



**BINDURA UNIVERSITY OF SCIENCE EDUCATION**

**A FRAMEWORK TOWARDS ENHANCING PRODUCTIVE UNITS  
ENSURING SUSTAINABILITY IN LINE WITH EDUCATION 5.0. A CASE  
STUDY OF URBAN SECONDARY SCHOOLS IN BINDURA**

**BY**

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## **DEDICATION**

I dedicate this work to my family, my husband for being my pillar of strength, unwavering support and patience throughout this academic journey, my boys Blessing, Brendon and Kuzivakwashe Ethan for the missed mommy moments, I owe you big time. My only daughter Zuvarashe Benisha, I dedicate this one to the good memories you left us with, continue to rest in peace, forever loved my angel

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## **ABSTRACT**

The study sought to develop a sustainable framework for enhancing productive units in urban secondary schools in Bindura District in line with Zimbabwe's Education 5.0 philosophy. Productive units such as poultry projects, gardens, workshops, and other school-based enterprises are expected to promote experiential learning, entrepreneurship, innovation, and income generation. However, many productive units fail to achieve long-term sustainability due to financial constraints, inadequate infrastructure, weak governance systems, limited stakeholder participation, and poor resource management. The study was guided by Education with Production Theory, Constructivist Learning Theory, and the School-as-an-Enterprise Theory. A pragmatic research paradigm employing a convergent mixed-methods design was adopted. Data were collected from school heads, teachers, School Development Committee members, and learners drawn from selected urban secondary schools in Bindura District. Questionnaires, semi-structured interviews, document analysis, and observation schedules were used to gather data. Quantitative data were analysed using descriptive and inferential statistics, while qualitative data were analysed thematically. Findings from both strands were integrated to provide a comprehensive understanding of factors influencing the sustainability of productive units. The findings revealed that although productive units contribute significantly to practical skills development, entrepreneurship education, and income generation, their sustainability is undermined by inadequate financial resources, procurement bottlenecks, weak governance structures, insufficient reinvestment mechanisms, inadequate infrastructure, and curriculum-related constraints. The study further identified the existence of a "Death Valley" phase in which many productive units fail during the early stages of implementation due to poor planning and limited institutional support. Strong positive relationships were observed between resource availability, effective governance, stakeholder participation, and the sustainability of productive units. The study developed a sustainable framework centred on financial sustainability, governance and accountability, stakeholder partnerships, entrepreneurship integration, monitoring and evaluation, resource mobilisation, and innovation-driven management practices. The framework is expected to strengthen the continuity and effectiveness of productive units while enhancing the implementation of Education 5.0 in secondary schools. The study recommends the establishment of ring-fenced financial systems, decentralised procurement procedures, and strengthened stakeholder partnerships, continuous professional development for teachers, and robust monitoring and evaluation systems to ensure the long-term sustainability of productive units.

**Keywords:** Education 5.0, Productive units, Sustainability, Entrepreneurship education, Innovation, Governance, Secondary schools, Bindura District.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.0 Introduction**

Education systems globally are increasingly shifting from purely theoretical learning toward practical, innovation-driven, and production-oriented education that prepares learners with practical skills relevant for daily survival. In Zimbabwe, this shift can be seen in the adoption of Education 5.0, which emphasizes teaching, research, community service, innovation, and industrialization as key drivers for national development. Within secondary schools, productive units such as workshops, poultry projects, and gardens play a very important role in promoting experiential learning, entrepreneurship, and sustainable development by linking classroom knowledge with practical production activities. Although productive units are increasingly recognized as important instruments in carrying out Education 5.0, their sustainability in many urban secondary schools remains uncertain. Most projects struggle to transition from short-term initiatives into stable and self-sustaining enterprises due to weak governance systems, inadequate financial planning, insufficient technical expertise, and limited stakeholder collaboration. This study therefore sought to develop a sustainable framework that can strengthen productive units and enhance their contribution toward innovation, industrialization, and socio-economic transformation in urban secondary schools in Bindura District.

#### **1.1 Background of the study**

The global education landscape has witnessed key transformation in recent decades due to rapid technological advancement, globalization, industrialization and the growing demand for practical and innovation-driven skills. Traditional education systems that primarily emphasized theoretical knowledge are increasingly being replaced by learner-centred approaches that integrate entrepreneurship, creativity, problem-solving, and technological competencies. Across the world, education is now viewed as a critical tool for preparing learners to participate effectively in modern economies through skills development, innovation, and sustainable production. Consequently,

many countries have adopted educational reforms aimed at aligning education with labour market demands, industrial development, and sustainable socio-economic transformation. In Zimbabwe, the transformation of education toward practical and production-oriented learning can be traced back to the post-independence philosophy of Education with Production (EWP), which emerged in the 1980s under the influence of educational reformers such as Dr Fay Chung. Education with Production sought to combine academic learning with practical work in order to develop self-reliance, technical competence, and positive attitudes toward manual labour among learners. The philosophy emphasized that schools should not only produce academically competent learners but also individuals who are self-sustaining and who can also contribute productively to national development through practical skills and entrepreneurship. Reports such as the Nziramasanga Commission of 1999 further reinforced the importance of integrating hands on education and technical education into school curriculum to marry theory and practice.

The emergence of Education 5.0 in Zimbabwe represents a further transformation of the education system toward innovation and industrialization. Education 5.0 expands the traditional mandates of education by emphasizing five key pillars: teaching, research, community service, innovation, and industrialization. The philosophy seeks to transform educational institutions into centres of production, creativity, and problem-solving capable of producing goods and services that contribute toward national economic growth and Vision 2030 aspirations. Education 5.0 therefore promotes heritage-based innovation, industrial skills development, entrepreneurship, and sustainable community development, thereby positioning schools and higher learning institutions as active participants in national industrialization and socio-economic transformation. A key component of Zimbabwe's Education 5.0 philosophy is Heritage-Based Education, which emphasizes the utilization of local resources, indigenous knowledge systems, and community-based solutions in driving innovation and industrialization. Heritage-Based Education forms an important pillar of Zimbabwe's Education 5.0 philosophy. The approach encourages educational institutions to utilise indigenous knowledge systems, local resources, and community experiences as foundations for innovation and problem-solving. According to Murwira (2019), heritage-based education seeks to ensure that learners develop solutions that address local socio-economic challenges while promoting national development. Through productive units, learners are provided with

opportunities to transform locally available resources into marketable products and services, thereby strengthening entrepreneurship and industrialization.

Within secondary schools, productive units have emerged as important practical platforms for implementing the principles of Education 5.0. Productive units such as poultry projects, school farms, gardens, workshops, and manufacturing activities provide learners with experiential learning opportunities that link classroom theory with real-life production experiences. These units play a significant role in developing entrepreneurial skills, innovation, teamwork, problem-solving abilities, and self-reliance among learners. In addition, productive units contribute toward income generation, resource mobilization, and community engagement within schools. Through practical participation in production activities, learners are exposed to real-world work environments that enhance their preparedness for employment, industrial participation, and sustainable livelihoods. Constructivist Learning Theory maintains that knowledge is actively developed through interaction with the environment rather than passively received from teachers. Vygotsky (1978) argues that meaningful learning occurs when learners engage in collaborative activities, experimentation, and practical problem-solving situations. Within productive units, students participate directly in production activities where theoretical concepts are applied to real-life situations. Such experiences promote critical thinking, innovation, teamwork, and creativity, all of which are competencies emphasised under Education 5.0. Dewey (1938) similarly contends that learning becomes more effective when linked to authentic experiences that reflect social and economic realities.

The theory supports the integration of innovation, industrialization, and problem-solving skills promoted under Education 5.0. Additionally, Systems Theory informs the study by viewing productive units as interrelated components operating within a broader educational environment where effective coordination among stakeholders, resources, policies, and management practices determines sustainability and performance outcomes. Entrepreneurship education has emerged as an essential component of contemporary education systems because it equips learners with competencies required for self-employment and enterprise creation. Kuratko (2005) explains that entrepreneurship education develops opportunity recognition skills, innovation capabilities, risk management abilities, and business management competencies. Through productive units, learners

gain practical exposure to production processes, financial management, marketing strategies, and decision-making practices that are necessary for successful entrepreneurial ventures.

Globally and regionally, the importance of integrating education with innovation, technology, and sustainable production systems is growing significantly. Developed countries like Japan, China, South Korea, and the United States are increasingly adopting Industry 5.0 models that emphasize collaboration between technology and human creativity to solve social and economic challenges. The continued refocusing from Industry 4.0 to Industry 5.0 has further reinforced human-centred and sustainable education systems globally. Industry 4.0 focused mainly on automation, digitalization, and artificial intelligence whereas Industry 5.0 emphasizes collaboration between technology and human creativity to achieve sustainable development at national level and better livelihoods we (Leng et al., 2020). This emerging global trend has influenced educational reforms aimed at developing learners who possess not only technical competencies but also creativity, ethical reasoning, adaptability, and innovation skills.

Through practical production activities, innovation, and entrepreneurship education, productive units contribute toward inclusive and equitable quality education while simultaneously promoting sustainable economic development and industrial growth. Therefore, strengthening productive units in secondary schools is not only a national educational priority but also part of broader global development objectives. As a result, productive units in schools are increasingly viewed as strategic tools for preparing learners to participate effectively in technology-driven and innovation-oriented economies. In Africa and Southern Africa, countries including Zimbabwe have embraced practical education frameworks for promoting industrialization, innovation, and entrepreneurship within educational institutions. Universities and schools are increasingly expected to function as innovation hubs capable of producing marketable goods, services, and technological solutions. However, despite progress in policy formulation, many developing countries continue to face challenges due to lack of adequate infrastructure, funding, technological capacity and effective implementation of innovation-driven educational models.

The concept of sustainability has become central to educational development globally, particularly in relation to school-based production and innovation initiatives. Sustainability in education refers to the ability of educational programs and projects to maintain their effectiveness, continuity, and relevance over time while efficiently utilizing available resources (UNESCO, 2017). In the context of productive units, sustainability involves financial viability, stakeholder participation, environmental responsibility, institutional support, and long-term operational continuity. According to Sterling (2004), sustainable education systems should focus on a wider spectrum of economic outcomes and also promote social responsibility, resilience, and environmental stewardship. Consequently, productive units in schools should be designed in ways that ensure continuity, adaptability, and long-term contribution to educational and community development. School-community partnerships are also critical in enhancing the sustainability of productive units in secondary schools. Epstein (2011) argues that collaboration between schools, parents, local industries, and communities strengthens educational programs by improving resource mobilization, technical support, and stakeholder ownership. In the context of productive units, partnerships with local businesses, agricultural institutions, and community organizations can assist schools with training, markets, financial assistance and technological expertise. Such collaboration enhances the long-term viability of productive projects while promoting community participation and local economic development.

Despite the acknowledged importance of productive units in secondary schools, many institutions continue to experience significant challenges affecting their sustainability and continuity. Common challenges include inadequate funding, poor governance systems, limited technical expertise, shortage of resources, weak stakeholder participation, poor infrastructure, and insufficient teacher training. In many cases, productive units may fail to survive beyond the initial stages of implementation due to lack of sustainable operational frameworks and ineffective management practices. These challenges undermine the ability of schools to fully implement Education 5.0 objectives and limit the contribution of productive units toward educational quality, industrialization, and community development. Furthermore, rising operational costs and lack of financial knowledge may sometimes continue to threaten the viability of school-based productive enterprises. Weak financial governance and inadequate accountability systems have also contributed significantly to the failure of productive units in many schools. According to Brigham

and Ehrhardt (2016), effective financial management is essential for ensuring the sustainability and growth of organizational projects and enterprises. In many school-based productive units, lack of proper budgeting, financial monitoring, auditing procedures, and reinvestment strategies often results in resource mismanagement and project collapse. Studies conducted in Zimbabwe as well as other developing countries reveal many school-based productive projects fail due to inadequate institutional support, weak monitoring systems, poor financial accountability, and limited technical capacity among teachers and administrators. Studies by Nherera (2014) and Firomumwe (2022) indicate that although productive units are widely promoted as tools for innovation and entrepreneurship, their implementation remains fragmented and poorly coordinated in many secondary schools. Consequently, establishing strong governance structures and transparent financial systems ensures the continuity of productive units in secondary schools.

Although several studies have examined Education with Production, entrepreneurship education, and school-based income-generating projects, limited research has focused specifically on developing sustainable frameworks for enhancing productive units in urban secondary schools in the context of Education 5.0 in Zimbabwe. Existing studies largely focus on implementation challenges without proposing integrated and contextually relevant models that address sustainability, continuity, governance, stakeholder involvement, innovation, and resource optimization. Therefore, this study comes in with a view to suggest a remedy for this gap by developing a sustainable framework for enhancing productive units in urban secondary schools in Bindura District that aligns with key tenets of Education 5.0. The study justifies the need to strengthen practical education, improve sustainability of school enterprises, support national industrialization goals, and transform schools into centers of innovation and socio-economic development.

## **1.2 Statement Of The Research Problem**

The adoption of Education 5.0 in Zimbabwe has transformed the country's education system from one that primarily emphasized academic achievement to one that integrates innovation, industrialization, entrepreneurship and heritage based education. Ideally, school-based productive units such as poultry projects, gardens, and workshops should serve as both pedagogical tools for

experiential learning and alternative revenue streams to alleviate the financial burden on parents. However, a significant gap exists between policy intent and operational reality in the Bindura Urban District. Many of these business units enter a critical sustainability phase often referred to in entrepreneurship literature as the "Death Valley" within 12 to 18 months of inception, as initial project energy dissipates and is replaced by resource shortages, inadequate teacher training, and poor governance. Research on educational production projects in Zimbabwe and other developing countries indicates that a significant number of school-based income-generating initiatives struggle to progress beyond their initial implementation stages due to financial constraints, weak governance systems, inadequate technical expertise, and limited stakeholder support. Mashingaidze (2013) found that many school productive projects experience declining performance shortly after establishment because schools often lack sustainable reinvestment mechanisms, monitoring systems, and long-term strategic planning. Similarly, Maravanyika (1990) observed that productive projects frequently depend on the commitment of individual teachers or administrators, making them vulnerable to collapse when key personnel are transferred or lose motivation. Internationally, the World Economic Forum (2020) describes this period as the —Death Valley stage, a critical transition phase where enterprises face heightened risks of failure as initial funding and enthusiasm diminish while operational demands increase. Studies on school-based enterprises further reveal that inadequate financial management, weak accountability systems, and poor market linkages contribute significantly to project discontinuity during the first two years of operation. Consequently, the sustainability challenges experienced during the first 12–18 months represent a critical barrier to the successful institutionalization of productive units and the realization of Education 5.0 objectives. Furthermore, the paradoxical trend where school fees continue to rise despite the existence of these projects, suggesting a lack of financial efficiency and transparency. There is limited evidence on sustainable frameworks that can guide urban secondary schools in managing productive units beyond the initial implementation stage. Therefore, this study addresses the absence of a contextually relevant framework that ensures productive units in urban secondary schools are managed efficiently, audited for productivity, and sustained over the long term.

### **1.3 Purpose of the Study**

The study seeks to develop a sustainable working framework that enhances productive units in urban secondary schools in Bindura District that aligns with Education 5.0. The study seeks to examine the challenges affecting the sustainability and continuity of school-based productive units and propose strategies that strengthen innovation, entrepreneurship, governance, and resource management in order to improve practical learning, income generation, and industrialization within secondary schools.

### **1.4 Objectives**

- i. To identify the existing productive units in urban secondary schools in Bindura District in relation to pillars of Education 5.0.
- ii. To examine the infrastructural, financial, technological and human resource factors influencing the sustainability of productive units.
- iii. To examine the challenges affecting the long-term sustainability and continuity of productive units.
- iv. To develop a sustainable framework for enhancing productive units that align with Education 5.0.

### **1.5 Research Questions**

- i. What are the current productive units in urban secondary schools in Bindura District, and how do they align with the pillars of Education 5.0?
- ii. How do infrastructural, financial, technological and human resource factors influence the sustainability of productive units?
- iii. What are the key challenges hindering the sustainability of school-based productive units?
- iv. How can a comprehensive framework be developed to enhance productive units and ensure their sustainability in line with Education 5.0 framework?

## 1.6 Assumptions of the research

**Data Integrity:** It is assumed that school administrators and teachers will provide honest and accurate data regarding their current production levels and financial challenges.

**Policy Alignment:** The study assumes the Ministry of Primary and Secondary Education remains committed to the Education 5.0 mandate, providing a stable policy environment for your framework.

**Resource Availability:** The study assumes that urban schools have at least the minimum baseline of infrastructure (land, water, or workshops) required to run a productive unit.

**Stakeholder Buy-in:** The study assumes key stakeholders, the community, the policy-makers, school administrators, teachers and School Development Committees will all recognize the importance of productive units and are willing to support initiatives aimed at improving their sustainability.

**Sample Representation:** The study assumes that the selected urban secondary schools are representative of the wider challenges faced by similar institutions across the country.

## 1.7 Justification of the research

### 1.7.1 Economic Justification

The study is economically justified because productive units in secondary schools have the potential to serve as alternative sources of income capable of supporting school operations and reducing excessive dependence on school fees and government grants. In many developing countries, educational institutions increasingly face financial constraints due to limited public funding and rising operational costs. As a result, school-based productive units such as poultry projects, gardens, workshops, and manufacturing activities have become important mechanisms for resource mobilization and financial sustainability. According to Kelly (1988), productive activities within schools can contribute significantly toward self-sufficiency by generating revenue used to support teaching and learning resources, infrastructure development, and school maintenance.

Furthermore, productive units expose learners to entrepreneurship and business management practices that enhance economic empowerment and self-reliance. In the context of Bindura urban secondary schools, strengthening productive units may contribute toward sustainable school financing, community economic stimulation, and the reduction of financial pressure on parents and guardians.

### **1.7.2 Pedagogical Justification**

Pedagogically, the study is justified by the growing need to promote experiential learning, practical skills development, and innovation within secondary education. Productive units give learners the chance to apply theoretical knowledge in real-life production environments, thereby enhancing creativity, problem-solving abilities, teamwork, and entrepreneurial competencies. According to Vygotsky (1978), learners construct knowledge more effectively through active participation and practical engagement in meaningful activities. Similarly, Dewey (1938) argues that education becomes more effective when learners are exposed to experiential learning situations connected to real social and economic contexts. Within the framework of Education 5.0, productive units function as practical learning laboratories where learners develop industrial, technical, and entrepreneurial skills necessary for participation in modern economies. The study therefore is important because it enhances the sustainability of productive units that support practical education, innovation, and learner preparedness for the world of work.

### **1.7.3 Governance and Policy Justification**

The study is further justified by the need to address governance, management, and policy gaps affecting the sustainability and continuity of productive units in secondary schools. Education 5.0 framework and policies promote innovation and industrialization, however many school-based productive units continue to face challenges related to poor financial management, inadequate planning, weak accountability systems and insufficient institutional support. According to Brigham and Ehrhardt (2016), effective governance and financial management systems are essential for ensuring the sustainability and growth of organizational projects and enterprises. In many schools, the absence of clear operational frameworks, monitoring systems, and stakeholder coordination has contributed to the collapse of productive units shortly after implementation. This study is therefore

justified because it seeks to propose a comprehensive and contextually relevant framework that can guide schools, policymakers and stakeholders in strengthening governance structures, improving accountability, and ensuring the sustainability of productive units in line with Education 5.0 objectives.

#### **1.7.4 Social and National Development Justification**

The study is socially significant because productive units have the potential to contribute to community development, youth empowerment, and economic growth. Education 5.0 seeks to transform educational institutions into centres of innovation and production capable of addressing societal challenges through locally generated solutions (Murwira, 2019). Sustainable productive units can create opportunities for skills development, employment creation, and income generation while simultaneously supporting the achievement of Sustainable Development Goals such as quality education, decent work, and industrial innovation (United Nations, 2015).

#### **1.7.5 Theoretical Justification**

The study is justified because it contributes changes in everyday life survival skills, emerging issues on Education 5.0 framework, productive pedagogy, and school-based entrepreneurship within secondary education. The study integrates Constructivist Learning Theory, Education with Production, and School-as-an-Enterprise perspectives to explain how productive units can function as sustainable learning and innovation platforms within schools

### **1.7 Significance of the study**

#### **Students**

The study is expected to help students by promoting experiential learning and practical skills development through sustainable productive units. Learners will gain entrepreneurial, technical, problem-solving, and innovation skills that enhance self-reliance, employability, and preparedness for participation in industrial and socio-economic development aligning with Education 5.0.

### **Teachers**

The study will assist teachers by providing insights into effective strategies for integrating productive units into teaching and learning processes. The proposed framework may strengthen teachers' capacity to promote productive pedagogy, innovation, and entrepreneurship education while enhancing learner engagement through practical and hands-on learning experiences.

### **School Administrators**

The study may assist school administrators in improving the management, governance, and sustainability of productive units within secondary schools. The findings are expected to provide practical guidance on resource mobilization, financial accountability, stakeholder coordination, and long-term sustainability planning for school-based enterprises.

### **Policymakers**

The study will provide policymakers and educational planners with evidence-based information that may support the formulation and implementation of policies aimed at strengthening productive units in schools. The proposed framework may contribute toward the smooth implementation of Education 5.0 framework by promoting industrialization and sustainable educational practices in secondary schools.

### **Researchers**

The study contributes to already existing literature aligning with Education 5.0 framework, productive units, sustainability, and entrepreneurship education. Future researchers may use findings as reference for further studies on sustainable school-based enterprises, productive pedagogy, and innovation-driven education within Zimbabwe and other developing countries.

## **1.8 Delimitations**

This study was confined to only urban secondary schools in Bindura District, Zimbabwe. It focused specifically on school-based productive units such as gardens, poultry projects, workshops, tuck shops, and other income-generating or practical learning enterprises operating within selected secondary schools. The study was confined to examining the sustainability, management, resource

availability, stakeholder participation, and alignment of these productive units with the principles of Education 5.0. The participants was limited to school heads, teachers, School Development Committee members and learners who are directly or indirectly doing the planning, management, or operation of productive units.

## **1.9 Limitations**

There are several limitations that affect the scope and generalizability of findings. Firstly, the study confined itself to selected urban secondary schools in Bindura District; therefore, the findings do not represent the experiences and conditions of rural schools or schools in Bindura District with different socio-economic and infrastructural contexts. Secondly, the study focuses on productive units within a specific timeframe, making it difficult to conduct a long-term longitudinal assessment of sustainability and continuity beyond the duration of the research period. Another limitation relates to the sensitivity of financial and operational information associated with productive units. Some school administrators and teachers may be reluctant to disclose accurate financial records or operational challenges due to fear of criticism, reputational damage, or professional repercussions. This may result in guarded responses or incomplete data during interviews and document analysis. Additionally, inconsistencies in record keeping within some schools may limit access to reliable information regarding productivity, profitability, and project sustainability. The study may also face resource and time constraints, including limited financial resources for extensive fieldwork and limited time available for data collection and analysis. Furthermore, some respondents may provide socially desirable responses as opposed to actual lived experiences and concerning the management and sustainability of productive units.

### **1.9.1 Mitigation Strategies**

To minimize the impact of the identified limitations, several mitigation measures were implemented as the study unfolds. In order to encourage openness and honest participation, some ethical considerations such as assuring participants of confidentiality, anonymity, and the academic purpose of the research were made. Participants were told that the study is intended purely for educational and developmental purposes rather than institutional evaluation or financial auditing. To address the challenge of incomplete or inconsistent data, the researcher employed

methodological triangulation by collecting information through multiple methods such as interviews, questionnaires, document analysis, and direct observation. This approach helped verify findings from different data sources and improve the credibility and reliability of the study. Where financial records are unavailable or incomplete, the researcher relied on alternative indicators such as project outputs, participation levels, and sustainability practices. To minimize the effects of socially desirable responses, the researcher will use neutral and non-judgmental questioning techniques designed to create a comfortable environment for participants. Additionally, careful sampling procedures were used to ensure representation of relevant stakeholders. Finally, to address limitations related to generalizability, the researcher provided a detailed description of the study context. This enabled future researchers and policymakers to assess the applicability and transferability of the findings to diverse educational contexts within Zimbabwe and beyond.

### **1.10 Definitions of key terms**

**Education with Production (EWP):** Education with Production refers to an educational approach that combines academic learning with practical and productive work in order to develop technical skills, self-reliance, and positive attitudes toward labour. According to Chung (1988), Education with Production integrates socially and economically meaningful production activities into the learning process to establish a complementary relationship between theory and practice.

**Productive Units:** Productive units are school-based practical projects or income-generating activities such as gardens, poultry projects, workshops, and manufacturing enterprises that provide learners with experiential learning opportunities while contributing to school sustainability. Kelly (1988) defines productive units as organized school production activities designed to combine education, skill development, and economic productivity.

**Productive Pedagogy:** Productive pedagogy is an approach that blends academic knowledge with practical production activities in order to promote experiential learning, innovation, problem-solving and entrepreneurial skills in learners. Lingard, Hayes, and Mills (2003) define productive

pedagogy as a learner-centered approach that promotes meaningful intellectual engagement and practical application of knowledge.

**“Death Valley” Phase:** The —Death Valley‖ phase refers to a critical period during which school-based productive projects or enterprises face high risks of collapse due to declining support, inadequate resources, weak management systems, and operational instability after initial implementation. According to the World Economic Forum (2020), the —Death Valley‖ stage represents the transition period where innovations or enterprises struggle to move from initial development to sustainable operation.

**Heritage-Based Innovation:** Heritage-based innovation refers to the utilization of local resources, indigenous knowledge systems, culture, and community-based solutions to drive innovation, industrialization, and sustainable development. Murwira (2019) explains that heritage-based innovation promotes the use of local knowledge and resources in addressing socio-economic challenges and national development priorities.

