identifiable information (PII) is anonymized or de-identified. Any references to individual participants will be removed or generalized. Results will be presented in aggregated form, ensuring no individual's data can be traced back to them. The report will be shared securely with stakeholders, and access will be restricted to authorized individuals only.

Peer-reviewed articles published in academic or professional journals that communicate the study's key findings, methodology, and implications to the broader research community. The publication will adhere to ethical standards for data protection as outlined in the study's institutional ethics committee approval, and informed consent procedures will be clearly referenced.

The summary will present findings in such a way that participants cannot be identified. Personal or sensitive data will not be included, and any case examples will be sufficiently anonymized. It will state explicitly how privacy was protected during the research and will assure the reader that no identifiable information is included in the summary.

How will the organisation/company/stakeholder group/community be informed of the results or outcomes? (If applicable.)

A formal written report or executive summary can be prepared that includes the research findings, implications, and recommendations. These documents can be shared with both internal and external stakeholders.

Attach a copy of the research instrument (questionnaire/interview schedule/focus group questions) to your email and mark as Annexure A

C. OFFICIAL USE ONLY - TO BE COMPLETED BY COMPANY/ORGANISATION/COMMUNITY

Decision:

- ☒ Permission granted.
☐ Permission with conditions is granted.
☐ No permission could be granted at this time.

Special Conditions (If any - Expectations of the outcomes of the study must be stated. For example: Will feedback/report be required before submission of the publication?):

The following person and/or department/and or committee has been appointed to assist the researcher in the data collection process (if applicable):

By signing this form, you are indicating that you have read the description of the study, have the legal and delegated authority to grant permission for the study on behalf of the company/organisation/stakeholder/community and that the company/organisation/stakeholder/community in principle agrees to the terms as described in the short questionnaire that follows:

1. I/We have reviewed the application form and received a copy of it. The purpose and nature of this study are clear, and all questions and issues of concern have been answered to satisfaction.

☒ Yes
☐ No

2. I/We (name of the person responsible and/or name of company/organisation/stakeholder/community)

agree to support this study and hereby grant permission for the data generated from this research to be used in the researcher's publications on this topic.

☒ Yes
☐ No

Signature



Name and surname of the person with delegated authority to grant permission on behalf of the company/organisation/stakeholder/community

LUCIA NTWAMPE &
FLOYD MASHUZI

Designation/Position

DIRECTOR

Email:

lucia@pharmblis.co.za
FLOYD@pharmblis.co.za

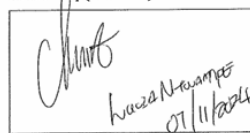
Contact number:

(011) 896 2179

Date:

07/11/2024

Official stamp (if available):


Lucia Ntwampe
07/11/2024

Appendix D – Ethics Letter



College of Economic and Management Sciences_ERC Business Management

Date: 04/07/2025

Dear: Ms Suzan Nkosi

Decision: Ethics Approval from 04 July 2025 to 04 July 2030

NHREC Registration # : (if applicable)

Ref #: 5865

Name: Ms Suzan Nkosi

Student #: 54765366

Staff #:

Researcher: Ms Suzan Nkosi
Cnr Alpha & Branch Road, Driehoek, Germiston, Boksburg, 1401
Johannesburg
54765366@mylife.unisa.ac.za 0736754313

Supervisor: Prof Ntsieni Ramasimu
ramasrn@unisa.ac.za

Framework for Apprenticeship Training Programs: A Case Study of Manufacturing Small and Medium Companies in South Africa

Qualification: Doctor of Philosophy in Management Studies

Thank you for the application for research ethics approval by the College of Economic and Management Sciences_ERC Business Management for the above-mentioned research study. Ethics approval is granted for **five years**.

The low-risk **application** was **reviewed** by the College of Economic and Management Sciences_ERC Business Management on **04 July 2025** in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising during the undertaking of the research study that may affect the ethical integrity of the study, including those involving research participants, third parties, or juristic persons, must be reported in writing to the College of Economic and Management Sciences_ERC Business Management without delay.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that may affect study-related risks to research participants, juristic or third persons, must be reported in writing to the College of Economic and Management Sciences_ERC Business Management, accompanied by a progress report.

5. The researcher will ensure that the research study complies with all applicable national legislation, professional codes of conduct, institutional guidelines, and scientific standards relevant to the specific field of study. Where applicable, adherence to the following South African legislation is essential: the Protection of Personal Information Act (No. 4 of 2013), the Children's Act (No. 38 of 2005), and the National Health Act (No. 61 of 2003)

6. Future use of this research data is permitted only in de-identified form and only for secondary research with objectives similar to those of the original study. Any secondary use involving identifiable human data will require additional ethics clearance.
7. No fieldwork activities may continue beyond the stated expiry date **04 July 2030**. A completed Research Ethics Progress Report must be submitted as an application for renewal and is subject to approval by the Research Ethics Committee. A Close-Out Report must be submitted upon completion of the research study.
8. The College of Economic and Management Sciences_ERC Business Management may require the submission of regular progress reports on an **annual** basis, in alignment with Section 7.2 of the Unisa Policy on Research Ethics (2024).

Additional Conditions

1. Disclosure of data to third parties is prohibited without explicit consent from the research participants and Unisa.
2. Research data must be stored in compliance with the university's research data management policy for a period of up to 15 years.
3. When publishing the results, the researcher must take appropriate precautions to safeguard the confidentiality and privacy of the research participants, juristic persons, third parties, and the university, in accordance with institutional policies and ethical standards.
4. Adherence to the National Statement on Ethical Research and Publication Practices, specifically Principle 7 on Social Awareness, must be ensured. This principle states: 'Researchers and institutions must be sensitive to the potential impact of their research on society, marginal groups, or individuals, and must consider these when weighing the benefits of the research against any harmful effects, with a view to minimising or avoiding the latter where possible.' The University of South Africa (Unisa) accepts no liability for any failure to comply with this principle.

Note

The reference number 5865 should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,



Dr Nadia van Huyssteen
Chair of College of Economic and Management Sciences_ERC Business Management
E-mail: marxn@unisa.ac.za



Prof Maelakanyo Christopher Mulaudzi
Executive Dean / By delegation from the Executive Dean of College of Economic and Management Sciences_ERC Business Management
E-mail: tshimc@unisa.ac.za

Appendix E – Editing Certificate

LANGUAGE & TECHNICAL EDITING CERTIFICATE		
BK EDITORIAL AND PUBLISHING (PTY) LTD [REG: 2020157767/07] [WWW.BKEDITORIALS.COM]		
certifies that the work titled		
"FRAMEWORK FOR APPRENTICESHIP TRAINING PROGRAMS: A CASE STUDY OF MANUFACTURING SMALL AND MEDIUM COMPANIES IN SOUTH AFRICA"		
authored by Suzan Nkosi		
has been edited and proofread to improve grammar, consistency, readability, flow, and logic.		
29 DECEMBER 2025		
		
Mr KM Leshaba, Managing Editor bkeditorials@gmail.com		European Association of Science Editors Membership 5471

Appendix F – Turnitin Report

Similarity Report

PAPER NAME

Thesis_5476536_SuzanNkosi.docx

AUTHOR

SUZAN NKOSI

WORD COUNT

58377 Words

CHARACTER COUNT

390437 Characters

PAGE COUNT

247 Pages

FILE SIZE

1.4MB

SUBMISSION DATE

Dec 1, 2025 2:13 PM GMT+2

REPORT DATE

Dec 1, 2025 2:24 PM GMT+2

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● Excluded from Similarity Report

- Manually excluded sources