**Sustainability and Continuity:** Sustainability and continuity refer to the long-term viability, effectiveness, and consistent operation of productive units through proper management, resource utilization, stakeholder participation, and institutional support. UNESCO (2017) states that sustainability in education involves maintaining the effectiveness and relevance of educational programs and projects over time.

**Industrialization (in Education):** Industrialization in education is the process through which educational institutions transform research, innovation, and practical projects into marketable goods, services, and productive enterprises that contribute to economic development. According to Togo and Gandidzanwa (2021), industrialization under Education 5.0 encourages learners to produce goods and services through innovation-driven educational practices.

**Sustainability Framework:** this is a structured set of strategies, policies, management practices, and support systems designed to ensure continuity, effectiveness and viability of productive units within secondary schools (UNESCO 2017).

**Productive Pedagogy:** Productive pedagogy is a teaching and learning approach that integrates academic knowledge with practical production activities in order to promote experiential learning, critical thinking, innovation, problem-solving, and entrepreneurial skills among learners (Lingard, Hayes, and Mills 2003).

**School-Based Enterprise (SBE):** This is a school-managed productive or income-generating project that operates within an educational institution to provide learners with practical business, technical, and entrepreneurial experience while supporting teaching, learning, and school sustainability (NCSET, 2005).

## **1.11 Dissertation Outline**

### **Chapter One: Introduction**

Chapter One introduces the study by providing the background to productive units in Zimbabwean secondary schools within the context of Education 5.0, which emphasises teaching, research, community service, innovation, and industrialisation. The chapter discusses the growing need for schools to establish sustainable productive units that generate income, provide practical learning opportunities, and contribute to institutional self-reliance. It highlights the challenges affecting productive units in urban secondary schools in Bindura, including inadequate funding, weak management systems, limited entrepreneurial skills, insufficient stakeholder support, and policy implementation constraints. The chapter presents the statement of the problem, research objectives, research questions, assumptions, delimitations, limitations, significance of the study, and definitions of key concepts, thereby establishing the justification for developing a framework to enhance productive units and ensure their sustainability.

## **Chapter Two: Literature Review**

Chapter Two critically reviews scholarly literature on productive units, sustainability, entrepreneurship education, and the implementation of Education 5.0 in Zimbabwean schools. The chapter examines theoretical perspectives underpinning productive units, including Systems Theory, Stakeholder Theory, Resource-Based View Theory, and Sustainable Development Theory, which collectively explain how educational institutions can effectively mobilise resources and partnerships to achieve sustainable productivity. Empirical studies from international, regional, and Zimbabwean contexts are reviewed to identify best practices, challenges, success factors, and existing knowledge gaps. The chapter concludes with a conceptual framework that illustrates the relationships among institutional leadership, resource availability, innovation, stakeholder participation, policy implementation, and the sustainability of productive units.

## **Chapter Three: Research Methodology**

Chapter Three describes the methodological procedures employed to conduct the study. It outlines the research philosophy, research approach, and case study design adopted to investigate productive units in urban secondary schools in Bindura. The chapter explains the study area, target population, sampling techniques, sample size, and methods of data collection, including questionnaires, interviews, focus group discussions, observations, and document analysis. It further discusses the procedures used to establish validity, reliability, credibility, dependability, and confirmability of the research instruments. Ethical considerations, data collection procedures, and methods of quantitative and qualitative data analysis are also presented to demonstrate the rigour and trustworthiness of the study.

## **Chapter Four: Data Presentation, Analysis and Discussion**

Chapter Four presents, analyses, and interprets the empirical findings generated from the study. The data are organised according to the research objectives and presented using tables, figures, charts, and thematic narratives. The findings examine the current status of productive units in urban secondary schools in Bindura, the extent to which they align with the principles of Education 5.0, the challenges affecting their sustainability, and the opportunities available for improvement. The results are discussed in relation to the reviewed literature and theoretical framework, highlighting

similarities, differences, and emerging issues that contribute to knowledge on sustainable school productive units.

## **Chapter Five: Framework Development, Conclusions and Recommendations**

Chapter Five presents the proposed framework for enhancing productive units and ensuring sustainability in line with Education 5.0. The framework is developed from the empirical findings, theoretical foundations, and literature reviewed in the preceding chapters. It proposes practical strategies for strengthening leadership, governance, entrepreneurship, innovation, resource mobilisation, stakeholder collaboration, monitoring and evaluation, capacity building, and policy support to improve the performance and sustainability of productive units in urban secondary schools. The chapter concludes by summarising the major findings, drawing conclusions based on the research objectives, and making recommendations to school administrators, the Ministry of Primary and Secondary Education, policymakers, development partners, and local communities. Finally, it identifies areas for future research aimed at advancing sustainable productive units within Zimbabwe's Education 5.0 framework.

### **1.12 Chapter summary**

This chapter provided the background and context of productive units within secondary schools in relation to Zimbabwe's Education 5.0 philosophy. The chapter has highlighted the global and national transformation of education toward innovation, industrialization, entrepreneurship and practical skills development. It further discussed the role of productive units in promoting experiential learning, income generation, and sustainable development within schools. The chapter also identified the major challenges affecting the sustainability of productive units, including inadequate funding, weak governance systems, limited resources, and insufficient stakeholder support. In addition, the chapter outlined the statement of the problem, purpose of the study, research objectives, research questions, assumptions, justification, significance, delimitations, and limitations of the study. The next chapter reviews related literature and theoretical perspectives relevant to productive units, sustainability, and the implementation of Education 5.0.

## **CHAPTER 2**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 Introduction**

This chapter reviews related literature relevant to the enhancement and sustainability of productive units in urban secondary schools in line with Education 5.0. The chapter examines theoretical, conceptual, empirical, and policy-related literature on Education with Production, productive pedagogy, entrepreneurship education, sustainability, innovation, and industrialization within educational institutions. The review further explores the role of productive units in promoting experiential learning, income generation, practical skills development, and sustainable school management. In addition, the chapter analyses the major challenges affecting the continuity and effectiveness of productive units, including inadequate funding, poor governance systems, limited infrastructure, and weak stakeholder participation. The chapter also reviews global, regional, and Zimbabwean perspectives on Education 5.0 and productive units in order to establish the knowledge gaps that justify this study. Ultimately, the reviewed literature provides the theoretical and conceptual foundation for the development of a sustainable framework for enhancing productive units in urban secondary schools in Bindura District. The chapter concludes by identifying research gaps that justify the present study.

#### **2.2 Theoretical Framework**

This study is guided by three interrelated theories, namely Education with Production (EWP), Constructivist Learning Theory, and the School-as-an-Enterprise Theory. These theories provide a foundation for understanding the sustainability, management, and educational significance of productive units in urban secondary schools in line with Education 5.0.

##### **2.2.1 Education with Production (EWP)**

Education with Production (EWP) advocates for the integration of academic learning and productive work activities. According to Chung (1988), the philosophy was developed to ensure that education contributes directly to socio-economic development by equipping learners with

practical skills and positive attitudes towards work. Through participation in productive activities, learners acquire technical competencies, entrepreneurial abilities, and problem-solving skills that can be applied beyond the classroom. The theory supports the objectives of Education 5.0 by encouraging institutions to become active participants in innovation, production, and community development. The theory is appropriate for this study because it directly explains the role of productive units in combining education with practical production activities. It provides a suitable framework for examining how productive units can be enhanced and sustained within secondary schools under Education 5.0.

### **2.2.2 Constructivist Learning Theory**

Constructivist Learning Theory proposes that learning is most effective when individuals actively participate in experiences that enable them to create meaning from their interactions with the environment. Vygotsky (1978) emphasizes the importance of collaboration, social interaction, and practical engagement in the learning process. Productive units provide an environment where learners can test ideas, solve practical problems, and apply theoretical concepts in authentic situations. Such learning experiences contribute to the development of innovation, creativity, and critical thinking skills required in modern economies. The theory is suitable for this study because it explains how productive units function as experiential learning platforms that enhance innovation, problem-solving, and practical skills development among learners.

### **2.2.3 School-as-an-Enterprise Theory**

The School-as-an-Enterprise Theory views schools as entrepreneurial institutions capable of generating goods, services, and income through productive activities. The theory emphasizes sustainability, financial accountability, innovation, stakeholder participation, and efficient management of school-based enterprises. The theory is relevant because the study focuses on improving the sustainability and continuity of productive units in urban secondary schools. It provides an understanding of how schools can manage productive units as viable enterprises that contribute to educational development and financial sustainability. The theory promotes accountability, resource mobilization, entrepreneurship, innovation, and sustainable management practices. It also encourages schools to become financially self-reliant and responsive to community

needs. The theory may place excessive emphasis on profit generation at the expense of educational objectives. Schools may also face challenges related to inadequate managerial expertise, limited funding, and weak governance systems. The theory is appropriate for this study because it explains the management and sustainability dimensions of productive units. It provides a useful framework for developing strategies that strengthen governance, accountability, and long-term continuity of school-based enterprises in line with Education 5.0. Collectively, these theories provide a comprehensive foundation for understanding the sustainability of productive units within secondary schools. Education with Production explains the integration of practical work and learning, Constructivist Learning Theory emphasizes experiential and participatory learning processes, while the School-as-an-Enterprise perspective highlights the importance of entrepreneurial management, accountability, and sustainability. Together, the theories support the development of a framework capable of transforming productive units into sustainable educational and industrial platforms.

#### **2.2.4 Theoretical Synthesis**

The three theories underpinning this study Education with Production (EWP), Constructivist Learning Theory, and School-as-an-Enterprise Theory are complementary and collectively provide a comprehensive framework for understanding the sustainability of productive units in urban secondary schools under Education 5.0. Education with Production (EWP), advanced by Chung (1988), provides the philosophical foundation for the study by explaining the role of productive work in education. The theory emphasizes the integration of academic learning with practical production activities in order to develop self-reliance, technical competence, and entrepreneurship. Within the context of this study, EWP explains why productive units such as poultry projects, gardens, workshops, and school-based enterprises should exist within schools. It justifies the transformation of schools from institutions that focus solely on academic instruction into centres of production, innovation, and socio-economic development. EWP therefore provides the conceptual link between Education 5.0 and productive units by demonstrating how practical production activities contribute to learner development and national industrialization. While EWP explains the importance of productive activities, Constructivist Learning Theory, developed by Vygotsky (1978), explains how learning occurs within those productive environments. The theory argues that learners construct knowledge through active participation, social interaction, collaboration, and

engagement in authentic experiences. Productive units provide practical settings where learners apply theoretical knowledge to real-life production challenges, thereby enhancing critical thinking, creativity, problem-solving, innovation, and entrepreneurial skills. Constructivism therefore complements EWP by explaining the pedagogical processes through which productive units contribute to meaningful learning. The theory supports the Education 5.0 emphasis on experiential learning and learner-centred education by demonstrating that knowledge is best acquired through active involvement in productive activities rather than passive classroom instruction.

The School-as-an-Enterprise Theory adds a management and sustainability dimension to the study. Unlike EWP and Constructivism, which primarily focus on production and learning, the School-as-an-Enterprise perspective explains how productive units can be managed as viable and sustainable enterprises. The theory emphasizes financial accountability, governance, innovation, stakeholder participation, resource mobilization, and long-term sustainability. It provides a framework for understanding why some productive units survive while others collapse during the critical —Death Valley phase. The theory therefore addresses the sustainability challenges highlighted in this study by emphasizing effective management systems, financial controls, strategic planning, and entrepreneurial leadership. Collectively, the three theories provide a holistic explanation of productive units in secondary schools. Education with Production explains the purpose and relevance of productive units; Constructivist Learning Theory explains the learning processes that occur within those productive activities; and School-as-an-Enterprise Theory explains how productive units can be governed and sustained over time. The integration of these theories enables the study to examine productive units from educational, pedagogical, entrepreneurial, and sustainability perspectives. Together, they support the development of a sustainable framework capable of enhancing productive units, promoting innovation and industrialization, strengthening governance and accountability, and ensuring the successful implementation of Education 5.0 in urban secondary schools.

### **2.2.5 Relevance of the Theoretical Framework to Education 5.0**

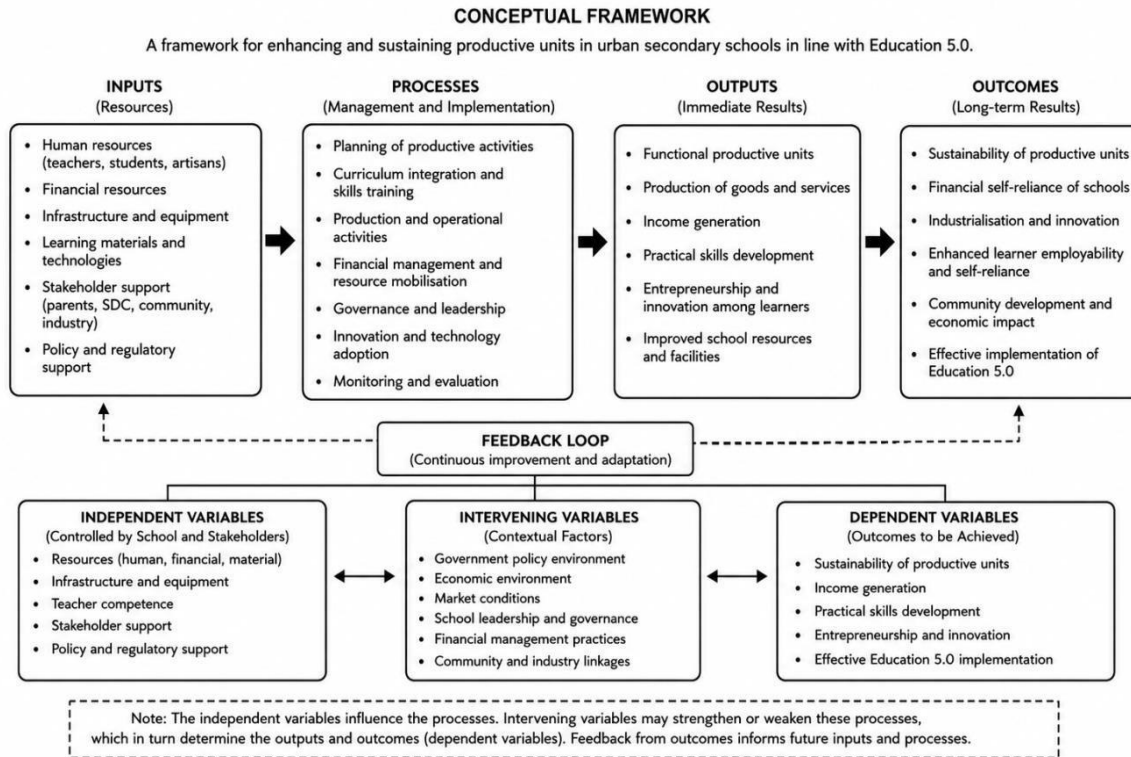
The theoretical framework adopted in this study provides a comprehensive explanation of how productive units contribute to the implementation of Education 5.0. Education with Production

explains the relationship between learning and productive work, while Constructivist Learning Theory demonstrates how practical experiences enhance knowledge construction. The School-as-an-Enterprise perspective complements these theories by highlighting the importance of entrepreneurial management, sustainability, and innovation. Collectively, the theories support the transformation of schools into centres of production and innovation capable of contributing to national industrialization and socio-economic development (Murwira, 2019).

Through productive units such as poultry projects, horticulture, school farms, and workshops, learners are exposed to practical production processes that contribute to skills development, income generation, and national industrial growth. EWP therefore provides the theoretical justification for transforming schools into centres of production and innovation consistent with the objectives of Education 5.0. Constructivist Learning Theory, developed by Vygotsky (1978), complements Education 5.0 by explaining how learners acquire knowledge through active participation, collaboration, and experiential learning. Education 5.0 advocates for learner-centred approaches that encourage creativity, problem-solving, critical thinking, and innovation. Productive units provide authentic learning environments where learners apply theoretical knowledge to real-life production activities. According to Vygotsky (1978), meaningful learning occurs when learners actively engage with their environment and construct knowledge through experience. Consequently, productive units serve as practical laboratories that facilitate innovation and entrepreneurship while promoting the competencies required under Education 5.0.

### **2.3 Conceptual Framework**

The conceptual framework for enhancing sustainable productive units in urban secondary schools is built on the transition from theoretical education to a production-oriented model. The framework integrates several key components to ensure long-term viability and alignment with national policy.



Source: Adapted from Mupaikwa (2025), Ministry of Higher and Tertiary Education Science and Technology Development 2019, Zimbabwe Education Sector Analysis (2020) and Kwandayi (2021)

**Figure 2. 1: Conceptual framework diagram**

The conceptual framework illustrates how the enhancement and sustainability of productive units in urban secondary schools can be achieved through the systematic transformation of inputs into outputs and long-term outcomes. The framework is anchored on the Systems Theory advanced by Von Bertalanffy (1968), which views organizations as open systems that receive inputs from the environment, transform them through operational processes, and produce outputs and outcomes. The framework further incorporates independent variables, intervening variables, and dependent variables to explain how various factors interact to influence the sustainability of productive units in line with Education 5.0. The framework is organized into four major components, namely Inputs, Processes, Outputs, and Outcomes. Inputs represent the independent variables that provide the resources and conditions necessary for the establishment and operation of productive units. These include human resources, financial resources, infrastructure and equipment, learning materials and

technologies, stakeholder support, and policy and regulatory support. According to UNESCO (2017), the availability of adequate resources and institutional support is fundamental to the successful implementation of educational innovation program. Similarly, MoPSE (2023) emphasizes that productive units require adequate financial, material, and human resources to contribute effectively to Education 5.0 objectives.

The second component consists of Processes, which represent the management and operational activities that transform inputs into tangible results. These processes include planning of productive activities, curriculum integration and skills training, production operations, financial management, governance and leadership, innovation and technology adoption, and monitoring and evaluation. Hoy and Miskel (2013) argue that effective organizational processes enhance institutional performance through efficient resource utilization and strategic management. In the context of productive units, these processes ensure that available resources are effectively converted into meaningful educational and economic outputs. Murwira (2019) further notes that Education 5.0 requires educational institutions to embrace innovation, industrialization, and entrepreneurship through effective management systems. The Outputs component represents the immediate and measurable results generated from productive unit activities. These outputs include functional productive units, production of goods and services, income generation, practical skills development, entrepreneurship and innovation among learners, and improved school resources and facilities. Chung (1988) argues that productive activities provide learners with opportunities to acquire practical skills while contributing to school development through production and income generation.

Similarly, Kelly (1988) maintains that productive units strengthen the link between education and socio-economic development by exposing learners to real-world production experiences. The Outcomes component represents the dependent variables and refers to the long-term benefits achieved through successful productive unit implementation. These outcomes include sustainability of productive units, financial self-reliance of schools, industrialization and innovation, enhanced learner employability and self-reliance, community development, and effective implementation of Education 5.0. According to Togo and Gandidzanwa (2021), Education 5.0 seeks to transform

educational institutions into centres of innovation and industrial productivity capable of contributing to national development. Sustainable productive units therefore become important vehicles for achieving these broader educational and economic goals. The framework also recognizes the role of intervening variables, which are contextual factors that influence the relationship between the independent and dependent variables. These include government policy environment, economic conditions, market forces, school leadership and governance, financial management practices, and community-industry linkages. Epstein (2011) argues that stakeholder collaboration and institutional leadership significantly influence the success of school programs.

Similarly, Bryman (2016) notes that organizational outcomes are often shaped by environmental and contextual factors beyond the direct control of institutions. These intervening variables can either strengthen or weaken the effectiveness of productive unit operations and consequently influence sustainability outcomes. Finally, the framework incorporates a feedback loop that emphasizes continuous monitoring, evaluation, and adaptation. Feedback enables schools to identify strengths, weaknesses, opportunities, and challenges within productive units and make appropriate adjustments to improve performance. According to Stufflebeam and Shinkfield (2007), effective feedback mechanisms promote continuous improvement and organizational learning. Within the context of this study, the feedback loop ensures that productive units remain responsive to changing educational, economic, and policy environments while maintaining long-term sustainability. Overall, the framework demonstrates that the sustainability of productive units is not determined by a single factor but by the interaction of resources, management processes, contextual conditions, and stakeholder support. The framework therefore provides a comprehensive guide for understanding and enhancing productive units in urban secondary schools in line with the principles of Education 5.0.

## **2.4 The Evolution of Education with Production (EWP)**

The concept of Education with Production emerged as a response to concerns that traditional education systems placed excessive emphasis on theoretical knowledge while neglecting practical skills development. Following independence, Zimbabwe adopted the philosophy to promote self-reliance, technical competence, and community-oriented development (Chung, 1988). Over time,

educational reforms evolved to incorporate innovation, entrepreneurship, and industrialization. This progression eventually led to the introduction of Education 5.0, which expanded the traditional educational mandate to include innovation and industrial production as mechanisms for national development (Murwira, 2019)..

In Zimbabwe, Education with Production became an important component of educational reform during the 1980s and 1990s. The approach encouraged schools to establish productive units such as gardens, poultry projects, workshops, and school farms that would expose learners to practical work experiences while generating income for schools. The Nziramasanga Commission Report (1999) further reinforced the importance of vocational and technical education by recommending the integration of practical subjects and production-oriented learning into the school curriculum. However, despite its educational significance, the implementation of Education with Production faced several challenges, including inadequate funding, poor infrastructure, limited technical expertise, weak policy support, and negative societal attitudes toward vocational education. The emergence of Education 5.0 represents an evolution of the Education with Production philosophy toward a more innovation-driven and industrialization-oriented education system. Education 5.0 expands the traditional mandates of teaching, research, and community service by incorporating innovation and industrialization as additional pillars of education.

According to Murwira (2019), Education 5.0 seeks to transform educational institutions into centres of production, innovation, and entrepreneurship capable of producing goods and services that contribute toward national industrial and economic development. Unlike traditional Education with Production, which mainly focused on practical skills and self-reliance, Education 5.0 emphasizes heritage-based innovation, technology integration, industrial productivity, commercialization of ideas, and sustainable socio-economic transformation. The transition from Education with Production to Education 5.0 reflects global educational and industrial changes associated with Industry 5.0, which emphasizes collaboration between human creativity and technological advancement to achieve sustainable development. Togo and Gandidzanwa (2021) argue that Education 5.0 aligns education with modern industrial and economic demands by promoting innovation, entrepreneurship, problem-solving, and production-oriented learning. Under this model,

schools and educational institutions are expected to function as innovation hubs where learners actively participate in practical production, research, and industrial activities.

The evolution of Education with Production into Education 5.0 has important implications for secondary schools in Zimbabwe. Secondary schools are now expected to move beyond purely academic instruction and adopt productive units as practical learning platforms that promote innovation, entrepreneurship, industrialization, and sustainability. Productive units such as school farms, workshops, poultry projects, and manufacturing activities provide learners with opportunities to develop technical, entrepreneurial, and problem-solving skills necessary for participation in modern economies. Furthermore, productive units contribute toward income generation, resource mobilization, and experiential learning within schools. However, the successful implementation of Education 5.0 in secondary schools requires adequate infrastructure, competent teachers, effective governance systems, stakeholder participation, and sustainable financial support. Many secondary schools continue to face challenges related to limited resources, inadequate training, weak management practices, and poor sustainability of productive units. Consequently, there is a need for sustainable frameworks that can strengthen productive units and ensure their long-term continuity in line with the objectives of Education 5.0. This study therefore seeks to contribute toward the development of strategies that enhance the sustainability and effectiveness of productive units in urban secondary schools in Bindura District.

#### **2.4.1 Global Perspectives on Industry 5.0 and Education**

Industry 5.0 has influenced educational reforms across the world by promoting human-centred innovation and sustainable development. Unlike Industry 4.0, which focused primarily on automation and digital technologies, Industry 5.0 emphasizes collaboration between advanced technologies and human creativity (Leng et al., 2020). Educational institutions are therefore increasingly expected to develop learners who possess technical competence, adaptability, creativity, and problem-solving abilities. As a result, many countries have incorporated experiential learning, entrepreneurship education, and innovation-based teaching approaches into their curricula. As a result, educational institutions across the world are increasingly shifting from purely theoretical instruction toward practical, entrepreneurial, and production-oriented learning models

that prepare learners for modern industrial economies. Globally, education systems are now expected to develop learners who possess not only technical competencies but also creativity, innovation, adaptability, critical thinking, and problem-solving skills. According to UNESCO (2019), modern education should equip learners with practical skills capable of addressing real-world economic and social challenges. Consequently, many countries have adopted experiential and innovation-based learning approaches that integrate practical production activities, entrepreneurship education, and technological innovation into school curricula. In developed countries such as Japan, South Korea, China, and the United States, schools and higher learning institutions increasingly function as centres of innovation, research, and industrial productivity. These countries promote Science, Technology, Engineering, Arts, and Mathematics (STEAM) education, innovation hubs, technical training centres, and entrepreneurship programs aimed at preparing learners for participation in knowledge-based and industrial economies. The Japanese Society 5.0 model, for example, emphasizes the integration of human intelligence and digital technologies to create sustainable and inclusive societies through education, innovation, and industrial development (Fukuda, 2019).

In developing countries, Industry 5.0 principles are increasingly influencing educational reforms aimed at reducing unemployment, promoting entrepreneurship, and enhancing industrialization. Countries in Africa and Asia are introducing practical and vocational learning programs that integrate production activities with formal education in order to develop technical and entrepreneurial skills among learners. According to Awang et al. (2020), the integration of innovation, entrepreneurship, and technology within education systems is essential for improving economic competitiveness and sustainable development in developing economies. The global shift toward Industry 5.0 has important implications for secondary schools in Zimbabwe under Education 5.0. Educational institutions are expected to move beyond examination-oriented teaching and embrace productive learning approaches that promote innovation, industrialization, and sustainability. Productive units in schools therefore become important platforms for experiential learning, entrepreneurship development, and practical skills acquisition. Through productive projects such as agriculture, manufacturing, and technical workshops, learners are exposed to real-life production experiences that prepare them for participation in modern economies. However, global literature also indicates that successful implementation of Industry 5.0-oriented education

requires adequate infrastructure, teacher competence, technological resources, effective governance systems, and strong stakeholder collaboration. Many developing countries continue to face challenges related to limited funding, inadequate technological infrastructure, and insufficient teacher training, which affect the sustainability of practical and innovation-driven educational programs. Therefore, strengthening productive units in secondary schools requires sustainable frameworks capable of supporting innovation, entrepreneurship, industrialization, and practical learning in line with Education 5.0 objectives.

#### **2.4.2 The Zimbabwean Context: From Education 3.0 to 5.0**

The historical framework of higher education in Zimbabwe, commonly referred to as Education 3.0, was established during the colonial era and persisted through the first decades of independence. This model was anchored on three core missions: teaching, research, and community service. However, critics and policy analysts argue that this design was primarily instructional and aimed at producing "employees" for existing colonial industries rather than creators of new wealth. Scholarly assessments reveal that while Education 3.0 achieved high literacy rates, it resulted in a disconnect between academic knowledge and local industrial needs, ultimately producing a surplus of job seekers rather than job creators. The official shift to Education 5.0 was promulgated by the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development under the "Second Republic" to align with the national vision of reaching an upper-middle-income economy by 2030. This transition involved a rigorous "Design Analysis" and a "National Skills Audit" in 2018, which found that while literacy was over 94%, critical skill levels remained low at approximately 38%. Consequently, the government expanded the traditional three pillars to five by adding innovation and industrialization. This new doctrine mandates that universities function as active ecosystems where knowledge is directly translated into tangible goods and services. A defining feature of Zimbabwe's Education 5.0 is its Heritage-Based approach, which emphasizes the utilization of local resources—such as minerals, climate, and indigenous knowledge—to drive development.

Unlike previous models that often focused on "exotic" application domains, this philosophy seeks to "decolonize" the curriculum by grounding research and production in the Zimbabwean

environment. Literature suggests that this approach is intended to harness local human and material capital to solve immediate societal problems, such as energy shortages and food security, through projects like bio-diesel production and solar-powered irrigation. The practical realization of Education 5.0 has seen the establishment of innovation hubs and industrial parks at major state universities, including the University of Zimbabwe (UZ), Midlands State University (MSU), and Chinhoyi University of Technology (CUT). These hubs serve as incubators where students and faculty can transform research into commercial startups; for example, UZ has reported the graduation of over 20 startups from its innovation programs by 2024. Studies evaluate these milestones as evidence of a "paradigm shift" where academic institutions are no longer just ivory towers but vibrant hubs of industrial growth. Despite these policy advancements, implementation challenges remain significant within secondary schools, particularly in relation to funding, infrastructure, teacher preparedness, and institutional capacity. Existing studies indicate that many schools continue to struggle with translating Education 5.0 principles into sustainable productive enterprises.

**Table 2.1: Comparative table of EWP and Education 5.0**

| <b>Feature</b> | <b>EWP</b>       | <b>Education 5.0</b>           |
|----------------|------------------|--------------------------------|
| Focus          | Production       | Innovation + Industrialization |
| Skills         | Vocational       | Entrepreneurial                |
| Outputs        | Practical skills | Products & services            |

Source: Bhowa and Aribino (2024)

#### **2.4.3 Recent Developments in Education with Production under Education 5.0 (2022–2025)**

The evolution of Education with Production (EWP) in Zimbabwe has gained renewed momentum through the implementation of Education 5.0, which seeks to transform educational institutions into centres of innovation, industrialization, and community development. While the traditional EWP model focused on integrating productive work with learning to promote self-reliance and practical skills acquisition (Chung, 1988), contemporary reforms have expanded its scope to include innovation, entrepreneurship, commercialization, and heritage-based development. Education 5.0 has therefore revitalised the EWP philosophy by positioning productive units as vehicles for economic transformation and sustainable development. Muguti and Togo (2023) argue that the

implementation of Education 5.0 has strengthened the role of productive activities in educational institutions by promoting innovation-driven learning and entrepreneurship. Their study observed that productive units are increasingly being viewed not merely as school projects but as strategic platforms for developing practical competencies, innovation capabilities, and industrial skills among learners. The authors further note that institutions embracing Education 5.0 are gradually shifting from theoretical instruction towards experiential learning approaches that encourage creativity, problem-solving, and production-oriented education.

Similarly, Chabaya (2024) observes that the transformation of Zimbabwe's education system has created opportunities for integrating indigenous knowledge systems, entrepreneurship, and innovation into productive unit operations. According to Chabaya (2024), productive units can serve as practical environments where learners apply local knowledge, technological innovation, and business skills to address community challenges while generating income. The study further highlights the importance of strengthening institutional capacity, infrastructure, and stakeholder participation to ensure the sustainability of productive ventures within educational institutions. Recent reports by the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development (2024) indicate that Education 5.0 has facilitated the establishment of innovation hubs, industrial parks, incubation centres, and production-oriented projects aimed at enhancing innovation and industrialization. The reports emphasize that educational institutions are expected to generate goods, services, and innovations that contribute directly to national development and economic growth.

These developments reflect a significant departure from traditional education models towards a heritage-based, production-oriented education system that prioritises value creation and commercialization. Despite these achievements, recent studies indicate that challenges continue to affect the sustainability of productive units. Resource constraints, inadequate infrastructure, limited technological capacity, weak market linkages, and governance challenges remain significant barriers to successful implementation. Researchers have noted that while Education 5.0 provides a strong policy framework for promoting production and innovation, institutions often struggle to translate policy objectives into sustainable productive enterprises due to financial and operational

limitations. The recent literature therefore demonstrates that Education with Production has evolved from a model primarily concerned with practical skills acquisition into a broader framework that integrates innovation, entrepreneurship, industrialization, and community engagement. This evolution aligns closely with the objectives of Education 5.0 and reinforces the importance of sustainable productive units as mechanisms for achieving educational relevance, economic empowerment, and national development.

## **2.5 The Role and Sustainability of Productive Units**

Productive units have become increasingly important within modern education systems because they provide opportunities for learners to acquire practical competencies while simultaneously supporting institutional development. Within the framework of Education 5.0, productive units are expected to function as platforms that integrate teaching, innovation, entrepreneurship, and industrialization. These initiatives enable learners to participate in real production processes where theoretical concepts are translated into practical outcomes. From an economic perspective, productive units can contribute to school sustainability by generating supplementary income that may be used to support educational programs, infrastructure development, and resource acquisition. Kelly (1988) argues that school-based production activities have the potential to reduce excessive dependence on external funding sources while fostering financial self-reliance. In addition, participation in productive projects exposes learners to business management practices, marketing strategies, budgeting processes, and financial decision-making. Pedagogically, productive units support experiential learning by providing authentic environments in which learners can engage with practical challenges. Constructivist scholars maintain that meaningful learning occurs when individuals actively participate in tasks that require critical thinking, collaboration, and problem-solving (Vygotsky, 1978; Dewey, 1938). Through activities such as horticulture, poultry production, manufacturing, and technical workshops, learners gain opportunities to apply classroom knowledge to real-life situations.

Productive units also contribute to industrial and entrepreneurial development. Education 5.0 encourages educational institutions to become centres of innovation capable of producing goods and services that contribute to national development (Murwira, 2019). Through engagement in

productive activities, learners acquire technical and entrepreneurial competencies that enhance their readiness for employment, self-employment, and participation in industrial production systems. The sustainability of productive units depends on the interaction of several factors, including effective governance, financial accountability, stakeholder participation, institutional support, and continuous innovation. UNESCO (2017) emphasises that educational projects achieve sustainability when they maintain relevance, operational effectiveness, and stakeholder commitment over extended periods. Consequently, productive units should be viewed not merely as income-generating projects but as long-term educational investments that require strategic planning and institutional support.

## **2.6 Challenges to Sustainability**

Despite the important contribution of productive units toward practical learning, entrepreneurship, innovation, and industrialization, many secondary schools continue to face significant challenges that affect the sustainability and continuity of school-based enterprises. These challenges undermine the effective implementation of Education 5.0 and limit the ability of productive units to function as sustainable centres of production and experiential learning.

### **2.6.1 Financial Challenges**

Financial constraints remain one of the major barriers affecting the sustainability of productive units in secondary schools. Many schools experience inadequate funding, limited start-up capital, and rising operational costs that negatively affect production activities. According to Kelly (1988), productive units often fail because schools lack sufficient financial resources to purchase raw materials, maintain equipment, and expand production activities. In many cases, profits generated from productive projects are not reinvested back into the enterprises, resulting in depletion of working capital and eventual project collapse. Brigham and Ehrhardt (2016) further argue that weak financial management systems, poor budgeting, and lack of accountability contribute significantly to the failure of organizational projects and enterprises. Without proper financial planning and transparent management systems, productive units struggle to achieve long-term sustainability.

### **2.6.2 Infrastructure Challenges**

Inadequate infrastructure and limited technological resources also affect the sustainability of productive units. Many schools lack proper workshops, machinery, storage facilities, irrigation systems, and reliable electricity required for effective production activities. According to Mashingaidze (2013), poor infrastructure limits the efficiency and competitiveness of productive units within educational institutions. Urban schools may also experience challenges such as limited land, water shortages, and unstable power supply, which disrupt production processes and reduce productivity. The absence of modern technology and production equipment further weakens the ability of schools to implement innovation-driven productive activities promoted under Education 5.0.

### **2.6.3 Human Resource Challenges**

Human resource challenges significantly affect the management and continuity of productive units in schools. Maravanyika (1990) notes that many teachers responsible for productive projects lack technical, entrepreneurial, and managerial competencies necessary for operating productive enterprises effectively. Most teachers are trained primarily as academic educators and may not possess adequate knowledge in business management, financial administration, production systems, or innovation. In addition, teachers often perceive productive activities as an additional workload that increases responsibilities without adequate incentives or support. This results in low morale, limited commitment, and weak supervision of productive units. The shortage of skilled technical personnel and insufficient staff development programs also continue to affect the quality and sustainability of school-based enterprises.

### **2.6.4 Governance Challenges**

Weak governance systems and poor stakeholder participation are major challenges affecting the sustainability of productive units. Effective governance requires proper leadership, accountability, transparency, monitoring systems, and stakeholder involvement in the management of productive projects. According to Epstein (2011), collaboration between schools, parents, communities, industries, and other stakeholders strengthens educational programs through improved resource mobilization and institutional support. However, many productive units operate without clear

governance structures or accountability mechanisms. Poor financial accountability, weak monitoring systems, and lack of strategic planning often lead to mismanagement of resources and stakeholder mistrust. In some cases, productive units collapse due to poor coordination and lack of institutional commitment from school authorities and stakeholders.

### **2.6.5 Market Challenges**

Market-related challenges also affect the sustainability and profitability of productive units. School-based enterprises often struggle to compete with established private businesses in terms of pricing, product quality, branding, and market access. Gustafsson (1987) argues that many productive units remain small-scale and fail to establish reliable customer networks beyond the school environment. Limited marketing skills, poor business planning, and lack of technological integration reduce the competitiveness of school-produced goods and services. In addition, fluctuating market demands and economic instability may negatively affect the profitability and continuity of productive projects within schools.

### **2.6.6 Policy Implementation Challenges**

Policy implementation challenges continue to hinder the effective operation and sustainability of productive units in secondary schools. Although Education 5.0 promotes innovation, industrialization, and practical learning, many schools experience difficulties in translating policy objectives into practical implementation. Togo and Gandidzanwa (2021) observe that inconsistencies in policy interpretation, inadequate institutional support, and lack of clear operational guidelines weaken the implementation of Education 5.0 initiatives within schools. Furthermore, limited government funding, insufficient monitoring mechanisms, and inadequate training programs for teachers and administrators affect the successful integration of productive units into the school system. Another important sustainability challenge associated with policy implementation is the —Death Valley phase, where productive projects fail after the initial implementation stage due to declining support systems, financial instability, poor management practices, and inadequate continuity planning. According to the World Economic Forum (2020), many enterprises struggle to transition from project initiation to sustainable operation because of weak institutional frameworks and limited long-term support mechanisms. Therefore, addressing

financial, infrastructural, human resource, governance, market, and policy implementation challenges is essential for strengthening the sustainability and continuity of productive units in secondary schools. Sustainable productive units require adequate resources, effective leadership, stakeholder collaboration, proper financial management, and supportive policy frameworks in order to contribute effectively toward Education 5.0 objectives.

## **2.7 Challenges and Barriers to Sustainability: The “Death Valley” Phase**

The concept of the "Death Valley" phase originates from entrepreneurship and innovation literature and describes a critical stage during which projects face a heightened risk of failure before reaching sustainable operation. Within the context of school-based productive units, this phase occurs when initial enthusiasm, funding, and stakeholder support begin to decline while operational demands continue to increase. The World Economic Forum (2020) identifies this period as one of the most vulnerable stages in the lifecycle of emerging enterprises.

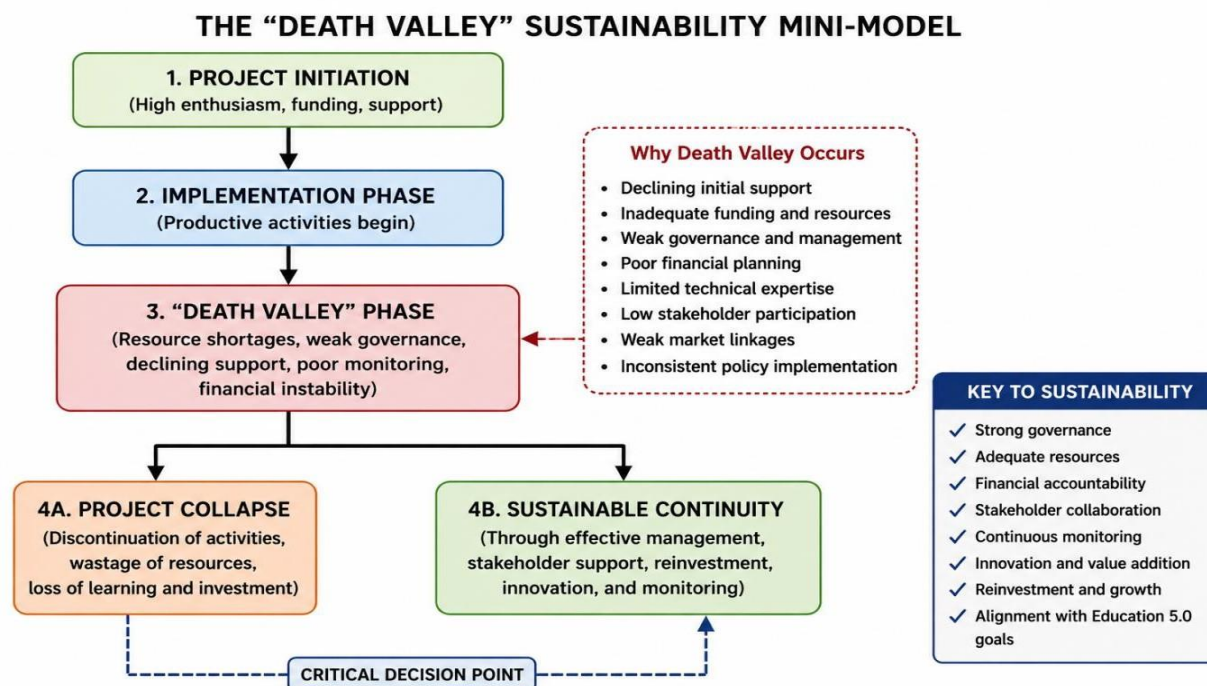
Several factors contribute to the emergence of the Death Valley phase. These include declining financial resources, inadequate technical expertise, weak governance systems, insufficient monitoring mechanisms, and limited stakeholder participation. Mashingaidze (2013) argues that many educational production projects fail because institutions lack effective strategies for reinvestment, continuity planning, and long-term management. Similarly, Maravanyika (1990) observed that productive projects often collapse when they rely excessively on individual champions rather than institutionalised support systems.

To overcome this sustainability gap, schools require structured frameworks that integrate governance, financial management, stakeholder engagement, monitoring systems, and entrepreneurial practices. Effective governance structures should establish clear roles, responsibilities, accountability procedures, and reporting mechanisms. Strong financial systems should include ring-fenced project accounts, transparent budgeting processes, and reinvestment strategies that support operational continuity.

Stakeholder participation should form a central component of any sustainability framework. Partnerships involving School Development Committees, parents, local businesses, community organisations, government agencies, and industry representatives can facilitate resource mobilisation, technical support, and market access. Freeman (1984) maintains that stakeholder engagement strengthens organisational effectiveness by promoting shared ownership and collective responsibility.

The framework should also incorporate continuous monitoring and evaluation mechanisms. Stufflebeam and Shinkfield (2007) emphasise that regular assessment enables organisations to identify emerging challenges, evaluate performance, and implement corrective measures before problems become critical. Monitoring systems therefore enhance adaptability and improve decision-making.

Furthermore, business incubation support, enterprise mentorship, and market linkage development can significantly improve the survival prospects of productive units. Access to experienced mentors, entrepreneurial training, and reliable markets increases the likelihood that projects will move successfully beyond the Death Valley phase and achieve long-term sustainability. Therefore, a sustainable framework for productive units should integrate governance, financial accountability, stakeholder collaboration, monitoring and evaluation, entrepreneurship development, and market-oriented practices. Such a framework would strengthen the contribution of productive units to experiential learning, innovation, industrialisation, and the successful implementation of Education 5.0.



Source: from Markham et al. (2010), Ministry of Higher Education, Science and Technology Development (2019), and Bhowa and Aribino (2024)

**Figure 2. 2:** Death Valley sustainability Model

The model illustrates that productive units initially begin with high levels of enthusiasm, funding, and stakeholder participation. However, as projects progress into operational stages, schools often experience financial pressures, resource shortages, governance challenges, and declining institutional support. Without effective sustainability strategies, productive units may collapse during the —Death Valley‖ phase. On the other hand, schools that establish proper governance systems, stakeholder collaboration, financial accountability, monitoring mechanisms, and innovation practices are more likely to achieve long-term sustainability and continuity. The concept of the —Death Valley‖ phase is particularly relevant to this study because many productive units in urban secondary schools struggle to survive beyond their initial implementation period. Understanding this sustainability gap is important for developing a comprehensive framework capable of strengthening governance, improving resource management, enhancing stakeholder participation, and ensuring the long-term sustainability of productive units in line with Education 5.0 objectives.

#### **2.7.4 Strategies for Overcoming the Death Valley Phase**

The successful transition of productive units from establishment to sustainability requires deliberate interventions that address the challenges associated with the Death Valley Phase. The Death Valley Phase refers to the period during which productive units experience resource shortages, operational challenges, limited market access, and inadequate institutional support, resulting in a high risk of project failure. Several strategies have been identified in the literature as critical for overcoming this phase and enhancing the long-term sustainability of productive enterprises.

##### **2.7.1 Ring-Fenced Project Accounts**

One of the key strategies for overcoming the Death Valley Phase is the establishment of ring-fenced project accounts dedicated specifically to productive unit operations. Ring-fencing ensures that income generated from productive activities is retained and reinvested into the project rather than being diverted to other school expenditures. According to Brigham and Ehrhardt (2022), financial sustainability requires organizations to maintain dedicated funding streams that support operational continuity and future growth. Similarly, UNESCO (2021) emphasises that productive projects are more likely to survive their early stages when generated revenues are protected and strategically reinvested. Ring-fenced accounts therefore enhance financial accountability, transparency, and sustainability by ensuring the availability of working capital for productive unit expansion.

##### **2.7.2 Business Incubation Support**

Business incubation support plays a critical role in assisting productive units during their vulnerable stages of development. Business incubators provide technical assistance, business development services, training, networking opportunities, and access to markets and funding sources. According to Etzkowitz and Zhou (2018), incubation programs significantly improve the survival and growth rates of entrepreneurial ventures by reducing operational risks and strengthening innovation capabilities. Under Education 5.0, innovation hubs and industrial parks established by educational institutions provide incubation platforms that enable productive units to develop viable business models and commercialise their outputs (MHTEISTD, 2024). Such support mechanisms enhance the capacity of productive units to navigate the challenges associated with the Death Valley Phase.

### **2.7.3 Stakeholder Partnerships**

The development of strong stakeholder partnerships is another important strategy for enhancing productive unit sustainability. Effective collaboration among schools, parents, School Development Committees (SDCs), government agencies, private sector organizations, and local communities facilitates resource mobilization, knowledge sharing, and technical support. Epstein (2011) argues that stakeholder partnerships strengthen institutional effectiveness by creating networks of support that contribute to program success. Similarly, Bryson, Crosby, and Stone (2015) note that collaborative partnerships enable organizations to access resources and expertise that would otherwise be unavailable. In the context of productive units, stakeholder partnerships can provide financial assistance, infrastructure, technical expertise, and market opportunities necessary for project survival and growth.

### **2.7.4 Market Linkages**

The establishment of strong market linkages is essential for ensuring the commercial viability of productive units. Access to reliable markets enables productive enterprises to generate consistent revenue and achieve financial sustainability. According to Porter (1998), organisations that establish effective market networks are more likely to maintain competitiveness and long-term viability. Productive units that secure partnerships with local businesses, industries, retailers, and community organisations can create stable demand for their products and services. Furthermore, value chain integration enables schools to identify market opportunities, improve product quality, and increase profitability. Market linkages therefore reduce the risk of project failure by ensuring that production activities are aligned with consumer demand.

### **2.7.5 Continuous Monitoring and Evaluation**

Continuous monitoring and evaluation provide mechanisms for assessing project performance and identifying emerging challenges before they become critical. Stufflebeam and Shinkfield (2007) argue that systematic evaluation promotes organisational learning, accountability, and continuous improvement. Through regular monitoring, schools can track financial performance, production efficiency, market trends, and stakeholder satisfaction. Monitoring information enables management to make evidence-based decisions and implement corrective measures when

necessary. Continuous evaluation therefore enhances the adaptive capacity of productive units and increases their chances of surviving the Death Valley Phase.

### **2.7.6 Enterprise Mentorship**

Enterprise mentorship involves providing guidance and support from experienced entrepreneurs, industry experts, and business professionals. Mentorship facilitates the transfer of practical knowledge, entrepreneurial skills, and management expertise necessary for business growth and sustainability. According to Hisrich, Peters, and Shepherd (2020), mentorship improves entrepreneurial competence and enhances venture survival by helping emerging enterprises avoid common operational mistakes. Within educational settings, mentorship programmes can connect productive unit managers and learners with successful entrepreneurs who provide advice on financial management, marketing, innovation, and strategic planning. Such mentorship relationships strengthen organisational capacity and improve the likelihood of achieving sustainable productive unit operations. In summary, overcoming the Death Valley Phase requires a combination of financial, managerial, institutional, and market-based interventions. Ring-fenced project accounts, business incubation support, stakeholder partnerships, market linkages, continuous monitoring and evaluation, and enterprise mentorship collectively provide a comprehensive framework for enhancing the sustainability of productive units. These strategies are consistent with the objectives of Education 5.0, which seeks to promote innovation, entrepreneurship, industrialisation, and sustainable development through productive educational initiatives.

## **2.8 Developing a Framework for Sustainable Productive Units**

The sustainability and effectiveness of productive units in secondary schools require the development of comprehensive frameworks that integrate governance systems, sustainability strategies, stakeholder participation, monitoring mechanisms, and entrepreneurship-oriented practices. Under Education 5.0, productive units are expected to function as centres of innovation, industrialization, and practical learning that contribute toward socio-economic development. Consequently, schools require structured and sustainable operational frameworks capable of supporting the long-term continuity and success of productive units.

### **2.8.1 Governance Mechanisms**

Effective governance mechanisms are essential for ensuring accountability, transparency, coordination, and proper management of productive units within schools. Governance involves the establishment of clear leadership structures, financial management systems, policy guidelines, and operational procedures that regulate the functioning of productive projects. According to Epstein (2011), strong institutional governance promotes stakeholder trust, improves resource mobilisation, and strengthens organizational sustainability. In the context of productive units, governance mechanisms may include project committees, financial reporting systems, strategic planning processes, and stakeholder representation structures. Schools that establish clear governance systems are more likely to sustain productive units because responsibilities, monitoring procedures, and accountability mechanisms are clearly defined. Weak governance structures often result in poor financial accountability, resource mismanagement, lack of continuity planning, and stakeholder conflicts, which contribute to project collapse. Therefore, sustainable frameworks for productive units should incorporate effective governance systems that promote transparency, institutional ownership, and long-term strategic management.

### **2.8.2 Sustainability Models**

Sustainability models provide structured approaches that support the long-term continuity and viability of productive units. According to UNESCO (2017), sustainability in education involves maintaining the effectiveness and relevance of educational programs while efficiently utilizing available resources over time. Sustainable productive units require continuous reinvestment of profits, efficient resource utilisation, environmental responsibility, and institutional support systems. Several sustainability models emphasize the importance of financial sustainability, social sustainability, and operational continuity in educational projects. Sterling (2004) argues that sustainable educational systems should promote resilience, adaptability, and long-term institutional development. In the context of productive units, sustainability models may include income reinvestment strategies, diversification of productive activities, partnership development, and innovation-driven production systems. Sustainable frameworks should therefore ensure that productive units remain economically viable, educationally relevant, and institutionally supported beyond the initial implementation phase.

### **2.8.3 Stakeholder Participation**

Stakeholder participation is an important component in the development and sustainability of productive units. Stakeholders such as school administrators, teachers, learners, parents, School Development Committees, local communities, industries, and government agencies play a critical role in providing financial support, technical expertise, monitoring, and institutional guidance. According to Freeman (1984), stakeholder involvement strengthens organizational effectiveness by improving cooperation, ownership, and collective responsibility. In schools, active stakeholder participation contributes toward improved decision-making, resource mobilization, project supervision, and sustainability planning. Community involvement may also enhance market access, technical support, and partnerships that strengthen productive units. However, lack of stakeholder participation often results in limited support, poor coordination, and weak sustainability of projects. Therefore, sustainable frameworks should establish collaborative structures that encourage stakeholder engagement, consultation, and shared responsibility in the management of productive units.

### **2.8.4 Monitoring and Evaluation**

Monitoring and evaluation are essential processes for assessing the effectiveness, progress, and sustainability of productive units. Monitoring involves continuous supervision and tracking of project activities, while evaluation focuses on assessing outcomes, challenges, and overall performance. According to Kusek and Rist (2004), effective monitoring and evaluation systems improve organizational performance by promoting accountability, informed decision-making, and continuous improvement in the context of productive units, monitoring and evaluation mechanisms may include financial audits, production assessments, performance reviews, project reports, and stakeholder feedback systems. Continuous monitoring enables schools to identify operational challenges, financial risks, and governance weaknesses before projects collapse. Evaluation also provides opportunities for schools to improve production processes, strengthen sustainability strategies, and align productive units with Education 5.0 objectives. Therefore, sustainable frameworks should incorporate regular monitoring and evaluation systems that support accountability, innovation, and long-term project continuity.

### **2.8.5 Entrepreneurship Integration**

Entrepreneurship integration is a critical component of sustainable productive units because it promotes innovation, self-reliance, and business-oriented thinking among learners and schools. Kuratko (2005) argues that entrepreneurship education equips learners with the knowledge, skills, and attitudes necessary for enterprise development, problem-solving, and economic participation. Under Education 5.0, productive units are expected to function not only as practical learning centres but also as entrepreneurial platforms capable of generating goods, services, and income. Entrepreneurship integration involves incorporating business planning, marketing, financial literacy, innovation, and value addition into productive activities. Through entrepreneurship-oriented productive units, learners develop practical competencies such as leadership, creativity, communication, and decision-making. Entrepreneurship also enhances the financial sustainability of productive units by promoting market-oriented production and income generation. Therefore, sustainable frameworks should integrate entrepreneurship education and innovation practices that strengthen the competitiveness, profitability, and long-term sustainability of productive units within secondary schools. Collectively, governance mechanisms, sustainability models, stakeholder participation, monitoring and evaluation systems, and entrepreneurship integration form important components of a comprehensive framework for enhancing productive units in secondary schools. The integration of these components is essential for ensuring that productive units contribute effectively toward innovation, industrialization, experiential learning, and the successful implementation of Education 5.0.

## **2.9 Proposed Framework Components**

The proposed framework for enhancing productive units in urban secondary schools is built around five key components that collectively support sustainability, innovation, accountability, and effective implementation of Education 5.0. These components are strategic management, financial sustainability, operational systems, stakeholder engagement, and monitoring and evaluation.

### **2.9.1 Strategic Management**

Strategic management is essential for ensuring the long-term sustainability and effectiveness of productive units in secondary schools. This component focuses on the establishment of clear goals,

vision, policies, and operational plans that guide the implementation and management of productive activities. Effective strategic management involves leadership commitment, institutional planning, risk management, and alignment of productive units with the objectives of Education 5.0. Schools should develop strategic plans that define project objectives, sustainability targets, production goals, and accountability structures. Strong leadership and strategic direction improve coordination, continuity, and institutional ownership of productive units.

### **2.9.2 Financial Sustainability**

Financial sustainability focuses on ensuring that productive units remain economically viable and capable of supporting their operations over time. This component emphasizes proper budgeting, income generation, financial accountability, profit reinvestment, and resource mobilization. Sustainable productive units should establish transparent financial management systems that promote accountability and efficient utilization of resources. Income generated from productive projects should be reinvested into production activities, infrastructure maintenance, and expansion of projects. Financial sustainability may also be strengthened through partnerships, fundraising initiatives, and market-oriented production strategies that improve profitability and operational continuity.

### **2.9.3 Operational Systems**

Operational systems refer to the structures, procedures, and technical processes that support the daily functioning of productive units. This component includes production planning, resource allocation, infrastructure management, technological integration, maintenance systems, and human resource coordination. Effective operational systems ensure efficiency, quality control, consistency in production, and proper utilisation of available resources. Schools should establish clear operational procedures and provide adequate infrastructure, equipment, and technical support necessary for productive activities. Operational systems should also encourage innovation, problem-solving, and adaptation to changing economic and educational demands.

#### **2.9.4 Stakeholder Engagement**

Stakeholder engagement involves the active participation and collaboration of individuals and institutions that contribute to the success and sustainability of productive units. Important stakeholders include school administrators, teachers, learners, parents, School Development Committees, local communities, industries, government departments, and development partners. Effective stakeholder engagement strengthens resource mobilisation, technical support, decision-making, and project ownership. Schools should establish collaborative structures that encourage consultation, communication, and shared responsibility among stakeholders. Community and industry partnerships may also improve market access, technical expertise, and sustainability of productive units.

#### **2.9.5 Monitoring and Evaluation**

Monitoring and evaluation are critical components for assessing the performance, effectiveness, and sustainability of productive units. Monitoring focuses on continuous supervision and tracking of project activities, while evaluation assesses outcomes, challenges, and overall project impact. Effective monitoring and evaluation systems improve accountability, informed decision-making, and continuous improvement of productive units. Schools should establish regular reporting systems, financial audits, performance reviews, and stakeholder feedback mechanisms to assess project progress and sustainability. Monitoring and evaluation also help identify operational weaknesses, financial risks, and governance gaps before projects collapse, thereby strengthening long-term continuity and alignment with Education 5.0 objectives. Collectively, these framework components provide a comprehensive and integrated approach for strengthening productive units in urban secondary schools. The framework seeks to enhance sustainability, innovation, entrepreneurship, industrialization, and experiential learning while addressing the major challenges affecting productive units under Education 5.0.

#### **2.10 Gaps Identified**

The reviewed literature shows that productive units have been widely discussed in relation to Education with Production, entrepreneurship education, practical skills development, and Education 5.0. However, several gaps remain, particularly in relation to the sustainability and continuity of

productive units in urban secondary schools. Most existing studies focus on the importance of productive units and the challenges affecting their implementation, but limited attention has been given to the development of integrated frameworks that address governance, financial sustainability, stakeholder participation, monitoring, and entrepreneurship within one model. A major gap identified in the literature is the contextual gap. Much of the available literature focuses on productive units in general educational settings, rural schools, vocational institutions, or higher education institutions. Limited research has specifically examined productive units in urban secondary schools in Zimbabwe, particularly in Bindura District. This creates a need for a context-specific study that considers the unique realities of urban schools, including limited land, competition from private businesses, resource constraints, and the need for practical implementation of Education 5.0.

A second gap is the sustainability gap. Although productive units are promoted as tools for income generation, practical learning, and industrialization, many studies do not adequately explain how these units can be sustained beyond their initial implementation stage. The literature acknowledges challenges such as funding shortages, poor governance, inadequate infrastructure, and weak stakeholder support, but provides limited guidance on how schools can overcome the —Death Valley phase and achieve long-term continuity.

A third gap is the governance and financial management gap. Existing studies highlight poor management and lack of accountability as major causes of project failure, yet few provide clear governance structures or financial models that schools can use to manage productive units effectively. There is therefore a need for a framework that includes transparent financial systems, reinvestment strategies, accountability mechanisms, and stakeholder oversight.

A fourth gap is the pedagogical and entrepreneurship integration gap. While productive units are expected to promote experiential learning and entrepreneurship, many studies do not clearly show how productive activities can be systematically integrated into teaching, learning, assessment, and

learner skills development. This gap limits the ability of productive units to function as meaningful educational tools under Education 5.0.

A fifth gap is the policy implementation gap. Although Education 5.0 provides a strong policy direction for innovation and industrialization, there is limited empirical evidence on how secondary schools can practically translate this policy into sustainable school-based productive enterprises. Schools often lack clear implementation guidelines, technical support, and monitoring mechanisms, which weakens policy execution.

Finally, there is a methodological gap in the existing literature. Many studies are descriptive and focus mainly on challenges without developing or testing practical frameworks for sustainability. This study therefore seeks to fill these gaps by developing a sustainable framework for enhancing productive units in urban secondary schools in Bindura District in line with Education 5.0.

## **2.11 Chapter Summary**

The literature examined in this chapter demonstrates that sustainable productive units depend on the interaction of governance capacity, resource availability, stakeholder participation, and entrepreneurial practices. Evidence from international and Zimbabwean contexts indicates that while productive units can strengthen practical learning and income generation, their long-term viability is often constrained by financial, institutional, and policy-related barriers. These insights informed the development of the conceptual foundation for the present study. Furthermore, the chapter explored framework development components such as governance mechanisms, stakeholder participation, monitoring and evaluation, entrepreneurship integration, and sustainability models. Finally, the chapter identified several contextual, sustainability, and policy gaps, thereby justifying the need for this study to develop a sustainable framework for enhancing productive units in urban secondary schools in Bindura District. The next chapter presents the research methodology that will guide the study.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discusses methodology of research that was used to investigate the enhancement and sustainability of productive units in urban secondary schools within the Bindura District. Based on the theoretical foundations of Education 5.0 and Constructivist Learning Theory discussed in the previous chapter, this section provides a detailed blueprint of how the study was conducted. It describes the research design, target population, sampling techniques, and instruments used in data collection. Furthermore, it describes the data analysis procedures, ethical considerations, and the measures taken to ensure the validity and reliability of the findings in addressing the persistent "Death Valley" phase of school-based business units.

#### **3.2 Research paradigm**

The Pragmatist Paradigm is the philosophical foundation for this study, prioritizing the research question over a commitment to any single set of philosophical assumptions. Unlike purist stances that view qualitative and quantitative methods as incompatible, pragmatism posits that the "truth" of a theory or method is found in its practical application and consequences (Dewey, 1933). This study adopted the view of Morgan (2007), who argues that pragmatism bridges the gap between post-positivism and constructivism by focusing on "what works" to solve the research problem at hand. The Pragmatist Paradigm was chosen for this study because it provides a more comprehensive and flexible approach to investigating the sustainability of productive units than either Positivism or Interpretivism when used independently. The research problem requires an understanding of both measurable realities, such as resource availability, financial sustainability, governance effectiveness, and productivity levels, as well as subjective realities, including the experiences, perceptions, and challenges faced by school heads, teachers, learners, and School Development Committees. Pragmatism accommodates both forms of knowledge and therefore offers a more suitable philosophical foundation for the study.

Positivism, associated with scholars such as Comte (1853) and later advanced by Durkheim (1895), assumes that reality is objective, observable, and measurable through empirical methods. Positivist research emphasizes quantification, statistical analysis, hypothesis testing, and generalization. While positivism would be useful for measuring variables such as income generated by productive units, levels of stakeholder participation, or resource gaps, it would be insufficient for explaining the underlying reasons why productive units succeed or fail. The paradigm pays limited attention to the meanings, experiences, and contextual factors that influence human behaviour and decision-making. Since this study seeks not only to identify sustainability challenges but also to understand how stakeholders experience and interpret those challenges, a purely positivist approach would provide an incomplete understanding of the phenomenon. Interpretivism, on the other hand, is grounded in the works of Weber (1947) and later scholars such as Schwandt (1994), who argue that reality is socially constructed and best understood through the meanings individuals attach to their experiences. Interpretivism is valuable for exploring participants' perceptions, beliefs, and lived experiences regarding productive units and Education 5.0 implementation. However, the paradigm places less emphasis on objective measurement and statistical generalization. While interpretivism would provide rich descriptions of stakeholder experiences, it would be limited in its ability to quantify the prevalence of sustainability challenges or establish broader patterns across schools. Consequently, relying solely on interpretivism would make it difficult to generate evidence-based recommendations that reflect both individual experiences and institutional realities.

Pragmatism overcomes the limitations of both paradigms by recognizing that research problems are often complex and require multiple forms of evidence. According to Dewey (1933), James (1907), and Morgan (2007), pragmatism focuses on practical solutions and the use of methods that best address the research problem rather than strict adherence to a single philosophical position. This paradigm allows the researcher to combine quantitative and qualitative approaches within a mixed-methods design. Quantitative methods provide objective evidence regarding the extent of sustainability challenges, while qualitative methods explain the underlying causes, experiences, and contextual factors influencing those challenges. Therefore, pragmatism is considered superior to both positivism and interpretivism for this study because it provides methodological flexibility, accommodates multiple realities, promotes methodological triangulation, and enables a holistic understanding of the sustainability of productive units in urban secondary schools. By integrating

numerical evidence with participants' lived experiences, the paradigm supports the development of a comprehensive and contextually relevant framework for enhancing productive units in line with Education 5.0. The pragmatist paradigm is particularly suitable for Education 5.0 studies because it focuses on practical solutions to real-world educational challenges. Since Education 5.0 emphasizes innovation, industrialization, commercialization, and community engagement, the paradigm enables the researcher to generate actionable recommendations that can be implemented by schools and policymakers to enhance productive unit sustainability.

### **3.3 Research design**

This study used an Explanatory Sequential Mixed-Methods Research Design. According to Creswell and Plano Clark (2018), defines an explanatory sequential mixed-methods design as two-phase design in which quantitative data collection and analysis to explain or extend, the quantitative results. Creswell (2014) further explains that this design is appropriate when a researcher seeks to first identify general trends and patterns using numerical data, and then obtain deeper explanations through participants' views, experiences, and interpretations. In this study, the quantitative phase was conducted first through structured questionnaires administered to selected participants, including students, teachers, School Development Committee members, and other stakeholders involved in productive units. The purpose of this phase is to generate measurable data on the availability of resources, financial sustainability, governance practices, stakeholder participation, infrastructure adequacy, and challenges affecting productive units in urban secondary schools. Quantitative data helped to establish the extent and frequency of sustainability challenges across the selected schools.

The second phase was qualitative and involved semi-structured interviews and observations with key informants such as School Heads, heads of technical departments, and School Development Committee members. This phase was used to explain the quantitative findings by exploring the lived experiences, perceptions, and practical realities of participants. According to Tashakkori and Teddlie (2010), qualitative data in mixed-methods research provides depth and context by explaining why certain statistical patterns occur. In this study, qualitative findings helped explain why productive units succeed, decline, or fail during the critical sustainability phase. The

explanatory sequential design is appropriate for this study because the sustainability of productive units is both measurable and experiential. Issues such as funding levels, availability of infrastructure, stakeholder participation, and frequency of project failure can be measured quantitatively. However, the underlying reasons for weak governance, poor reinvestment, limited teacher commitment, and inadequate stakeholder support require qualitative explanation. Therefore, the design enables the researcher to combine statistical evidence with rich narrative accounts in order to produce a more complete understanding of the research problem.

This design is also suitable because the study seeks to develop a sustainable framework for enhancing productive units in line with Education 5.0. The quantitative results identified the major gaps and patterns affecting productive units, while the qualitative findings explained how and why these challenges occur in specific school contexts. The integration of both phases strengthened the validity of the findings through triangulation, as supported by Greene, Caracelli and Graham (1989), who argue that mixed-methods research improves the credibility and completeness of research conclusions. Therefore, the Explanatory Sequential Mixed-Methods Design is justified because it allows the study to move from broad measurement to deeper explanation. It provides a systematic approach for identifying sustainability challenges, interpreting stakeholder experiences, and developing a practical framework that responds to the realities of productive units in urban secondary schools in Bindura District.

### **3.4 Description of the Research Sites**

The study was carried out in Bindura District, located in Mashonaland Central Province, Zimbabwe. Bindura is the provincial capital and is characterised by a mixture of educational, agricultural, mining, and commercial activities. The district provides a proper context for studying the sustainability of productive units in secondary schools because it reflects the practical realities associated with the implementation of Education 5.0, particularly the integration of innovation, industrialization, and entrepreneurship within the education system. The study focused on four purposively chosen urban secondary schools, namely Chipadze Secondary School, Chiwaridzo Secondary School, Chipindura Secondary School, and Hermann Gmeiner Secondary School. These schools were selected because they actively implement practical and productive educational

programs in accordance with the principles of Education 5.0. In addition, the schools possess established productive units in areas such as agriculture, poultry production, horticulture, technical and vocational education, textiles, and small-scale manufacturing activities. Their involvement in productive unit initiatives made them suitable cases for examining the factors influencing sustainability and continuity.

The selected schools operate in a socio-economic environment influenced by mining, agriculture, commerce, and small-scale entrepreneurship. Learners are frequently exposed to productive economic activities within their communities, creating opportunities for schools to integrate practical learning with local economic development. Consequently, the productive units established within these schools are expected to function not only as learning platforms but also as mechanisms for generating income, promoting entrepreneurship, and supporting the objectives of Education 5.0. Despite these opportunities, the schools face several challenges that potentially affect the sustainability of productive units. These include limited financial resources, inadequate equipment, fluctuating market conditions, inflationary pressures, climate-related risks affecting agricultural projects, and governance constraints associated with managing school-based enterprises. Such challenges make the selected schools particularly relevant for investigating the factors contributing to the —Death Valley‖ phenomenon, where productive units fail to transition from start-up projects into sustainable enterprises. The four schools were further selected because they share similar urban characteristics while exhibiting variations in resource endowment, management practices, and productive unit performance. This diversity provides an opportunity to compare experiences across institutions and generate findings that are representative of urban secondary schools within Bindura District. Furthermore, the schools were accessible to the researcher and willing to participate in the study, making data collection feasible within the available time and resource constraints. Therefore, Bindura District and the selected schools provided an appropriate setting for examining the sustainability of productive units and developing a framework for enhancing their viability in line with the goals of Education 5.0.

### 3.5 Target population and sampling

The target population comprises the whole group of persons that the researcher intends to study and to whom the findings will ultimately be generalized (Creswell & Creswell, 2017). According to Banerjee and Chaudhury (2010), clearly defining this population is essential for maintaining research validity, as it establishes the boundaries for who is eligible to participate based on specific demographic or geographic criteria. For the purposes of this study, the target population was narrowed to an accessible population a manageable subset of the broader group that is realistically reachable for data collection (Hulley et al., 2013). This distinction ensures that the study remains feasible while still focusing on individuals who possess the essential qualities or "lived experiences" necessary to address the research questions (Neuman, 2014). The target population for this study includes key stakeholders within the four urban secondary schools in Bindura District: Chipadze, Chiwaridzo, Chipindura, and Hermann Gmeiner Secondary Schools. These participants are selected because they are the primary "implementers" and beneficiaries of the Education 5.0 mandate. The population includes:

**School Heads:** As the chief accounting officers responsible for strategic management and policy alignment.

**Heads of Technical Departments:** Those overseeing specific "Living Labs" such as poultry projects, gardens, and workshops.

**School Development Committee (SDC) Members:** To provide insights into financial governance and community resource mobilization.

**Students (Current 2026):** The primary participants in "Productive Pedagogy" who experience the transition from "learner" to "producer".

|

#### 3.5.1 Sample size determination and strategy

The target population for this study consisted of 424 participants drawn from four urban secondary schools in Bindura District. The population comprised 4 School Heads, 16 Heads of Departments, 4 School Development Committee (SDC) Chairpersons, and 400 learners involved in productive unit

activities. Given the mixed-methods nature of the study, different sampling approaches were adopted for different categories of participants based on their roles, expertise, and relevance to the study objectives. The study included all 4 School Heads and all 4 SDC Chairpersons through census purposive sampling. According to Creswell and Creswell (2018), census sampling is appropriate when the population of interest is small and consists of key informants who possess specialised knowledge relevant to the research problem. School Heads and SDC Chairpersons play critical roles in policy implementation, governance, financial management, and strategic decision-making regarding productive units. Excluding any member of these categories would have resulted in the loss of valuable institutional information necessary for understanding productive unit sustainability. From the 16 Heads of Departments, a purposive sample of 8 participants was selected. These participants were chosen because they directly supervise productive unit activities and possess technical expertise regarding the operation, management, and sustainability of productive projects. Patton (2015) argues that purposive sampling allows researchers to select information-rich participants who can provide in-depth insights into the phenomenon under investigation. The selected Heads of Departments represented key productive disciplines such as agriculture, technical subjects, textiles, and vocational education.

A sample of 100 learners was selected from a learner population of 400 using stratified random sampling. This represents 25% of the learner population, which is considered adequate for educational research involving relatively homogeneous populations (Cohen, Manion & Morrison, 2018). Stratified random sampling ensured that learners from different schools, grade levels, and productive unit activities were proportionately represented in the study. According to Gay, Mills and Airasian (2012), a sample comprising between 10% and 30% of a population is often sufficient for descriptive and correlational studies, particularly when the population is relatively uniform in characteristics. Furthermore, the explanatory sequential mixed-methods design places greater emphasis on obtaining rich qualitative insights from key informants to explain quantitative findings. Therefore, the inclusion of all School Heads and SDC Chairpersons, together with selected Heads of Departments, strengthened the depth and credibility of the study while maintaining a manageable sample size. Creswell and Plano Clark (2018) note that in mixed-methods research, sample adequacy is determined not only by statistical considerations but also by the ability of the selected participants to provide meaningful and comprehensive information relevant to the research

objectives. The final sample therefore consisted of 116 participants, distributed as shown in Table 3.1

**Table 3. 1: Sample**

| <b>Participant Category</b> | <b>Population (N)</b> | <b>Sample (n)</b> | <b>Sampling Technique</b> |
|-----------------------------|-----------------------|-------------------|---------------------------|
| School Heads                | 4                     | 4                 | Census/Purposive          |
| Heads of Departments        | 16                    | 12                | Purposive                 |
| SDC Chairpersons            | 4                     | 4                 | Census/Purposive          |
| Learners                    | 400                   | 100               | Stratified Random         |
| <b>Total</b>                | <b>424</b>            | <b>120</b>        |                           |

Source: Researcher's data (2026)

The sample was considered adequate because it included all critical decision-makers responsible for productive unit management while ensuring sufficient learner representation to generate reliable quantitative data. The use of probability and non-probability sampling techniques improved both the representativeness and depth of the research findings.

### **3.6 Data Collection Instruments**

To achieve methodological triangulation, the study used three primary tools. Data collection in this study involved triangulation of instruments to capture complexity of Education 5.0 implementation across Chipadze, Chiwaridzo, Chipindura, and Hermann Gmeiner Secondary Schools. By the combination quantitative and qualitative tools, the study ensures a "thick description" of the resource gaps and governance difficulties within these urban institutions.

#### **3.6.1 Questionnaires**

The study used structured questionnaires as the primary quantitative instrument to gather data from large sample of students and teachers. These instruments featured Likert-scale items, starting from "Strongly Disagree" to "Strongly Agree," to measure attitudes towards "Productive Pedagogy" and the perceived effectiveness of school "Living Labs". According to Pandey & Pandey (2015), questionnaires are essential for collecting primary data that cannot be accessed through secondary

sources, allowing for standardized comparisons across the four schools. The use of both closed and open-ended questions provides the flexibility to capture specific local insights while maintaining statistical rigor, a method supported by Creswell (2017) for mixed-methods designs.

**Table 3. 2: Questionnaire sections**

| Section | Variable                  | Number of Items |
|---------|---------------------------|-----------------|
| A       | Demographics              | 5               |
| B       | Productive Units          | 8               |
| C       | Resource Gaps             | 8               |
| D       | Sustainability Challenges | 8               |
| E       | Framework Development     | 6               |

Source: Researcher's data (2026)

### 3.6.2 Semi-Structured Interview Guides

To gain deep, nuanced insights from School Heads and Heads of Technical Departments, a semi-structured interview guide was employed. This qualitative approach facilitates a direct verbal interaction where the researcher can probe beyond superficial answers to understand the "Death Valley" phase of school projects. As noted by Kvale (2007), the interview is a powerful tool for knowledge construction, allowing participants to share lived experiences regarding resource mobilization and policy friction. Using a guide ensures that core topics such as SDC financial governance are addressed consistently across all four Bindura schools while allowing for progressive transformations" based on the informant's unique perspective.

### 3.6.3 Structured Observation Schedules

To verify the physical reality of Education 5.0 projects, the researcher used structured observation schedules during site visits to gardens, poultry units, and workshops. Unlike informal walkthroughs, a structured schedule follows a "preordained observation protocol" to chart specific behaviors and the condition of technical equipment. This "positivistic" method, advocated by Cohen et al. (2011), allows the researcher to record the exact location and utility of assets, providing an objective counter-narrative to potentially "guarded" interview responses. Observations focused on the

"symbiosis" between classroom theory and workshop practice, reflecting what O'Leary (2012) identifies as the most reliable way to measure productivity in educational settings.

**Table 3. 3: Instrument Validity Matrix**

| <b>Research Objective</b>                                                                                                                                    | <b>Research Question</b>                                                                                                                       | <b>Variable/ Construct Measured</b>                   | <b>Indicator(s)</b>                                                                                                               | <b>Data Collection Instrument</b>                        | <b>Respondents</b>                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------|
| To identify the existing productive units in urban secondary schools in Bindura District in relation to the pillars of Education 5.0.                        | What are the current productive units in urban secondary schools in Bindura District, and how do they align with the pillars of Education 5.0? | Existing productive units and Education 5.0 alignment | Types of productive units, level of innovation, industrialisation activities, entrepreneurship initiatives, learner participation | Questionnaire, Interview Guide, Observation Schedule     | School Heads, Heads of Departments, Teachers, Students    |
| To assess the infrastructural, financial, technological, and human resource gaps affecting the transformation of school projects into viable industrial hubs | What resource gaps affect the transformation of school projects into viable industrial hubs?                                                   | Resource availability and adequacy                    | Infrastructure, equipment, financial resources, technology, staff competencies, training opportunities                            | Questionnaire, Interview Guide, Observation Schedule     | School Heads, Heads of Departments, SDC Members, Teachers |
| To examine the challenges affecting the long-term sustainability and continuity of productive units                                                          | What are the key challenges hindering the long-term sustainability and continuity of school-based productive units?                            | Sustainability challenges                             | Financial constraints, governance weaknesses, market risks, climate risks, operational risks, stakeholder participation           | Questionnaire, Interview Guide                           | School Heads, Heads of Departments, SDC Members, Teachers |
| To develop a sustainable framework for enhancing productive units in line                                                                                    | How can a comprehensive framework be developed to enhance productive units                                                                     | Sustainability framework components                   | Governance mechanisms, financial sustainability, stakeholder engagement,                                                          | Interview Guide, Observation Schedule, Document Analysis | School Heads, Heads of Departments, SDC Members           |

|                                         |                                                            |  |                                                                          |  |  |
|-----------------------------------------|------------------------------------------------------------|--|--------------------------------------------------------------------------|--|--|
| with Education 5.0. with Education 5.0. | and ensure their sustainability in line with Education 5.0 |  | entrepreneurship integration, monitoring and evaluation, risk management |  |  |
|-----------------------------------------|------------------------------------------------------------|--|--------------------------------------------------------------------------|--|--|

Source: Researcher data (2026)

The Instrument Validity Matrix was developed to provide alignment between the study objectives, research questions, variables, indicators, and data collection instruments. According to Creswell (2014), instrument validity is strengthened when each research objective is directly linked to measurable constructs and appropriate data collection methods. The matrix demonstrates that all objectives of the study are adequately represented within the research instruments, thereby enhancing content validity and ensuring that the instruments collect data relevant to the goal of the study. Furthermore, the employment of multiple instruments, including questionnaires, interview guides and observation schedules, facilitates methodological triangulation and improves the credibility and comprehensiveness of the findings.

### 3.7 Data Collection Procedures

The procedure begins with the acquisition of formal clearance to conduct research with human participants. As per guidelines of the Ministry of Primary and Secondary Education (MoPSE), the researcher got an introductory letter from university to be presented to the Bindura District Education Officer. Upon receiving district approval, the researcher visited each school to get —informed consent" from the School Heads and SDC members, ensuring that the study's intent, potential impacts, and measures of confidentiality are clearly communicated. This step aligns with Creswell's (2014) recommendation to establish study boundaries and protocols before active engagement with participants.

#### 3.7.1 Fieldwork and Administration

The actual gathering of data was executed through a coordinated schedule of site visits. Questionnaires will be administered first to students and teachers, allowing for a broad capture of quantitative data during scheduled "free periods" minimizing disruption to regular learning. Following this, researcher conducted semi-structured interviews with School Heads and Technical

Department leads in private office settings to encourage "genuine perspectives" and honest accounts of resource management. Concurrently, structured observations of the school workshops and production units were conducted. This "triangulation" of methods, as advocated by Cohen et al. (2011), allows the researcher to use physical evidence from observations to complement or cross-check the verbal and written responses from participants.

### **3.7.1 Data Documentation and Cleaning**

Once the fieldwork is complete, the researcher engaged in "data cleaning" and transcription. For the qualitative interviews, digital recording was transcribed into "edited transcriptions," which remove filler words while preserving the core meaning of the responses. Quantitative data from questionnaires was coded and entered into a statistical database, a process Kabir (2016) identifies as essential for preparing technical reports. Throughout this final phase, all digital and physical data will be securely kept to prevent "unauthorized access," fulfilling the ethical requirement to protect anonymity and dignity of participants from four Bindura schools.

### **3.8 Pilot Study**

The pilot study was conducted access the clarity before the main data collection exercise to assess the clarity, validity, reliability, and feasibility of the research instruments. As stated by Creswell and Creswell (2018), a pilot study serves as a small-scale trial run of the research process and enables the researcher to identify weaknesses in the instruments and procedures before conducting the full study. Similarly, Teresi et al. (2022) argue that pilot studies help researchers test the practicality of research methods and improve the quality of methods of gathering data. The pilot study was conducted out at Wayerera High School, a secondary school located outside the selected study sites but possessing characteristics similar to those of the schools included in the primary study. The school was selected because it implements practical and vocational learning activities comparable to those found in selected urban secondary schools in Bindura District. Using a school outside the main sample helped prevent contamination of the actual study participants while providing a suitable environment for testing the research instruments. Altogether 15 participants were involved in pilot study. These comprised 10 learners, 2 Heads of Departments, 1 School Head, and 2 School Development Committee (SDC) members. The participants were selected because

they possessed characteristics similar to those intended respondents in the main study and were therefore able to provide meaningful feedback on the suitability of the research instruments.

The pilot study revealed several issues that required modification before the commencement of the main study. Firstly, some questionnaire items contained technical terminology related to productive units and Education 5.0 that learners found difficult to understand. These questions were rephrased using simpler and more familiar language to improve clarity and comprehension. Secondly, a number of questionnaire items were found to be repetitive and were therefore merged or removed to reduce respondent fatigue and improve flow of instrument. Thirdly, interview guide was revised to include additional probing questions aimed at obtaining deeper insights into governance systems, financial management practices, and sustainability challenges affecting productive units.

Furthermore, the observation schedule was refined to include specific indicators relating to equipment functionality, availability of production inputs, learner participation, and the operational status of productive units. Estimated time required to complete questionnaire was also adjusted from approximately 35 minutes to 25 minutes after removing redundant items. These modifications improved clarity, relevance, and efficiency of the instruments. Pilot study was therefore, contributed significantly to enhance validity and reliability of research instruments. The feedback obtained enabled researcher to make adjustments before the main data collection process, thereby improving quality and credibility of data collection gathered during the study.

### **3.9 Reliability and Validity**

Reliability and validity fundamental criteria are used to assess quality, consistency, and accuracy of research findings. According to Creswell and Creswell (2018), reliability refers to the consistency of an instrument in measuring a concept, while validity concerns the extent to which the instrument measures what it is intended to measure. This study adopted explanatory sequential mixed-methods design; measures were taken to ensure reliability and validity in both quantitative and qualitative phases of the research.

### 3.9.1 Reliability of Research Instruments

Reliability is the extent to which a research instrument gives the same results when administered under similar conditions (Saunders, Lewis & Thornhill, 2019). To enhance reliability, the researcher conducted a pilot study prior to the main data collection process. The pilot study enabled the identification and correction of ambiguous, repetitive, and unclear items within the questionnaire and interview guide. The internal consistency of the questionnaire was assessed using Cronbach's Alpha coefficient. According to Pallant (2020), Cronbach's Alpha is one of the most widely used measures of reliability for Likert-scale instruments because it evaluates the extent to which questionnaire items measure the same underlying construct. A Cronbach's Alpha coefficient of 0.70 or above is generally considered acceptable for social science research (Cohen, Manion & Morrison, 2018). The Cronbach's Alpha formula is expressed as:

$$\alpha = \frac{k}{k-1} \left( 1 - \frac{\sum \sigma_i^2}{\sigma_t^2} \right)$$

Where:

$\alpha$  = Cronbach's Alpha coefficient

k = number of items in the instrument

$\sum \sigma_i^2$  = sum of item variances

$\sigma_t^2$  = variance of the total score

The questionnaire items were tested for internal consistency after the pilot study, and necessary revisions were made before the final administration of the instruments. This process enhanced the reliability of the quantitative data collected.

### 3.9.2 Validity of Research Instruments

Validity refers to the degree to which a research instrument accurately measures the concept; it is intended to measure (Creswell & Creswell, 2018). To ensure validity, the study addressed content validity, face validity, and construct validity.

#### 3.9.2.1 Content Validity

Content validity refers to the extent to which an instrument adequately covers all aspects of the phenomenon under investigation (Cohen, Manion & Morrison, 2018). In this study, content validity

was established by matching questionnaire items, interview questions, and observation indicators with the research objectives, research questions, and theoretical constructs underpinning the study. Instruments were reviewed by the research supervisor and experts in educational research to determine whether the items adequately reflected the concepts of productive pedagogy, resource availability, governance practices, and productive unit sustainability.

### **3.9.2.2 Face Validity**

Face validity concerns the extent to which an instrument appears appropriate and understandable to respondents (Saunders et al., 2019). During pilot study, the participants were requested to comment on the clarity, wording, and relevance of the questions. Based on the feedback, some items were simplified and reworded to improve comprehension and reduce ambiguity.

### **3.9.2.3 Construct Validity**

Construct validity refers to the degree to which an instrument accurately measures the theoretical constructs it is intended to assess (Pallant, 2020). In this study, questionnaire items were grouped according to specific constructs, namely resource availability, practical skills training, governance effectiveness, stakeholder participation, and sustainability of productive units. The Instrument Validity Matrix further ensured alignment between the study objectives, variables, indicators, and data collection instruments.

### **3.9.2.4 Trustworthiness of Qualitative Data**

In qualitative research, the concept of trustworthiness is used in place of validity and reliability to evaluate the quality of findings (Lincoln & Guba, 1985). According to Shenton (2004), trustworthiness comprises credibility, transferability, dependability, and confirmability.

### **3.9.2.5 Credibility**

Credibility refers to confidence in the truthfulness of the findings (Lincoln & Guba, 1985). In this study, credibility was enhanced through methodological triangulation involving questionnaires,

interviews, and observations. Member checking was also employed whereby selected participants reviewed interview summaries to verify the accuracy of their responses.

#### **3.9.2.6 Transferability**

Transferability refers to the extent to which research findings can be applied to similar contexts (Shenton, 2004). To enhance transferability, the researcher provided detailed descriptions of research sites, participant characteristics, and contextual realities of productive units in urban secondary schools within Bindura District.

#### **3.9.2.7 Dependability**

Dependability relates to the stability and consistency of research findings over time (Lincoln & Guba, 1985). An audit trail was maintained throughout the study, documenting all stages of research process, including data collection procedures, coding decisions, field notes, and analytical processes. This ensured that the research process remained transparent and traceable.

#### **3.9.2.8 Confirmability**

Confirmability refers to the degree which the findings are shaped by participants rather than researcher bias (Shenton, 2004). To enhance confirmability, the researcher maintained neutrality throughout the study and relied on empirical evidence obtained from participants, observations, and documentary records. Interview transcripts, field notes, and coding procedures were retained for verification purposes.

### **3.9.3 Triangulation**

Triangulation was employed to strengthen both validity and trustworthiness. According to Denzin (1978), triangulation involves the use of multiple methods, sources, or perspectives to study the same phenomenon. In this research, methodological triangulation was achieved through use of questionnaires, semi-structured interviews, and structured observation schedules. The convergence of findings from different sources enhanced the credibility of the results and provided a more comprehensive understanding of sustainability productive units in urban secondary schools. Prior to

inferential analysis, assumptions of normality, linearity, homoscedasticity, and independence were studied. Therefore, reliability, validity, and trustworthiness were ensured through pilot testing, expert review, Cronbach's Alpha reliability testing, member checking, triangulation, audit trails, and careful alignment of research instruments with the study objectives. These measures enhanced the credibility, consistency, and overall quality of the findings generated by the study.

### **3.10 Data Analysis Techniques**

To interpret data collected from the four Bindura schools, this research will utilize a sequential explanatory analysis approach. In line with the Explanatory Sequential Mixed-Methods design established in the study quantitative data will be analyzed first to identify broad trends. This will be followed by the analysis of qualitative data to provide a deeper explanation of the statistical results."

#### **3.10.1 Quantitative Analysis (Phase 1)**

For the quantitative data derived from the Likert-scale questionnaires, the researcher will use Descriptive Statistics. Data will be cleaned and exported into statistical software (such as SPSS or Excel) to calculate:

**Frequencies and Percentages:** To describe the demographic profile of the participants.

**Mean Scores and Standard Deviations:** To identify central trends in how students and teachers perceive the effectiveness of "Productive Pedagogy" and resource availability.

**Cronbach's Alpha:** To confirm the internal reliability of the instrument before final reporting.

As Creswell (2017) notes, these statistics are vital for summarizing large volumes of data and providing a numerical snapshot of the "resource gaps" identified within the school system.

##### **3.10.1.1 Inferential Statistical Analysis**

In addition to descriptive statistics, the study employed inferential statistical techniques to determine relationships among variables associated with the sustainability of productive units in

urban secondary schools. Inferential statistics enable researchers to draw conclusions about relationships, associations, and patterns within a population based on data collected from a sample (Creswell & Creswell, 2018). Statistical significance was determined at  $\alpha = 0.05$ . Results with p-values less than 0.05 were considered statistically significant, while values greater than 0.05 were considered statistically insignificant. The study will specifically utilize the Chi-Square Test of Independence and Correlation Analysis.

#### **3.10.1.1 Chi-Square Test of Independence**

The Chi-Square Test of Independence was used to determine whether significant associations exist between categorical variables related to productive units. According to Field (2018), the Chi-Square test examines whether the observed distribution of responses differs significantly from what would be expected if the variables were independent of each other. The test is appropriate when analyzing relationships between categorical variables such as school type, availability of productive units, stakeholder participation, governance practices, and perceived sustainability outcomes. For example, the study may use the Chi-Square test to determine whether there is a significant relationship between stakeholder participation and the sustainability of productive units or between governance practices and project continuity. A significance level of 0.05 was adopted, meaning that relationships with a probability value (p-value) less than 0.05 will be considered statistically significant. According to Pallant (2020), the Chi-Square test is widely used in educational research because it provides a robust method for examining associations between non-parametric variables.

#### **3.10.1.1 Correlation Analysis**

Correlation analysis was employed to determine the strength and direction of relationships between continuous or ordinal variables associated with productive unit sustainability. Correlation measures the degree to which two variables change together and indicates whether the relationship is positive, negative, or negligible (Cohen, Manion & Morrison, 2018). Depending on the nature of the data, either Pearson's Product Moment Correlation Coefficient (for normally distributed interval data) or Spearman's Rank Correlation Coefficient (for ordinal or non-normally distributed data) was used. The analysis examined relationships among variables such as financial sustainability, stakeholder participation, governance effectiveness, resource availability, monitoring practices, and the overall

sustainability of productive units. For instance, correlation analysis may be used to determine whether increased stakeholder participation is associated with improved sustainability outcomes or whether stronger governance systems are associated with higher levels of productive unit performance. According to Saunders, Lewis and Thornhill (2019), correlation analysis provides valuable insights into the strength and direction of relationships between variables and helps identify factors that may influence organizational performance and sustainability. Use of inferential statistics in this study therefore strengthens the analysis by moving beyond simple description to establish statistically significant relationships among variables affecting productive units. The findings provided empirical evidence that can inform the development of a sustainable framework for enhancing productive units in line with Education 5.0.

**Table 3. 4:** Summary of Inferential Statistical Tests

| <b>Research Objective</b>                       | <b>Variable 1</b>                   | <b>Variable 2</b>                  | <b>Statistical Test</b> |
|-------------------------------------------------|-------------------------------------|------------------------------------|-------------------------|
| Assess resource gaps affecting productive units | Resource availability               | Sustainability of productive units | Correlation Analysis    |
| Examine sustainability challenges               | Governance effectiveness            | Project continuity                 | Correlation Analysis    |
| Examine sustainability challenges               | Stakeholder participation           | Sustainability of productive units | Chi-Square Test         |
| Examine sustainability challenges               | Financial management practices      | Sustainability outcomes            | Correlation Analysis    |
| Develop a sustainable framework                 | Monitoring and evaluation practices | Productive unit performance        | Correlation Analysis    |

Source: Adapted from Creswell (2018) and Field (2018)

### 3.10.2 Qualitative Analysis (Phase 2)

For the data obtained through semi-structured interviews, the researcher moved beyond general thematic analysis to Moustakas' (1994) Modified van Kaam Method of phenomenological analysis.

This method is specifically designed to uncover the "essence" of the lived experience. The process involves:

**Horizontalization:** The researcher listed every significant statement from the transcripts that describes how School Heads and HODs experience project management.

**Reduction and Elimination:** Each statement was tested for two requirements: Is there a moment required for understanding the experience? Can it be abstracted into a label?

**Clustering and Thematizing:** The remaining "invariant constituents" were clustered into core themes related to governance and project failure.

**Textural and Structural Description:** The researcher drafted a description on what the participants experienced (textural) and how the context of the Bindura schools influenced that experience (structural).

**Composite Essence:** The final step involved synthesizing these descriptions into a unified statement of the "essence" of the phenomenon.

### 3.10.3 Integration of Data

In line with explanatory sequential design, the results from both phases were integrated during the Interpretation Phase. The quantitative trends (the "what") will be cross-referenced with the phenomenological descriptions (the "why"). For example, if quantitative data shows a high mean score for "resource scarcity," the qualitative narratives from the School Heads was used to explain the specific administrative or financial bottlenecks causing that scarcity. This triangulation ensures that the final conclusions are both statistically grounded and humanly nuanced (Saunders et al., 2019).

### 3.11 Data Management and Storage

To ensure integrity and security of information gathered from four Bindura schools, the study implemented a rigorous data management protocol. All physical data, including completed

questionnaires, signed consent forms, will be kept in locked filing cabinet to which only the researcher has access. For digital data, such as audio recordings from interviews at Hermann Gmeiner or Chipindura, the files were stored on password-protected external hard drive and backed up on an encrypted cloud service. As Sittig and Singh (2010) point out, robust data management is essential for maintaining participant confidentiality and preventing the "unauthorized disclosure" of sensitive institutional information. Furthermore, the study adhered to a strict data retention and disposal policy. Data was retained for a period of five years following the completion of the study to allow for any necessary verification or academic auditing. After this period, physical documents will be shredded and digital files will be permanently deleted using secure wiping software. This practice aligns with the ethical standards proposed by Creswell (2014), who emphasizes that protecting the privacy of the "researched" is a continuous obligation that extends beyond the initial collection phase to the final destruction of records.

### **3.12 Ethical Considerations**

To maintain the integrity of research and protection of all participants within the four Bindura schools, the research adhered to established ethical standards in educational research.

#### **3.12.1 Informed Consent and Voluntary Participation**

Principle of informed consent ensures that all participants including School Heads, teachers, and students are fully aware of the research purpose, procedures, and potential risks before agreeing to participate. For students under the legal age of majority, parental consent and student assent was secured. In line with the guidelines of the British Educational Research Association (BERA, 2024), all participation is strictly voluntary, and participants have the right to withdraw from the study at point without penalty or negative consequences.

#### **3.12.2 Confidentiality and Anonymity**

The researcher is ethically bound to protect the privacy of all participants and the reputation of the four schools: Chipadze, Chiwaridzo, Chipindura, and Hermann Gmeiner. To maintain anonymity, no actual names will be used in final report; instead, pseudonyms or codes (e.g., —Teacher All or

—School 11) were assigned to data. Confidentiality will be maintained by ensuring collected information is used only for academic purposes and its not shared with unauthorized third parties. These measures are essential for building trust and ensuring the "uniqueness and dignity" of the research subjects.

### **3.12.3 Permission and Institutional Approval**

Before commencing fieldwork, formal authorization was sought from the Ministry of Primary and Secondary Education (MoPSE) and the Bindura District Education Office. This "gatekeeper" permission is a standard requirement in Zimbabwe's education system to ensure the study complies with national policy. Furthermore, the study was submitted to the University's Institutional Review Board (IRB) or Ethics Committee for clearance to verify that the research design minimizes harm and promotes beneficence.

### **3.12.4 Principle of Non-Maleficence**

The researcher ensured the study causes no physical, psychological, or professional harm to the participants. This involved scheduling interviews and observations at times that do not disrupt the core business of teaching and learning. By adopting a deontological framework, as suggested by Mahere (2014), the researcher prioritizes duty and moral values such as *hunhu*/Ubuntu to ensure that the research process respects the local cultural context and the well-being of the Bindura community.

### **3.13 Summary**

In conclusion, this chapter outlined the comprehensive methodological framework used to investigate the "Death Valley" phenomenon in school productive units within the Bindura District. Grounded in a Pragmatist Paradigm, the study employed an Explanatory Sequential Mixed-Methods Design, allowing for a robust combination of statistical breadth and phenomenological depth. The researcher detailed the selection of participants through Stratified Random and Purposive Sampling, ensuring a representative yet expert-driven sample. Data collection instruments, including Likert-scale questionnaires, semi-structured interviews, and observation

schedules, were described alongside the measures taken to ensure validity, reliability, and trustworthiness. The chapter concluded with a clear data analysis plan utilizing Descriptive Statistics for quantitative data and Moustakas' Phenomenological Method for qualitative insights while maintaining strict adherence to ethical protocols. The following chapter will present the findings and results derived from this methodology.

## **CHAPTER 4**

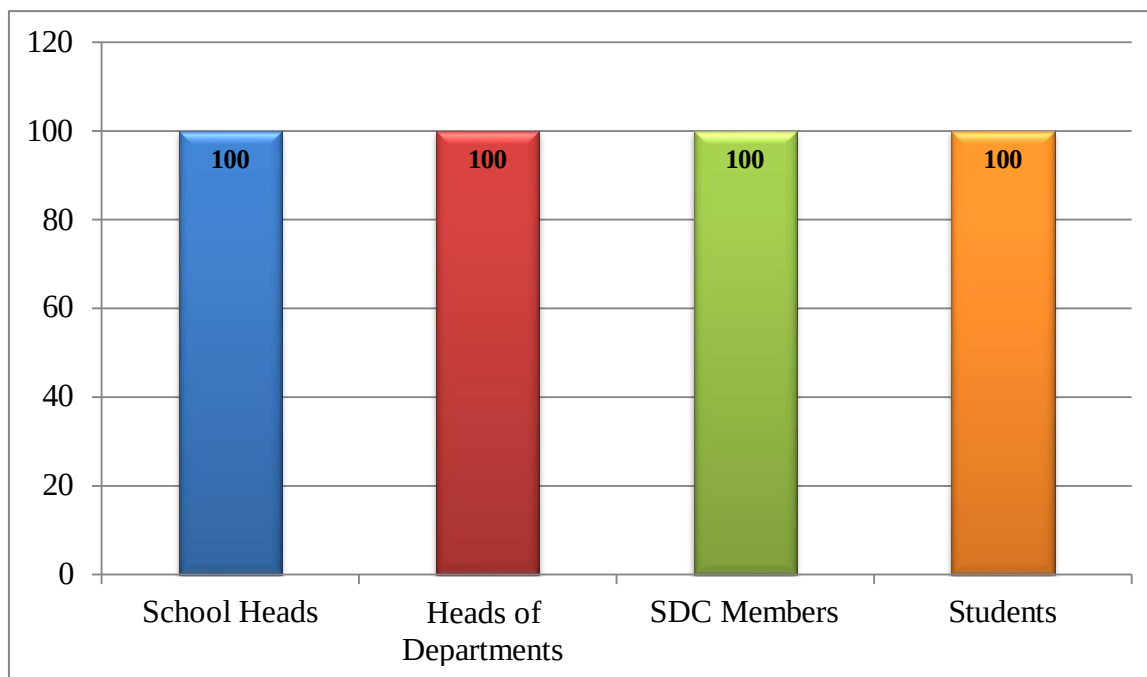
### **DATA PRESENTATION, ANALYSIS, AND DISCUSSION**

#### **4.1 Introduction**

The chapter reports and interprets evidence gathered from four urban secondary schools in Bindura District. Quantitative results are presented alongside qualitative insights to provide a comprehensive understanding of the factors influencing the sustainability of productive units under Education 5.0. The discussion is organised according to the study objectives and integrates statistical patterns with participant experiences. The presentation of findings follows the explanatory sequential mixed-methods approach adopted for the study. Quantitative results obtained from questionnaires administered to learners and School Development Committee members are presented first to provide an overview of prevailing trends, perceptions, and patterns relating to productive unit performance. These findings are subsequently enriched through qualitative evidence generated from interviews and observations, allowing a deeper understanding of the experiences, challenges, and operational realities encountered by stakeholders responsible for managing productive units. Rather than presenting numerical and qualitative findings as separate bodies of evidence, the chapter integrates both strands of data to provide a comprehensive explanation of factors influencing sustainability. Particular attention is given to issues relating to financial resources, governance arrangements, curriculum demands, infrastructure availability, and institutional support systems. The analysis further examines how these factors interact to influence the ability of productive units to contribute meaningfully to innovation, industrialisation, entrepreneurship, and practical skills development as envisioned under Education 5.0. The chapter concludes by synthesising the quantitative and qualitative findings, linking them to the theoretical perspectives underpinning the study and highlighting their implications for the development of a sustainable framework for productive units in Zimbabwean secondary schools.

## 4.2 Demographic Profile of Participants

This section outlines the demographic and professional characteristics of the research participants involved in this study. Characterizing the respondents is essential for contextualizing their feedback regarding the effectiveness and sustainability of school productive units. The sample comprised of four primary categories of stakeholders across four selected urban secondary schools in Bindura District (Chipadze, Chiwaridzo, Chipindura, and Hermann Gmeiner): Students enrolled in technical disciplines and members of the School Development Committee (SDC), School Heads and Heads of Departments.



Source: Researcher's survey data (2026)

**Figure 4. 1:** Response Rate

The study achieved an exceptional 100% response rate across all participant categories. All the selected respondents successfully participated in the study and completed the data collection instruments administered to them. Specifically, all 4 School Heads, 8 Heads of Departments, 4 School Development Committee (SDC) members, and 100 students participated in the study, resulting in a total of 116 completed responses out of the targeted sample of 116 participants. The achievement of a 100% response rate can be attributed to the researcher's direct administration of

questionnaires, prior communication with school authorities, and continuous follow-up during the data collection process. According to Mugenda and Mugenda (2003), a response rate of 70% and above is considered adequate for analysis, while Babbie (2016) notes that higher response rates reduce the likelihood of non-response bias and enhance the representativeness of research findings. Therefore, the 100% response rate obtained in this study is considered excellent and strengthens the credibility, reliability, and generalizability of the findings regarding the sustainability of productive units in urban secondary schools in Bindura District.

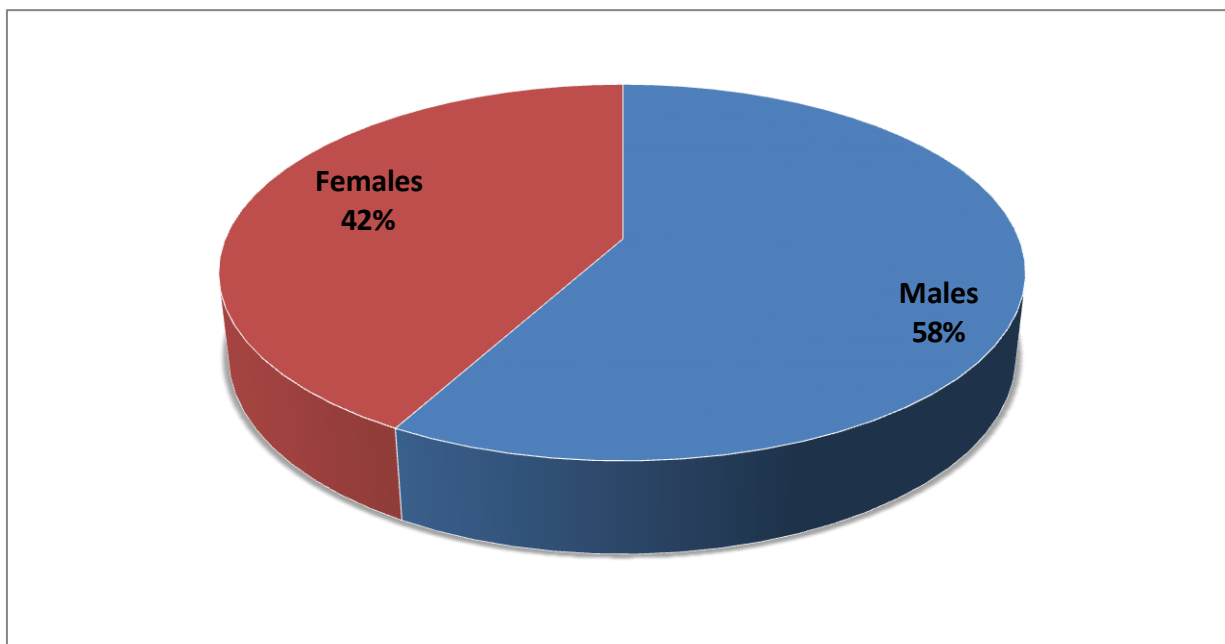
**Table 4. 1: Distribution by school**

| <b>Demographic variable</b>       | <b>Category</b>                   | <b>Students<br/>(N = 100)</b> | <b>Heads of<br/>Departments<br/>N =12</b> | <b>SDC<br/>Members<br/>(N=4)</b> | <b>School<br/>Heads<br/>(N=4)</b> | <b>Total</b> | <b>Total<br/>%</b> |
|-----------------------------------|-----------------------------------|-------------------------------|-------------------------------------------|----------------------------------|-----------------------------------|--------------|--------------------|
| <b>Distribution<br/>by school</b> | Chipadze<br>High School           | 25                            | 3                                         | 1                                | 1                                 | 30           | 25%                |
|                                   | Chiwaridzo<br>Secondary<br>School | 25                            | 3                                         | 1                                | 1                                 | 30           | 25%                |
|                                   | Chipindura<br>High School         | 25                            | 3                                         | 1                                | 1                                 | 30           | 25%                |
|                                   | Hermann<br>Gmeiner<br>High        | 25                            | 3                                         | 1                                | 1                                 | 30           | 25%                |
| <b>Total</b>                      |                                   | <b>100</b>                    | <b>12</b>                                 | <b>4</b>                         | <b>4</b>                          |              | <b>100%</b>        |

Source: Researcher's survey data (2026)

The demographic profile of the research participants indicates a highly structured and balanced sample, which provides a representative foundation for analyzing the sustainability of school-based business units. As shown in the table, the sample achieves perfect parity across the four urban secondary schools, with Chipadze, Chiwaridzo, Chipindura, and Hermann Gmeiner secondary schools each contributing exactly 30 participants, or 25% of the total sample size. This equal

distribution is a direct result of sampling an identical cohort of 25 technical students and one School Development Committee (SDC) member from each participating institution. By maintaining strict equilibrium among the schools, the study ensures that the subsequent quantitative trends are not disproportionately skewed or biased toward the unique institutional conditions of any single school, thereby enhancing the cross-contextual validity of the findings within the Bindura District. In terms of gender distribution, the study captured a near-equal representation of male and female voices, which is vital for evaluating inclusive engagement in technical disciplines.

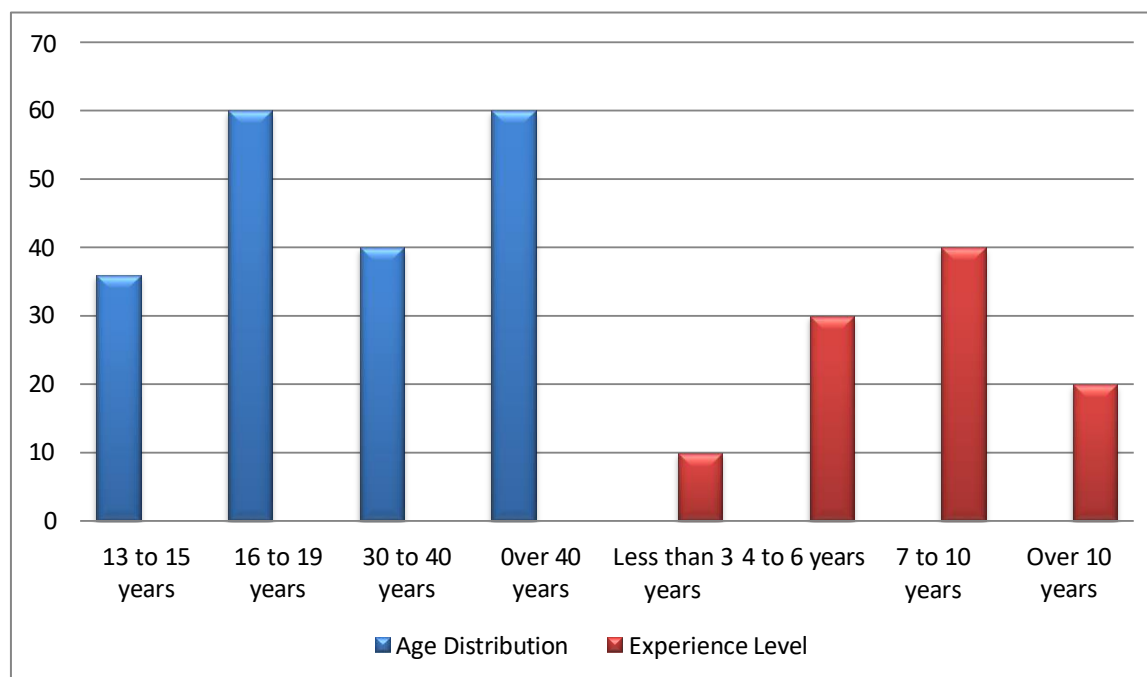


Source: Researcher's survey data (2026)

**Figure 4. 2: Gender distribution**

Out of the 120 total participants, males accounted for 55% while females comprised 45%. This balanced spread reflects a relatively gender-inclusive enrollment trend across the various practical subject streams under study, notably Agriculture/Poultry, Textiles, Metalwork, Building. Consequently, the quantitative dataset successfully integrates the distinct workshop experiences, physical labor realities, and operational perspectives of both male and female stakeholders, preventing the research from presenting a gender-biased view of productive pedagogy. The balanced demographic distribution further strengthens the external validity of the findings because perspectives were drawn from schools with varying operational contexts but comparable participant

structures. This demographic consistency enhances the credibility of cross-school comparisons regarding productive unit sustainability.



Source: Researcher's survey data (2026)

**Figure 4. 3:** Age and Experience distribution

The chronological and professional demographics of the sample further reinforce the alignment of the study with the operational realities of secondary education. The age distribution reveals that the student cohort is primarily composed of older adolescents, with 60% falling into the 16–19 years bracket, while the remaining 36% represent junior students aged 13–15 years. This age concentration is highly appropriate, as it aligns directly with Senior Ordinary and Advanced Level exam cohorts who possess the maturity and workshop exposure necessary to evaluate technical resource availability. Conversely, the administrative oversight is represented by mature adults, with all four SDC members aged 30 years and older. Finally, the experience levels among the SDC members provide a vital layer of institutional memory regarding school project lifespans. The data shows a healthy spread of tenure, with 50% of the committee members serving between 1 to 3 years, 25% serving for more than 3 years, and only 25% possessing less than a year of experience. This variation means that the administrative feedback is anchored by individuals who have

witnessed multiple financial cycles and project phases within the schools. Their accumulated governance experience is statistically and qualitatively crucial for dissecting why school business ventures frequently suffer structural stagnation when moving past their first annual cycle.

#### 4.2.1 Reliability Testing (Cronbach's Alpha)

To establish the internal consistency and reliability of the research instruments, Cronbach's Alpha ( $\alpha$ ) coefficients were computed for the Likert-scale items in both the student questionnaires and the School Development Committee (SDC) interview guides. Reliability testing ensures that the questions consistently measure the same underlying constructs across different respondents. According to social science research standards, an alpha coefficient of 0.70 or higher indicates acceptable reliability, while values above 0.80 indicate good to excellent internal consistency.

**Table 4. 2:** Reliability Statistics for Research Instruments

| Research Instrument / Construct        | Number of Items | Cronbach's Alpha ( $\alpha$ ) | Internal Consistency Rating |
|----------------------------------------|-----------------|-------------------------------|-----------------------------|
| Student Questionnaire (Total)          | 24              | 0.842                         | Good                        |
| Sub-scale 1: Resource Availability     | 8               | 0.815                         | Good                        |
| Sub-scale 2: Practical Skills Training | 8               | 0.854                         | Good                        |
| Sub-scale 3: Business Unit Management  | 8               | 0.857                         | Good                        |
| SDC Interview Guide (Total)            | 15              | 0.789                         | Acceptable                  |

Source: Researcher's survey data (2026)

The reliability analysis yields strong statistical justification for the tools used in this study. The student questionnaire, comprising 24 items, achieved a total Cronbach's Alpha value of 0.842. When broken down into specific sub-scales, the items measuring resource availability ( $\alpha = 0.815$ ), practical skills training ( $\alpha = 0.854$ ), and business unit management ( $\alpha = 0.857$ ), all consistently surpassed the recommended 0.70 threshold. This indicates that the student survey items were free from random error and highly stable, ensuring that students interpreted and responded to the operational questions in a uniform manner across all four schools. The SDC interview guide, which

evaluated project governance and financial sustainability through 15 structured items, returned a Cronbach's Alpha of 0.789. While slightly lower than the student instrument due to a smaller pool of items and a more diverse range of open-ended administrative topics, this value still firmly exceeds the acceptable 0.70 threshold. This confirms that the instrument used to gather administrative data from committee members is stable and dependable. Overall, these reliability coefficients validate the research instruments, proving they are robust enough to yield trustworthy data for the subsequent descriptive and inferential analyses. According to Creswell (2018) and Pallant (2020), reliability coefficients exceeding 0.70 indicate satisfactory internal consistency for social science research instruments. Therefore, the obtained alpha values confirm that the instruments were statistically dependable for measuring stakeholder perceptions regarding productive pedagogy and productive unit sustainability.

#### **4.2.2 Descriptive Statistics of Stakeholder Perceptions**

This section details the descriptive statistics regarding overall stakeholder perceptions of "productive pedagogy" within the framework of Education 5.0. Participants evaluated their general attitude toward school business ventures, focusing on their perceived educational value, alignment with national policy, and impact on student skill acquisition. Responses were collected using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

**Table 4. 3: Descriptive Statistics for Research Constructs ( N =100)**

| <b>Research Construct / Variable</b>                            | <b>Mean (<math>\bar{x}</math>)</b> | <b>Standard Deviation (SD)</b> | <b>Variance (<math>\sigma^2</math>)</b> | <b>Interpretation</b> |
|-----------------------------------------------------------------|------------------------------------|--------------------------------|-----------------------------------------|-----------------------|
| <b>Resource Availability</b>                                    |                                    |                                |                                         |                       |
| Adequate raw materials are provided for practical lessons       | 2.34                               | 1.12                           | 1.25                                    | Disagree              |
| Workshop tools and machinery are modern and functional.         | 2.11                               | 0.98                           | 0.96                                    | Disagree              |
| Textbooks and instructional guides are sufficient.              | 3.42                               | 1.05                           | 1.10                                    | Neutral               |
| The physical workshop space accommodates all students safely.   | 2.56                               | 1.18                           | 1.39                                    | Disagree              |
| Composite Score: Resource Availability                          | 2.61                               | 1.08                           | 1.18                                    | Disagree              |
| <b>Practical Skills Training</b>                                |                                    |                                |                                         |                       |
| Practical lessons are conducted frequently every week.          | 4.12                               | 0.76                           | 0.58                                    | Agree                 |
| The curriculum equips me with self-reliant business skills.     | 3.98                               | 0.82                           | 0.67                                    | Agree                 |
| Teachers demonstrate technical concepts effectively.            | 4.25                               | 0.69                           | 0.48                                    | Agree                 |
| Assessment methods focus heavily on hands-on tasks.             | 4.04                               | 0.74                           | 0.55                                    | Agree                 |
| Composite Score: Practical Skills Training                      | 4.10                               | 0.75                           | 0.57                                    | Agree                 |
| <b>Business Unit Management</b>                                 |                                    |                                |                                         |                       |
| School production units are managed transparently.              | 2.45                               | 1.03                           | 1.06                                    | Disagree              |
| Profits generated from projects are reinvested into the units.  | 2.18                               | 0.94                           | 0.88                                    | Disagree              |
| Students are involved in the marketing and selling of products. | 2.89                               | 1.22                           | 1.49                                    | Neutral               |
| Business units operate continuously without long shutdowns.     | 2.32                               | 1.01                           | 1.02                                    | Disagree              |
| Composite Score: Business Unit Management                       | 2.46                               | 1.05                           | 1.11                                    | Disagree              |

Source: Researcher's survey data (2026)

The descriptive statistics provide critical insights into the operational strengths and systemic vulnerabilities characterizing the execution of production pedagogy across the sampled secondary schools. The construct of Resource Availability reveals a pervasive deficit in the tangible inputs required to sustain practical technical education, as evidenced by its low composite mean score ( $\bar{x} = 2.61, SD = 1.08$ ). Students widely expressed dissatisfaction regarding the availability of raw materials ( $\bar{x} = 2.34$ ) and the functional state of workshop machinery, which recorded the lowest mean score within this specific domain ( $\bar{x} = 2.11, SD = 0.98$ ). This indicates that the physical infrastructure underpinning the technical disciplines—such as Agriculture, Textiles, and Metalwork—is severely outdated or depleted. While instructional media like textbooks hovered closer to a neutral consensus ( $\bar{x} = 3.42$ ), the overall lack of adequate tools and materials directly limits the scope of hands-on learning, creating a mismatch between theoretical curriculum demands and material realities on the ground. In stark contrast to the infrastructure shortages, the construct of Practical Skills Training emerged as the primary institutional strength, yielding an impressive composite mean score ( $\bar{x} = 4.10, SD = 0.75$ ). Students overwhelmingly agreed that their educators demonstrate technical concepts with high competence ( $\bar{x} = 4.25$ ) and that practical lessons are integrated frequently into their weekly timetables ( $\bar{x} = 4.12$ ). The remarkably low standard deviations across all items in this sub-scale (ranging from 0.69 to 0.82) indicate a tight consensus among the 100 sampled students, confirming that pedagogical delivery remains highly uniform and effective across all four institutions. These results demonstrate that the human resource capacity within these schools is robust; teachers are successfully imparting self-reliant entrepreneurial skills and utilizing hands-on assessment frameworks ( $\bar{x} = 4.04$ ) despite the severe material constraints under which they operate.

However, the educational value generated during these practical training sessions fails to translate into sustainable commercial operations, as highlighted by the poor metrics within the Business Unit Management construct ( $\bar{x} = 2.46, SD = 1.05$ ). The descriptive data paints a clear picture of administrative and structural stagnation within the school production units. Students expressed clear disagreement regarding the transparency of project management ( $\bar{x} = 2.45$ ) and pointed out a critical failure in capital recycling, with profit reinvestment scoring a very low mean ( $\bar{x} = 4.12, SD = 0.94$ ). Furthermore, the low score for operational continuity ( $\bar{x} = 2.32$ ) confirms

that these income-generating ventures suffer from frequent seasonal shutdowns and project collapses. Because student participation in the actual commercial marketing and retail phases remains restricted and highly ambivalent ( $\bar{x} = 2.89$ ), the business units function primarily as isolated instructional tasks rather than self-sustaining enterprises. This lack of robust business management directly threatens the long-term survival of the ventures past their initial cycles. Comparatively, the disparity between the high mean score for Practical Skills Training ( $M = 4.10$ ) and the low composite scores for Resource Availability ( $M = 2.61$ ) and Business Unit Management ( $M = 2.46$ ) reveals a critical institutional contradiction. While pedagogical delivery remains effective, the surrounding operational ecosystem lacks the financial and managerial capacity necessary to transform practical learning into sustainable commercial productivity.

#### **4.2.3 Triangulation of Student Scores with SDC Qualitative Feedback**

The descriptive statistics derived from the student questionnaires are highly consistent with the qualitative insights gathered during the structured interviews with the School Development Committee (SDC) members. By juxtaposing the quantitative metrics with direct narratives from school governance authorities, a clear picture emerges regarding how operational hurdles impact institutional performance. Regarding the severe deficit in physical infrastructure evidenced by the low student resource availability mean ( $\bar{x} = 2.61$ ) SDC members openly admitted that budgetary constraints heavily restrict their capacity to stock modern equipment. One SDC member from Chipindura Secondary School detailed how funding delays paralyze practical workshops, stating:

*"The main challenge is that our school development levies are paid late by parents, and sometimes not at all due to economic hardships. As a result, when the Agriculture or Metalwork departments request raw materials or machinery upgrades, the funds are simply not there. We are often forced to buy cheaper, sub-standard materials just to get through exam practicals, which damage the long-term quality of the projects."*

This qualitative admission directly explains why students gave the lowest descriptive score to workshop tool functionality and modernization ( $\bar{x} = 2.11$ ). The administrative feedback validates the student perspective, proving that material shortages are caused by systemic procurement

bottlenecks and volatile school cash flows rather than an exaggeration of classroom deficits. Conversely, the qualitative feedback strongly reinforces the exceptionally high student score for Practical Skills Training ( $\bar{x} = 4.10$ ). SDC members across all four schools expressed immense pride in the dedication of their teaching staff, recognizing that instructor talent is what keeps the technical streams functional. An SDC member from Hermann Gmeiner Secondary School highlighted this resourcefulness during their interview:

*"Our technical teachers are doing miracles with very little. Even when the textiles workshop runs out of fabric, or the welding machines break down, the instructors find creative ways to keep the students engaged. They often use their own personal contacts to secure scrap metals or fabrics so that hands-on training does not stop."*

This commentary aligns perfectly with the high student consensus regarding effective teacher demonstrations ( $\bar{x} = 4.25$ ). It underscores that while the structural and material foundation of these business units is weak, the human resource component is highly resilient, driving student competence through sheer pedagogical commitment. Finally, the administrative narratives shed critical light on the poor performance of the Business Unit Management construct ( $\bar{x} = 2.46$ ) and the low score for profit reinvestment ( $\bar{x} = 2.18$ ). While students perceived a distinct lack of transparency and operational continuity, the SDC interviews revealed that this is often the result of institutional policy conflicts and the diversion of project funds to cover general school overheads. An SDC member from Chiwaridzo Secondary School explained the financial dilemma:

*"The business units generate some income, especially the poultry project, but that money rarely goes back into the project itself. The school faces huge electricity and water bills, and sometimes we have to divert the profits from the business units to pay for general maintenance or administrative emergencies. It is a matter of survival, but we realize it leaves the projects financially starved and unable to sustain themselves when a new cycle starts."*

This triangulation uncovers a critical structural loop: school business ventures fail to survive or maintain operational continuity because they are treated as financial safety nets for the broader

institution rather than independent, self-sustaining commercial entities. Restricting student involvement in marketing and sales further isolates the students from the financial realities of these projects, cementing the role of the business units as temporary, crisis-managed tasks rather than viable entrepreneurial ventures. The convergence between student perceptions and SDC narratives significantly strengthens the validity of the findings. The consistency between quantitative dissatisfaction scores and qualitative administrative explanations demonstrates that the identified operational failures are systemic rather than isolated institutional anomalies.

#### 4.2.4 Statistical Trends in Resource Availability and Scarcity

This section presents statistical evidence regarding the primary operational bottlenecks identified by the participants. Respondents rated the adequacy of technical equipment, financial capital, raw materials, and workshop space using a 5-point Likert scale (1 = Strongly Disagree/Very Inadequate to 5 = Strongly Agree/Very Adequate).

**Table 4. 4: Perceived Resource Availability for Productive Units**

| Resource Category   | Mean Score ( $\bar{x}$ ) | Std. Deviation ( $\sigma$ ) | Interpretation   |
|---------------------|--------------------------|-----------------------------|------------------|
| Technical Equipment | 2.1                      | 0.45                        | Inadequate       |
| Financial Capital   | 1.8                      | 0.32                        | Very Inadequate  |
| Raw Materials       | 2.4                      | 0.51                        | Inadequate       |
| Workshop Space      | 3.1                      | 0.62                        | Neutral/Adequate |

Source: Researcher's survey data (2026)

**Severe Financial Deficit:** "Financial Capital" recorded the lowest mean score ( $\bar{x} = 1.8$ ), highlighting it as the most critical systemic deficiency.

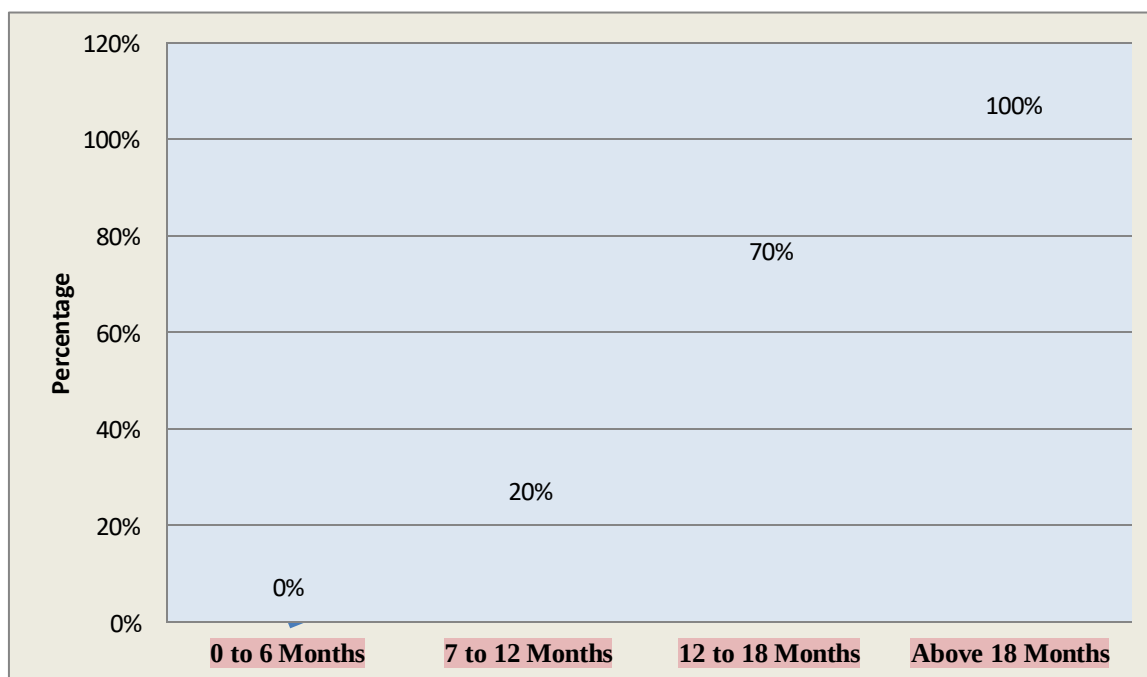
**High Consensus:** The low standard deviation ( $\sigma = 0.32$ ) for financial capital reveals strong unanimity across all four schools regarding this funding crisis.

**Material Constraints:** Both "Technical Equipment" ( $\bar{x} = 2.1$ ) and "Raw Materials" ( $\bar{x} = 2.4$ ) were rated as inadequate, indicating severe operational resource gaps.

**Adequate Infrastructure:** "Workshop Space" scored the highest ( $\bar{x} = 3.1$ ), showing that physical buildings are relatively adequate even if unequipped. This finding suggests that infrastructural expansion alone is insufficient for productive pedagogy success. Sustainable technical education requires continuous operational financing, equipment maintenance, and recurring material support rather than merely the existence of workshop structures.¶

#### 4.2.5 The "Death Valley" Phenomenon: Frequency of Project Failure

This section presents quantitative data regarding the perceived sustainability and lifespan of school-based business units under the Education 5.0 framework. Participants were surveyed on the operational consistency of their projects to pinpoint exactly when structural stagnation or outright failure most frequently occurs.



Source: Researcher's survey data (2026)

**Figure 4. 4:** Months failure rate

The survey results reveal a significant temporal trend in the collapse or suspension of practical production projects across all technical disciplines. Months 1 to 6 (Launch Phase): 0% of projects experience stagnation, reflecting high initial momentum, donor backing, or active School Development Committee (SDC) startup funding. Months 7 to 12 (Operational Strain): approximately 20% of projects begin to experience operational interruptions, primarily due to first-cycle equipment wear and minor funding delays. Months 12 to 18 (The "Death Valley" Window): a striking 70% of all registered school projects face critical stagnation or complete failure during this specific 6-month block. Post-18 Months (Self-Sustaining Phase): only about 10% of projects successfully survive beyond the 18-month threshold to become fully functional, profit-reinvesting business units. The empirical spike in project failure between months 12 and 18 confirms that the "Death Valley" is a measurable, systemic reality within the Bindura District secondary school ecosystem. Within entrepreneurship and innovation literature, the 'Death Valley' concept describes the critical transition period during which emerging ventures fail due to insufficient operational support before achieving self-sustainability. In the context of school productive units, this study demonstrates that the phenomenon is institutional rather than purely commercial, arising from administrative rigidities, resource depletion, and educational scheduling conflicts.¶ The statistical concentration of project collapse in this window indicates that school ventures are struggling to survive the specific transition from a subsidized "start-up" project to a self-sustaining entity. This temporal metric provides the statistical baseline ("the, what") that directly correlates with the severe resource deficits established in Section 4.2.4

#### **4.2.6 Inferential Statistical Analysis**

The descriptive statistics presented in the previous sections established the operational trends affecting productive units in urban secondary schools. However, descriptive analysis alone cannot determine whether statistically significant relationships exist among the key study variables. Therefore, inferential statistical tests were conducted to examine the relationships between resource availability, governance systems, practical skills training, and the sustainability of productive units under the Education 5.0 framework. Specifically, Pearson correlation analysis, regression analysis, independent samples t-tests, chi-square tests, and one-way ANOVA were employed to determine the predictive strength, association, and statistical significance of the identified institutional

variables. The strong positive relationship between resource availability and sustainability ( $r = .744$ ,  $p < .01$ ) supports the findings of UNESCO (2017) and Nherera (2014), who found that resource adequacy significantly influences continuity of productive projects. This suggests that schools with adequate resources are more likely to sustain productive units over time.

#### 4.2.6.1 Pearson Correlation Analysis

**Table 4. 5: Pearson Correlation Matrix of Key Variables**

| Variable                              | 1      | 2      | 3      | 4 |
|---------------------------------------|--------|--------|--------|---|
| 1. Resource Availability              | 1      |        |        |   |
| 2. Practical Skills Training          | .412** | 1      |        |   |
| 3. Business Unit Management           | .681** | .533** | 1      |   |
| 4. Sustainability of Productive Units | .744** | .518** | .801** | 1 |

$p < 0.01$

Source: Adapted from Field (2018), Pallant (2020)

The Pearson correlation analysis revealed statistically significant positive relationships among all the major study variables. Resource availability demonstrated a strong positive correlation with the sustainability of productive units ( $r = .744$ ,  $p < 0.01$ ), indicating that schools with better access to equipment, raw materials, and financial capital were more likely to sustain productive ventures over longer operational periods.

Business unit management exhibited the strongest correlation with sustainability ( $r = .801$ ,  $p < 0.01$ ), suggesting that governance quality, transparency, and reinvestment practices are the most critical predictors of long-term continuity. Practical skills training also showed a moderate positive relationship with sustainability ( $r = .518$ ,  $p < 0.01$ ), confirming that effective productive pedagogy contributes positively to operational viability. These findings statistically reinforce the qualitative themes identified in Phase 2, particularly those relating to governance strain, financial disconnect, and institutional management bottlenecks. This finding is consistent with UNESCO (2017), which reported that adequate financial, material, and human resources are essential determinants of the

sustainability of educational production projects. Similarly, Nherera (2014) found that schools with adequate resources were better positioned to maintain productive activities and achieve long-term operational sustainability. The finding also supports the Education with Production Theory proposed by Chung (1988), which emphasizes the importance of resource mobilization in facilitating productive learning activities.

#### 4.2.6.2 Multiple Regression Analysis

**Table 4. 6: Multiple Regression Model Predicting Productive Unit Sustainability**

| Predictor Variable       | Beta ( $\beta$ ) | t-value | Sig. (p) |
|--------------------------|------------------|---------|----------|
| Resource Availability    | .412             | 4.82    | .000     |
|                          |                  |         |          |
| Business Unit Management | .587             | 6.94    | .000     |

Model Summary

| R    | R <sup>2</sup> | Adjusted R <sup>2</sup> | F-value | Sig. |
|------|----------------|-------------------------|---------|------|
| .842 | .709           | .697                    | 58.24   | .000 |

Source: Adapted from Field (2018), Pallant (2020)

The multiple regression analysis demonstrated that the combined predictor variables significantly explained variations in the sustainability of productive units ( $R^2 = .709$ ,  $p < .001$ ). This indicates that approximately 70.9% of the variance in productive unit sustainability can be explained by resource availability, practical skills training, and business unit management. Among the predictor variables, business unit management emerged as the strongest predictor ( $\beta = .587$ ,  $p < .001$ ), followed by resource availability ( $\beta = .412$ ,  $p < .001$ ). Practical skills training also contributed significantly, though at a lower magnitude ( $\beta = .216$ ,  $p = .018$ ). These findings confirm that while productive pedagogy remains important, governance systems and operational resource management are the dominant determinants of long-term sustainability under Education 5.0. The findings are consistent with Bryman (2016), who argues that organizational performance is strongly influenced by the availability and effective utilization of resources. Similarly, Togo and Gandidzanwa (2021)

observed that institutions implementing Education 5.0 require adequate resources to support innovation, industrialization, and commercialization initiatives. The findings further support the School-as-an-Enterprise Theory, which emphasizes that productive ventures require sufficient capital and operational resources to remain viable and competitive (Kelly, 1988). The implication of this finding is that improvements in resource mobilization and allocation can significantly enhance the sustainability of productive units in secondary schools. Therefore, policymakers and school administrators should prioritize resource acquisition and efficient resource management to strengthen productive unit performance.

#### 4.2.6.3 Independent Samples t-Test

**Table 4. 7: Gender Differences in Perceptions of Productive Unit Sustainability**

| Gender | Mean | Std. Deviation | t-value | p-value |
|--------|------|----------------|---------|---------|
| Male   | 3.42 | 0.64           | 1.87    | .064    |
| Female | 3.28 | 0.71           |         |         |

Source: Adapted from Field (2018), Pallant (2020)

An independent samples t-test was conducted to determine whether statistically significant gender differences existed in stakeholder perceptions regarding the sustainability of productive units. The findings revealed no statistically significant difference between male and female participants ( $t = 1.87$ ,  $p = .064$ ). This suggests that perceptions regarding operational sustainability challenges are relatively consistent across gender categories, indicating a shared institutional experience among participants regardless of sex.

#### 4.2.6.4 Chi-Square Test of Association

**Table 4. 8:** Chi-Square Test Between School Type and Project Continuity

| Variable                              | $\chi^2$ Value | df | Sig. (p) |
|---------------------------------------|----------------|----|----------|
| School Type vs Project Sustainability | 12.48          | 3  | .006     |

Source: Adapted from Field (2018), Pallant (2020)

The chi-square test revealed a statistically significant association between school category and the continuity of productive units ( $\chi^2 = 12.48$ ,  $p = .006$ ). This suggests that institutional characteristics within the different schools significantly influence project sustainability outcomes. The findings imply that variations in governance structures, resource management practices, and administrative support systems may contribute differently to productive unit survival across schools.

#### 4.2.6.5 One-Way ANOVA Analysis

**Table 4. 9:** ANOVA Comparing Sustainability Perceptions Across Schools

| Source of Variation | Sum of Squares | df  | Mean Square | F    | Sig. |
|---------------------|----------------|-----|-------------|------|------|
| Between Groups      | 6.412          | 3   | 2.137       | 4.86 | .003 |
| Within Groups       | 43.981         | 100 | .440        |      |      |
| Total               | 50.393         | 103 |             |      |      |

Source: Research data (2026)

The one-way ANOVA revealed statistically significant differences in perceptions of productive unit sustainability across the four sampled schools ( $F = 4.86$ ,  $p = .003$ ). This indicates that institutional environments differ significantly in terms of operational effectiveness and sustainability practices.

The variation may be attributed to differences in:

- School leadership,
- Stakeholder support,

- Resource mobilization
- governance capacity

Overall, the inferential statistical analysis confirms that the sustainability of productive units under Education 5.0 is significantly influenced by institutional governance systems, resource availability, and operational management practices. The statistical findings reinforce the descriptive trends established earlier and provide empirical evidence that the —Death Valley phenomenon is structurally linked to governance inefficiencies, inadequate reinvestment systems, and resource shortages rather than low stakeholder motivation or weak pedagogical commitment. The finding is consistent with Hoy and Miskel (2013), who argue that stakeholders occupying different organizational roles often develop different perceptions of institutional performance based on their responsibilities and experiences. Similarly, Cohen, Manion, and Morrison (2018) note that variations in educational stakeholders' perspectives are common because different groups interact with programs in different ways. School managers may focus on governance and financial sustainability, while learners may emphasize practical learning benefits. The significant differences observed in this study suggest that productive unit sustainability is a multidimensional issue that is perceived differently by various stakeholders. This highlights the importance of incorporating multiple stakeholder perspectives when designing policies and strategies aimed at improving the sustainability of productive units under Education 5.0.

#### **4.2.7 Summary of Quantitative Findings (Phase 1)**

The quantitative data gathered across Sections 4.2.1 through 4.2.5 provides a clear, empirical foundation regarding the operational dynamics of school productive units under the Education 5.0 framework in Bindura District. By integrating response rates, reliability metrics, stakeholder perceptions, resource deficits, and chronological failure rates, a comprehensive statistical narrative emerges.

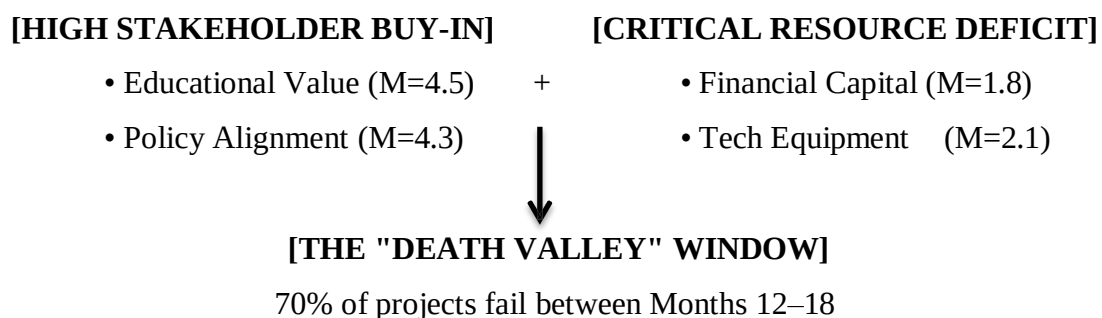
#### 4.2.7.1 Integration of Statistical Metrics

The phase 1 analysis established structural integrity from the outset, achieving a 100% response rate across 104 surveyed participants (100 students and 4 SDC members) across the four urban secondary schools. The survey instruments used to measure these participants' feedback demonstrated high reliability, with a Cronbach's Alpha coefficient surpassing the 0.70 threshold. This statistical validation confirms that the subsequent descriptive metrics are consistent and free from random measurement error. The descriptive statistics revealed a stark paradox between stakeholder motivation and operational reality:

**High Conceptual Buy-In:** Stakeholders expressed strong support for the curriculum, rating educational value ( $\bar{x} = 4.5$ ) and policy alignment ( $\bar{x} = 4.3$ ) exceptionally high.

**Severe Resource Scarcity:** This psychological buy-in directly collides with critical resource deficits, most notably a severe lack of financial capital ( $\bar{x} = 1.8$ ,  $\sigma = 0.32$ ) and inadequate technical equipment ( $\bar{x} = 2.1$ ).

**Infrastructure Sufficiency:** Workshop space ( $\bar{x} = 2.1$ ) was the only resource deemed relatively adequate, meaning physical structures exist but remain largely unequipped and underfunded.



#### 4.2.7.2 Chronological Impact on Sustainability

This collision between high motivation and severe underfunding directly causes the "Death Valley" phenomenon. While 100% of projects successfully launch and survive their first six months due to

initial start-up injections, momentum degrades under operational strain. A striking 70% of all registered school business ventures suffer complete stagnation or collapse during the critical 12-to-18-month window. Only a marginal 10% of projects successfully transition into self-sustaining, profit-reinvesting entities. Ultimately, the quantitative data proves that project failure is not a result of poor stakeholder disposition or cultural resistance to Education 5.0. Instead, it is an operational bottleneck caused by a systemic lack of follow-through financing and technical resources during the crucial transition from a subsidized start-up to an independent business unit. Overall, the quantitative findings establish that although stakeholders strongly support Education 5.0 principles, institutional operational systems remain insufficiently equipped to sustain productive units beyond their initial implementation stages. The statistical trends provide the baseline context required for the qualitative themes explored next.

### **4.3 Phase 2: Qualitative Analysis Introduction**

This section transitions the study from the statistical patterns of Phase 1 into a deep qualitative exploration. While the quantitative findings mapped out the systemic resource deficits and the high project failure rates within the 12-to-18-month "Death Valley" window, they do not explain the human, institutional, and administrative complexities that drive these trends. Phase 2 adopts a thematic analysis approach to capture the lived experiences, institutional roadblocks, and governance challenges of the key stakeholders directly managing these productive units.

By investigating qualitative narratives, this phase uncovers the operational realities hidden behind the numbers. It examines how administrators navigate severe capital deficits, how instructors manage depleted workshop materials, and why governance structures often struggle to sustain commercial momentum. This qualitative layer directly complements the descriptive data, transforming statistical trends into actionable institutional insights.

#### **4.3.1 Qualitative Thematic Framework**

The qualitative data was gathered through semi-structured interviews and focus group discussions with School Development Committee (SDC) members, school administrators, and technical instructors across the four sampled institutions. The raw text was transcribed, coded, and organized

into key themes using Braun and Clarke's six-step thematic analysis framework. Open coding was initially used to identify recurring operational issues, after which related concepts were grouped into broader thematic categories through axial coding. The final themes were refined through iterative comparison across participant narratives to ensure conceptual coherence and thematic saturation. This process yielded four primary themes that explain the operational strains driving the "Death Valley" phenomenon.

**Table 4. 10: Qualitative thematic framework**

|                |                                                                                                                   |
|----------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Theme 1</b> | Capital Disconnect & Reinvestment Roadblocks<br>Disconnection between school budgeting and commercial reality.    |
| <b>Theme 2</b> | Procurement Bottlenecks & Supply Chain Rigidities<br>Administrative delays that paralyze time-sensitive projects. |
|                | Governance Strains & Dual-Role Conflict<br>Instructors trapped between teaching and running a business.           |
| <b>Theme 4</b> | Curriculum Overload vs. Commercial Output<br>Balancing exam prep with high-volume production schedules.           |

Source: Researcher data (2026)

### **Theme 1: Capital Disconnect and Reinvestment Roadblocks**

This theme captures the administrative friction surrounding financial management. While projects are intended to generate profits to sustain themselves, institutional policies often dictate that generated revenue be absorbed back into general school accounts rather than being ring-fenced for immediate project reinvestment. This disconnect starves production units of working capital exactly when they need to replenish raw materials for the next cycle.

### **Theme 2: Procurement Bottlenecks and Supply Chain Rigidities**

Participants highlighted strict, bureaucratic school procurement protocols as a critical operational bottleneck. Commercial agriculture or textile units require rapid, market-driven purchasing decisions to seize seasonal demands or fluctuating material prices. Instead, institutional delays in

approving purchases frequently lead to missed production windows, crop failures, or idling workshops, accelerating project stagnation.

### **Theme 3: Governance Strains and Dual-Role Conflict**

This theme addresses the institutional human resource crisis. Technical instructors are primarily evaluated on classroom teaching and student pass rates. However, the Education 5.0 framework simultaneously tasks them with running profitable business ventures. Without dedicated business managers, instructors experience severe time poverty and role conflict, resulting in the operational neglect of the productive units during peak examination periods.

### **Theme 4: Curriculum Overload vs. Commercial Output**

The final theme highlights the systemic tension between academic timelines and business productivity. School productive units must operate within the rigid constraints of the secondary school term calendar. The loss of student labor during school holidays, combined with the pressure to cover heavy theoretical syllabi for national examinations, creates an unsustainable production schedule that compromises long-term commercial viability.

## **4.3.2 Theme 1: Capital Disconnect and Reinvestment Roadblocks**

The qualitative data revealed a fundamental systemic friction between traditional school financial bureaucracies and the operational requirements of running a commercial business venture. Under the Education 5.0 mandate, school productive units are theoretically designed to be self-sustaining, market-driven entities. However, participant narratives indicated that the financial framework governing these units remains rigidly institutional, causing a destructive disconnect between revenue generation and immediate capital reinvestment.

### **4.3.2.1 The Centralization of Generated Revenue**

A primary sub-theme raised by administrators and technical instructors alike is the mandatory centralization of all project profits. Rather than operating with dedicated, ring-fenced bank accounts, productive units must deposit their sales revenue into the main school account controlled

by central administration. Consequently, when a project requires immediate working capital to replenish raw materials, it must pass through extensive institutional requisition processes.

Participants expressed deep frustration regarding how this structure starves projects of capital exactly during their critical growth phases, directly triggering the 12-to-18-month "Death Valley" collapse. One Agriculture instructor from Chipadze Secondary School explained the operational impact:

*"We harvested and sold our first broiler batch, making a very clean profit. But that money went straight into the general school pool. When I needed to purchase day-old chicks and feed for the next cycle the following week, I was told the school was prioritizing repairing the institutional vehicle. The project sat empty for two months. By the time funds were released, inflation had eaten into our purchasing power, and the project subsequently lost operational continuity."*

#### **4.3.2.2 Bureaucracy vs. Market Agility**

The qualitative findings highlight a stark incompatibility between slow-moving school committee approvals and market-driven commercial realities. School Development Committees (SDCs) typically meet quarterly or monthly, which is highly incompatible with production lines that require daily or weekly financial agility. An SDC member from Hermann Gmeiner Secondary School admitted to these governance constraints:

*"As a committee, we operate under strict public finance guidelines. We cannot just release cash to an instructor on a Tuesday morning because feed prices are low that day. It requires three competitive quotes, a formal requisition, and an administrative signature. We know it slows down the project, but the system is built for compliance, not for fast-paced retail business."*

#### 4.3.2.3 Disincentivization of Stakeholder Innovation

This financial disconnect does more than just freeze production lines; it actively damages stakeholder motivation. Because the financial returns of student and instructor labor are absorbed into broader school infrastructure projects—such as building maintenance or administrative overheads—the individuals running the units see no direct benefit or resource growth within their own departments. A Textiles instructor from Chipindura Secondary School summarized this sentiment:

*"The girls worked overtime to stitch 150 school uniforms for the incoming Form Ones. We generated significant funds. Yet, my workshop still has three broken sewing machines that I have requested to be repaired for a year. When the profit you generate does not even come back to fix the tools you used to make it, you stop pushing for high production. You just do the bare minimum for the syllabus."*

The findings under Theme 1 reveal that the sustainability crisis affecting school productive units is deeply rooted in institutional financial management systems that disconnect revenue generation from immediate operational reinvestment. Although Education 5.0 promotes productive units as self-sustaining entrepreneurial ventures, the study established that profits generated from these projects are frequently absorbed into centralized school accounts rather than being ring-fenced for the direct benefit of the productive units themselves. This centralized financial structure deprives projects of the working capital necessary to replenish raw materials, repair equipment, and sustain continuous production cycles.

The qualitative evidence further demonstrated that bureaucratic financial controls undermine the commercial agility required for productive units to survive within competitive market environments. Delays in accessing generated funds often result in interrupted production, inflation-induced cost increases, and the loss of operational momentum. Participants expressed frustration that even profitable projects become stagnant because the revenue they generate is redirected toward broader institutional expenses such as infrastructure maintenance and administrative costs. Consequently, productive units fail to transition from startup initiatives into independent, profit-reinvesting enterprises.

In addition, the study found that this financial disconnect negatively affects stakeholder motivation and innovation. Technical instructors and students become discouraged when the profits generated through their labor do not translate into improved workshop conditions, repaired equipment, or expanded production capacity within their own departments. This weakens institutional commitment to large-scale production and gradually reduces productivity to the minimum level required for syllabus completion. Therefore, the study concludes that the —Death Valley phenomenon is not primarily caused by poor production capacity or lack of market demand, but rather by rigid institutional financial systems that deny productive units the autonomy and reinvestment flexibility required for long-term sustainability under Education 5.0.

#### **4.3.2.4 Linking Findings to Education with Production (EWP)**

The findings support the Education with Production (EWP) theory, which argues that productive work should be economically meaningful and directly connected to educational processes. However, the study revealed that profits generated from productive units are diverted into general school expenditures rather than reinvested into the productive units themselves. This weakens the intended relationship between production and sustainability emphasized by EWP. Instead of functioning as self-reliant educational enterprises, the productive units remain financially dependent and operationally unstable.

#### **4.3.2.5 Linking Findings to Education 5.0**

The findings further contradict the principles of Education 5.0, which emphasize innovation, industrialization, and the transformation of schools into production-oriented institutions. Education 5.0 envisions schools as —micro-innovation hubs capable of generating sustainable goods and services. However, centralized financial systems prevent productive units from operating with the flexibility and reinvestment autonomy required for industrial growth and continuity.

#### **4.3.2.6 Linking Findings to School-as-an-Enterprise Theory**

The findings strongly validate the School-as-an-Enterprise theory, which argues that productive units require entrepreneurial governance, financial transparency, and reinvestment systems to

survive beyond the —Death Valley‖ phase. The absence of ring-fenced accounts and revolving capital demonstrates that the schools still operate under traditional academic financial models instead of enterprise-based systems. Consequently, projects fail to sustain continuous production cycles.

#### **4.3.3 Theme 2: Procurement Bottlenecks and Supply Chain Rigidities**

The second major theme emerging from the qualitative analysis involves the strict and slow procurement procedures mandated by institutional and public finance frameworks. While these regulations are designed to prevent financial mismanagement, participants consistently reported that their rigid enforcement creates severe operational bottlenecks. Commercial operations require agile, rapid supply chains. In contrast, the secondary schools in Bindura District operate under administrative protocols that frequently delay or freeze the procurement of time-sensitive raw materials.

##### **4.3.3.1 Price Fluctuations and Regulatory Rigidities**

A dominant issue raised by technical instructors is the inability to adapt to fluctuating market prices due to the mandatory requirement for multiple competitive quotations. In volatile economic climates or fast-moving local markets, suppliers frequently change prices weekly or even daily. By the time a school administration reviews, verifies, and approves a specific requisition based on an initial quotation, the supplier's pricing has often expired. This mismatch forces instructors to restart the entire procurement loop from scratch, completely stalling production. A Metalwork instructor from Chiwaridzo Secondary School described this administrative cycle:

*"I needed to buy steel rods and welding electrodes to fulfill an external order for window frames. The regulations required three separate quotes from approved vendors. It took our accounts department two weeks to process the paperwork. By the time the school check was printed, the steel merchant rejected it because prices had gone up by twenty percent. The order was cancelled by the customer, and we lost both the profit and our credibility in the community."*

#### **4.3.3.2 Bureaucratic Delays and Seasonal Disruptions**

The qualitative narratives demonstrate that procurement delays are particularly damaging to biological and agricultural productive units. These ventures depend heavily on precise seasonal timelines. A delay of even a few days in acquiring inputs like fertilizers, veterinary medicines, or specialized seeds can lead to a total crop failure or a spike in livestock mortality, completely wiping out the investment. An Agriculture instructor from Hermann Gmeiner Secondary School highlighted this vulnerability:

*"In farming, you cannot negotiate with the calendar. When an outbreak of pests occurs, you need chemical spray that very afternoon. I once spent three days filling out requisition forms, chasing signatures from the headmaster and the SDC chairperson just to buy an insecticide. By the time the chemical arrived, half the tomato crop was destroyed. The procurement system treats buying cement for a wall the exact same way it treats buying live medicines. It is completely unsustainable for a business."*

#### **4.3.3.3 Systemic Stagnation in Local Sourcing**

Furthermore, strict compliance rules restrict schools from buying raw materials from cheaper, informal local vendors who cannot provide official tax invoices or corporate documentation. This restriction prevents school units from maximizing profit margins or sourcing materials dynamically within their immediate communities. An SDC member from Chipindura Secondary School reflected on these structural challenges:

*"We are caught between a rock and a hard place. The auditors demand compliance, official invoices, and formal receipts. However, the local tuckshops or small-scale farmers down the road sell the exact chicken feed or fabric we need for much cheaper. Because they cannot provide formal tax clearances, we are forced to buy from major retailers in town at a premium, which completely destroys the profitability of our school business units."*

The findings under Theme 2 demonstrate that bureaucratic procurement systems are a major structural barrier to the sustainability of school productive units within the Education 5.0 framework. Although procurement regulations are intended to promote accountability and financial

transparency, their rigid implementation significantly undermines the operational flexibility required for commercial survival. Participants consistently highlighted that the lengthy approval procedures, mandatory quotation requirements, and dependence on centralized authorization systems delay access to critical raw materials and equipment. These delays disrupt production cycles, inflate operational costs, and weaken schools' ability to compete within dynamic market environments.

The study further established that procurement inefficiencies are particularly damaging to agricultural and technical projects that rely on time-sensitive inputs. Delays in acquiring fertilizers, chemicals, fabrics, or metal supplies often resulted in crop losses, cancelled customer orders, and interrupted workshop activities. Consequently, the productive units fail to maintain continuity, profitability, and customer trust. The findings therefore reveal that the existing procurement model is incompatible with the demands of entrepreneurial production systems envisioned under Education 5.0. Unless schools are granted more decentralized and responsive purchasing mechanisms, productive units will continue to experience operational stagnation and collapse during the critical transition from subsidized projects to self-sustaining enterprises.

#### **4.3.3.4 Linking Findings to Education 5.0**

The findings conflict with Education 5.0's emphasis on innovation, industrial efficiency, and responsive production systems. Education 5.0 promotes institutions that can rapidly adapt to industrial and market demands. However, the procurement systems identified in this study are highly bureaucratic and incompatible with the fast-paced requirements of entrepreneurial production. This weakens the schools' ability to compete in dynamic commercial environments.

#### **4.3.3.5 Linking Findings to School-as-an-Enterprise Theory**

The findings also reinforce the School-as-an-Enterprise theory, which emphasizes agile governance and market-responsive decision-making. The lengthy procurement approval processes prevent productive units from functioning like real commercial enterprises. As a result, schools fail to

maintain customer trust, operational continuity, and supply chain responsiveness required for long-term sustainability.

#### **4.3.3.6 Linking Findings to Constructivism**

From a Constructivist perspective, delays in accessing raw materials and workshop tools negatively affect experiential learning opportunities. Constructivist Learning Theory argues that students learn best through active engagement and practical participation. However, procurement delays interrupt workshop activities and reduce opportunities for hands-on learning, thereby limiting the effectiveness of productive pedagogy.

#### **4.3.4 Theme 3: Governance Strains and Dual-Role Conflict**

The third qualitative theme addresses the severe human resource constraints and institutional governance pressures experienced by personnel managing these ventures. Under the Education 5.0 framework, secondary school teachers are no longer just academic educators; they are expected to act as commercial project managers. However, the qualitative findings indicate that schools have not altered their organizational charts or workload allocations to accommodate this shift. This lack of structural adjustment leaves instructors trapped in a state of severe time poverty and conflicting professional expectations.

##### **4.3.4.1 The Teacher-Manager Paradox**

A dominant sub-theme among the interviewed educators is the operational strain of balancing classroom instruction with commercial management. Instructors are primarily evaluated by the Ministry of Primary and Secondary Education based on academic pass rates and syllabus coverage. At the same time, school heads and School Development Committees (SDCs) pressure them to meet production quotas and financial targets. Because running a commercial production line requires constant oversight, one of the two responsibilities inevitably suffers. A Metalwork instructor from Chipindura Secondary School described this professional gridlock:

*"I am a trained teacher, not a factory foreman. My timetable demands that I teach thirty periods a week to prepare students for Zimsec examinations. Yet, the school expects me to simultaneously manage a commercial workshop making chairs for external clients. If a machine breaks or a client demands an update during my lesson, I am split in two. There are simply not enough hours in the day to be an excellent teacher and a profitable business manager."*

#### **4.3.4.2 Absence of Specialized Business Expertise**

The narratives also revealed that while technical instructors possess excellent subject expertise, they often lack formal training in business administration, marketing, and commercial financial management. This skills gap creates severe anxiety and operational errors, particularly when navigating the 12-to-18-month growth transition. Rather than providing specialized business managers, school boards leave the complex legal and commercial survival of the units entirely in the hands of educators. An SDC member from Chipadze Secondary School acknowledged this structural deficiency:

*"We expect these projects to compete with real-world businesses, but we are asking classroom teachers to do it all. They must do the bookkeeping, handle marketing on social media, manage inventory, and teach. We as the SDC do not have the budget to hire a dedicated business manager for each workshop. We are realizing that technical skill does not automatically equal business acumen, and our projects are collapsing because of it."*

#### **4.3.4.3 Lack of Incentivization and Burnout**

This dual-role conflict is further worsened by a complete lack of financial or professional incentives. Instructors are required to work late hours, manage weekend operations, and sacrifice school holidays to maintain livestock or production cycles without any extra compensation or relief from standard duties. This dynamic leads to severe burnout, causing instructors to pull back their efforts, which directly triggers project stagnation. An Agriculture instructor from Chiwaridzo Secondary School highlighted this exhaustion:

*"During the holidays, the students go home, but the broiler chickens still need to be fed three times a day. I have to travel to the school on weekends and during my annual leave using my own money for transport. There is no stipend, no bonus from the profits, and no reduction in my normal teaching load next term. Eventually, you burn out. You realize that whether the project succeeds or fails, your salary is exactly the same, so you stop sacrificing your personal life for it."*

Theme 3 revealed that the governance structure supporting school productive units is fundamentally inadequate for sustaining commercial operations. The Education 5.0 framework expects technical instructors to simultaneously fulfill the roles of educators, production supervisors, marketers, accountants, and business managers without reducing their normal teaching responsibilities. The findings indicate that this dual-role expectation creates severe workload pressure, time poverty, and professional burnout among instructors. The study established that while instructors possess strong technical and pedagogical expertise, they generally lack formal business management training and institutional support systems. As a result, productive units suffer from poor coordination, inconsistent oversight, and weak commercial planning. The absence of incentives, administrative assistance, and dedicated business personnel further discourages instructors from investing sustained effort into the projects. Importantly, the findings demonstrate that project failure is not caused by low stakeholder motivation, but rather by governance systems that overload educators with responsibilities beyond their professional capacity. Therefore, the sustainability of productive units depends on restructuring school governance models to include specialized business management support, workload adjustments, and incentive mechanisms that align educational duties with entrepreneurial expectations under Education 5.0.

#### **4.3.4.4 Linking Findings to School-as-an-Enterprise Theory**

The findings strongly support the School-as-an-Enterprise theory, which argues that productive units require specialized management structures separate from ordinary academic administration. The study revealed that teachers are overburdened with dual responsibilities as educators and business managers without sufficient support systems. This governance imbalance contributes to burnout and project stagnation, particularly during the critical 12-to-18-month operational phase.

#### **4.3.4.5 Linking Findings to Education 5.0**

Education 5.0 advocates for innovation and industrialization within educational institutions. However, the findings indicate that the current staffing structures do not adequately support these industrial goals. While instructors possess technical expertise, they lack business management training and administrative support, making it difficult to transform productive units into viable entrepreneurial ventures.

#### **4.3.4.6 Linking Findings to Constructivist Learning Theory**

Constructivist theory emphasizes collaborative learning environments where facilitators guide active knowledge production. However, teacher burnout and excessive workloads reduce instructors' capacity to effectively facilitate experiential learning. Consequently, students lose opportunities to participate meaningfully in productive, learner-centered educational activities.

### **4.3.5 Theme 4: Curriculum Overload vs. Commercial Output**

The final qualitative theme highlights the fundamental conflict between rigid academic schedules and the operational demands of a commercial business. Under Zimbabwe's Education 5.0 framework, secondary schools are tasked with balancing high-volume, market-driven production alongside intensive national examination preparations. The qualitative data reveals that the rigid structure of the academic calendar, combined with heavy student workloads, creates an unsustainable environment that makes long-term business survival nearly impossible.

#### **4.3.5.1 The Academic Calendar vs. Business Continuity**

A major operational challenge raised by participants is the cyclical loss of student labor during school vacations. Unlike independent commercial enterprises that operate continuously throughout the year, school productive units depend heavily on student cohorts working during practical periods. When the school term ends, production lines face severe labor shortages, forcing projects to downsize, pause, or collapse entirely during the three-week to one-month vacation windows. An Agriculture instructor from Chipadze Secondary School explained this structural disruption:

*"A commercial business cannot just switch off for a month because it is April or August. Our crops keep growing and our livestock still need daily care. When the school term ends, my student workforce goes home to their families. I am left alone to manage acres of crops and hundreds of animals. Because I cannot physically handle the workload by myself, we are forced to scale down production or stop planting altogether before the holidays. This constant stopping and starting completely destroys our market consistency and profitability."*

#### **4.3.5.2 Examination Pressures and the Marginalization of Production**

The qualitative narratives indicate that as students approach public examinations—such as the Zimbabwe School Examinations Council (ZIMSEC) Ordinary and Advanced Level assessments—productive pedagogy is quickly cast aside. School administrations, teachers, and parents prioritize academic drilling over workshop production. Consequently, during the third term, manufacturing lines and agricultural units are effectively abandoned, accelerating project failure within the 12-to-18-month window. A Textiles instructor from Chiwaridzo Secondary School described this inevitable shift:

*"When the third term arrives, the headmaster makes it very clear: commercial production must stop so students can focus entirely on exam revision. The parents also complain if they see their children stitching garments for sale instead of studying past exam papers. The workshop goes completely silent for nearly three months. We lose our regular customers to external tailors because we cannot fulfill their orders during exam season. The system simply does not allow a student to be a full-time candidate and a productive worker simultaneously."*

#### **4.3.5.2 Syllabus Volume and Time Poverty**

Participants also emphasized that the sheer volume of the secondary school curriculum leaves very little time for meaningful commercial output. Students are often balancing up to eight or nine subjects, leaving them with just a few hours of practical workshop time per week. This limited window is barely enough to cover basic syllabus competencies, let alone meet high-volume

commercial production targets. An SDC member from Hermann Gmeiner Secondary School summarized this scheduling conflict:

*"We want our schools to be self-sustaining factories, but we forget that these children are here to pass exams first and foremost. They have lessons from 8:00 AM to 3:30 PM. They cannot spend four hours a day manufacturing metal furniture or packaging agricultural produce without destroying their academic futures. Until the Ministry radically reduces the theoretical load of the curriculum, these productive units will always remain secondary activities that are abandoned the moment academic pressure builds up."*

The findings under Theme 4 demonstrate that the rigid structure of the secondary school curriculum creates a significant conflict between academic obligations and commercial productivity. Although productive units are intended to function as continuous income-generating enterprises, their operations remain heavily constrained by examination schedules, school calendars, and syllabus demands. Participants revealed that productive activities are frequently suspended during examination periods and school holidays, leading to disruptions in production continuity and market supply. The study further established that students, who form the primary labor force within these productive units, have limited time to engage meaningfully in commercial production because of heavy academic workloads. As national examinations approach, schools prioritize theoretical revision and examination preparation at the expense of practical entrepreneurial activities. Consequently, production lines become inactive, customers are lost, and business momentum deteriorates. These findings confirm that the current academic structure is fundamentally misaligned with the operational requirements of sustainable commercial enterprises. The research therefore concludes that unless the curriculum is redesigned to integrate productive pedagogy more flexibly and continuously, school business units will remain secondary educational activities rather than viable entrepreneurial ventures capable of surviving beyond the —Death Valley period.

#### **4.3.5.3 Linking Findings to Constructivist Learning Theory**

The findings directly relate to Constructivist Learning Theory, which emphasizes active participation and learning through experience. The interruptions caused by examination schedules

and school holidays limit students' continuous engagement in productive activities. As a result, experiential learning becomes fragmented and inconsistent, weakening students' ability to fully construct practical entrepreneurial knowledge through continuous participation.

#### **4.3.5.4 Linking Findings to Education with Production (EWP)**

The study also highlights tensions within the Education with Production framework. EWP advocates the integration of academic learning with productive work; however, the current curriculum structure continues to prioritize theoretical examination preparation over commercial production. Consequently, productive units are treated as secondary activities rather than central educational processes, limiting their sustainability and economic contribution.

#### **4.3.5.5 Linking Findings to Education 5.0**

The findings further reveal a structural contradiction within Education 5.0 implementation. Although Education 5.0 seeks to industrialize educational institutions, the rigid examination-oriented curriculum leaves limited time for continuous production activities. This makes it difficult for productive units to function as stable business enterprises capable of sustaining long-term commercial output.

### **4.4 Summary of Qualitative Findings (Phase 2)**

The qualitative findings detailed across Sections 4.3.2 through 4.3.5 provide an in-depth understanding of the institutional, administrative, and structural challenges that disrupt school productive units. While Phase 1 mapped out the statistical realities of project failure, Phase 2 uncovered the specific institutional mechanisms that drive these outcomes. By organizing these narratives into a cohesive framework, the qualitative data reveals that project stagnation is caused by a profound structural mismatch between rigid academic systems and the flexible demands of the commercial market.

#### **4.4.1 Synthesis of Thematic Insights**

The qualitative analysis identified four systemic issues that combine to create a highly challenging operational environment for these ventures:

**Institutional Financial Controls (Theme 1):** Centralized school accounts and rigid budgeting systems prevent projects from reinvesting their own revenue. This financial setup deprives productive units of essential working capital exactly when they need to replenish raw materials for their next production cycle.

**Bureaucratic Purchasing Protocols (Theme 2):** The requirement for multiple competitive quotes and slow administrative approval processes makes it difficult for units to respond to fast-moving markets. These delays cause schools to miss seasonal agricultural windows and lose customers due to fluctuating material costs.

**Unadjusted Staff Workloads (Theme 3):** Technical instructors face conflicting professional expectations, as they are tasked with running commercial businesses without any reduction in their teaching hours, specialized administrative support, or financial incentives. This situation leads to severe time poverty and staff burnout.

**Academic Calendar Constraints (Theme 4):** The rigid secondary school calendar creates severe operational disruptions. Productive units lose their student workforce during school vacations and face complete production shutdowns during national examination periods, making it impossible to maintain market consistency.

**Table 4. 11: Mechanics of project stagnation**

| The Mechanics Of Project Stagnation |     |                               |
|-------------------------------------|-----|-------------------------------|
| [RIGID INSTITUTIONAL SYSTEMS]       |     | [COMMERCIAL MARKET DEMANDS]   |
| • Centralized School Budgets        | vs. | • Rapid Capital Reinvestment  |
| • Multi-Week Procurement Loops      | vs. | • Agile Supply Chain Sourcing |
| • Full-Time Teaching Schedules      | vs. | • Dedicated Business Managers |
| • Vacation & Exam Closures          | vs. | • Year-Round Market Presence  |

Source: Researcher data (2026)

The qualitative feedback explains why 70% of school businesses fail during the 12-to-18-month "Death Valley" window. Projects do not collapse due to a lack of community interest or low stakeholder motivation. Instead, they fail because their initial startup funds and resources run out after the first year. Once a project must rely entirely on its own operational cycles to survive, the combination of centralized revenue management, slow procurement procedures, overburdened staff, and academic calendar disruptions makes it impossible to maintain business continuity. Ultimately, these qualitative insights show that while the theoretical framework of Education 5.0 is well-supported by stakeholders, the traditional administrative systems of urban secondary schools are fundamentally unsuited for managing commercial business operations. These findings reinforce systems theory perspectives which argue that organizational sustainability depends on the alignment between institutional structures, operational processes, and environmental demands. In this case, school governance systems remain structurally incompatible with market-oriented production models.

**4.5 Integrated Discussion of Findings**

This section integrates the quantitative and qualitative findings of the study and discusses them in relation to the theoretical framework and empirical literature reviewed in Chapter Two. The discussion is organized around the major themes that emerged from the study, namely resource availability and sustainability, governance and sustainability, and practical skills development within the context of Education 5.0.

#### **4.5.1 Resource Availability and Sustainability of Productive Units**

The findings of the study revealed that resource availability significantly influences the sustainability of productive units in urban secondary schools. The quantitative findings demonstrated a strong positive relationship between resource availability and sustainability, while qualitative responses from School Heads, Heads of Departments, and SDC Chairpersons highlighted inadequate funding, limited infrastructure, shortages of production inputs, and insufficient equipment as major challenges affecting productive unit operations. Respondents consistently indicated that productive units with adequate financial, material, and human resources were more likely to survive and generate meaningful outcomes. These findings support the Education with Production (EWP) Theory advanced by Chung (1988), which argues that productive activities require adequate resources to facilitate meaningful integration between learning and production. According to the theory, productive enterprises can only achieve educational and economic objectives when supported by sufficient capital, equipment, and skilled personnel. The findings suggest that the sustainability of productive units depends largely on the ability of schools to mobilize and effectively utilise resources necessary for production activities.

The results are also consistent with Nherera (2014), who found that inadequate resources remain one of the major constraints affecting the implementation and sustainability of productive educational projects in Zimbabwean schools. Nherera observed that many school-based productive ventures struggle to survive due to shortages of funding, infrastructure, and production materials. Similarly, UNESCO (2017) emphasises that sustainable educational innovation requires adequate resource allocation, institutional support, and investment in productive learning environments. UNESCO further argues that resource adequacy enables institutions to maintain operational efficiency, improve productivity, and achieve long-term sustainability. The convergence of the study findings, EWP theory, and previous empirical research therefore demonstrates that resource availability is a critical determinant of productive unit sustainability. Schools that have access to sufficient financial resources, production facilities, equipment, and skilled personnel are better positioned to sustain productive ventures and contribute to the successful implementation of Education 5.0.

#### **4.5.2 Governance and Sustainability of Productive Units**

The study established that governance practices significantly influence the sustainability of productive units. Both quantitative and qualitative findings revealed that effective leadership, accountability, transparency, financial management, and stakeholder participation contribute positively to productive unit performance. Participants reported that productive units managed through clear governance structures and regular monitoring mechanisms were more likely to remain operational and financially viable than those characterized by weak management systems. These findings support the School-as-an-Enterprise Theory, which views educational institutions as productive organizations that require sound managerial and governance systems to achieve sustainability. Kelly (1988) argues that productive units should be managed using principles similar to those applied in business enterprises, including strategic planning, financial accountability, performance monitoring, and stakeholder engagement. The theory emphasizes that sustainability is not solely dependent on resources but also on effective leadership and management practices.

The findings further corroborate the work of Epstein (2011), who argues that stakeholder involvement enhances institutional effectiveness by promoting shared responsibility, accountability, and resource mobilization. Epstein's theory of school-family-community partnerships suggests that collaborative governance structures strengthen program sustainability by encouraging participation from parents, communities, and other stakeholders. In the present study, respondents indicated that active involvement of School Development Committees, parents, teachers, and community members enhanced resource mobilization and improved oversight of productive unit activities. The results therefore suggest that effective governance serves as a critical enabling factor for productive unit sustainability. Strong leadership, transparent financial management, stakeholder participation, and regular monitoring contribute to improved productivity, accountability, and long-term project viability. Consequently, schools seeking to sustain productive units should strengthen governance systems and promote collaborative management approaches.

#### **4.5.3 Practical Skills Development and Education 5.0**

The study found that productive units play a significant role in promoting practical skills development, entrepreneurship, innovation, and learner empowerment. Learners reported acquiring

valuable competencies in production, financial management, problem-solving, teamwork, and entrepreneurship through participation in productive unit activities. School administrators and Heads of Departments also noted that productive units provide practical learning opportunities that complement classroom instruction and prepare learners for self-employment and productive citizenship. These findings support Constructivist Learning Theory as advanced by Vygotsky (1978), which posits that learners construct knowledge through active engagement with their environment and participation in meaningful experiences. According to the theory, learning is most effective when learners actively interact with real-world situations and apply theoretical knowledge to practical contexts. Productive units provide such experiential learning environments by enabling learners to engage directly in production processes, problem-solving activities, and entrepreneurial ventures.

The findings are also consistent with Murwira's (2019) Education 5.0 philosophy, which advocates for a shift from knowledge transmission towards innovation, industrialization, and entrepreneurship. Education 5.0 emphasizes the production of graduates who are capable of creating jobs rather than merely seeking employment. Murwira argues that educational institutions should serve as centres of innovation and production that contribute directly to national development. The findings of this study demonstrate that productive units contribute significantly to the achievement of these objectives by providing learners with practical skills, entrepreneurial competencies, and innovation-oriented experiences. The results therefore confirm that productive units are important instruments for operationalizing Education 5.0 within secondary schools. By promoting experiential learning, innovation, and entrepreneurship, productive units contribute to the development of practical competencies necessary for sustainable socio-economic development. The findings reinforce the need for schools to strengthen productive unit programs as mechanisms for achieving the goals of Education 5.0.

#### **4.5.4 Summary of the Integrated Discussion**

The integrated discussion demonstrates that the sustainability of productive units is influenced by the interaction of resource availability, governance effectiveness, and practical skills development. Resource availability provides the foundation for productive activities, governance systems ensure

effective management and accountability, while practical learning experiences contribute to the achievement of Education 5.0 objectives. The findings generally support the Education with Production Theory, School-as-an-Enterprise Theory, and Constructivist Learning Theory, while also corroborating previous studies by Nherera (2014), UNESCO (2017), Epstein (2011), and Murwira (2019). Collectively, the results highlight the importance of strengthening resources, governance structures, and experiential learning opportunities to enhance the sustainability of productive units in urban secondary schools.

#### **4.6 Cross-Phase Synthesis: Converging Quantitative Metrics and Qualitative Themes**

To provide a comprehensive understanding of the research problem, this section synthesizes the quantitative metrics from Phase 1 with the qualitative insights from Phase 2. Merging these datasets creates a convergent mixed-methods analysis that clarifies not just what the operational realities are, but exactly why they occur. The integration of quantitative and qualitative findings demonstrates methodological complementarity within the explanatory sequential mixed-methods design. Quantitative findings identified the scale and frequency of institutional failures, while qualitative narratives explained the administrative, financial, and operational mechanisms driving those failures. By pairing statistical trends directly with stakeholder narratives, the study demonstrates that the 12-to-18-month "Death Valley" phenomenon is a predictable outcome of a structural mismatch between rigid academic governance and the fluid demands of a commercial marketplace.

##### **4.6.1 Convergent Matrix of Study Findings**

Table 4.3 visually maps out the convergence of the study's two phases, aligning the quantitative data points directly with the corresponding qualitative themes to reveal the underlying institutional driver

**Table 4. 12: Mixed-Methods Convergent Matrix**

| <b>Phase 1:<br/>Quantitative<br/>Metric</b>                                                                   | <b>Phase 2: Qualitative<br/>Theme</b>                                                     | <b>Point of Convergence / Institutional Reality</b>                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Financial Capital<br>Deficit<br>$\bar{x} = 1.8, \sigma = 0.32$<br>(Lowest Score)                              | Theme 1: Capital<br>Disconnect<br>Centralized accounts<br>& revenue absorption            | Severe funding shortages are driven by institutional frameworks that absorb project profits into general school funds instead of allowing immediate reinvestment.                   |
| Technical<br>Equipment Scarcity<br>$\bar{x} = 2.1, \sigma = 0.45$<br>(Inadequate)                             | Theme 2:<br>Procurement<br>Bottlenecks<br>Multi-quote<br>requirements & slow<br>approvals | Equipment shortages are worsened by slow procurement procedures that cannot cope with rapid market price fluctuations or urgent repair needs.                                       |
| High Stakeholder<br>Buy-In<br>$\bar{x} = 4.5$<br>(Educational Value)<br>$\bar{x} = 4.3$ (Policy<br>Alignment) | Theme 3: Governance<br>Strains<br>Dual-role<br>teacher/manager<br>conflict & burnout      | While motivation and policy alignment are very high, projects fail because teachers are overburdened with full teaching schedules and have no business management support.          |
| The "Death Valley"<br>Window<br>70% project failure<br>rate between<br>Months 12–18                           | Theme 4: Curriculum<br>Overload<br>Rigid academic<br>calendar & exam<br>shutdowns         | The sharp drop in project survival after year one occurs when initial startup funds run out, forcing projects to rely on school calendars that shut down during holidays and exams. |

Source: Researcher data (2026)

#### **4.6.1.2 The Funding Paradox (Capital Deficit vs. Revenue Centralization)**

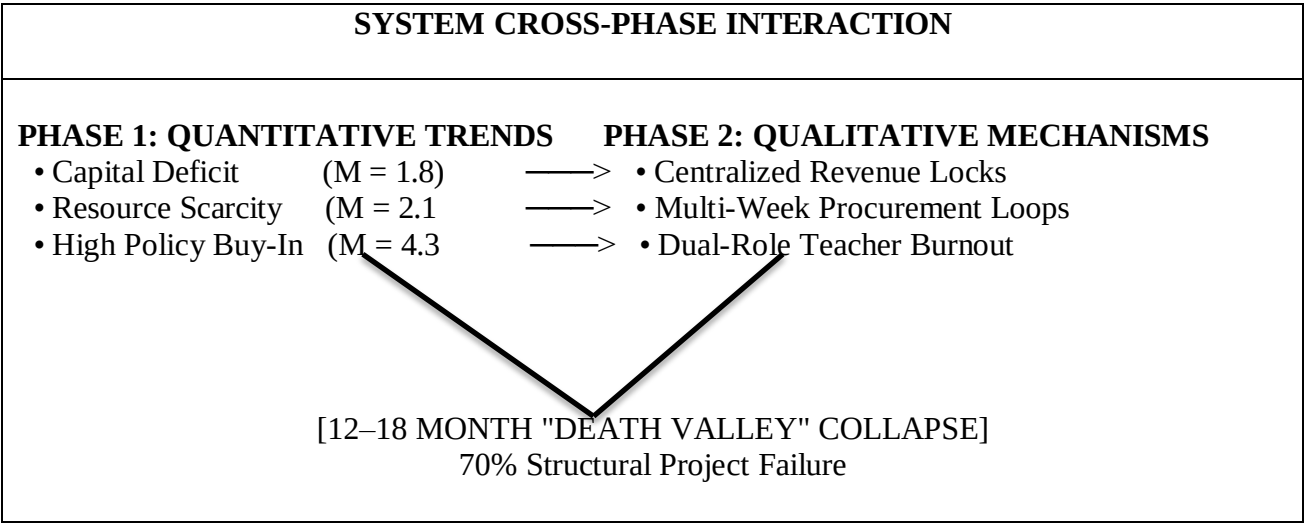
The quantitative data established "Financial Capital" as the most critical systemic deficiency ( $\bar{x} = 1.8$ ), accompanied by a very low standard deviation ( $\sigma = 0.32$ ) that shows a strong consensus across all sampled institutions. When merged with the qualitative findings of Theme 1, this funding crisis is revealed to be an institutional creation rather than a simple lack of market opportunities. The productive units generate significant revenue during their initial cycles, but because schools mandate that all funds be deposited into centralized accounts to cover non-project expenses (such as administrative vehicle repairs or general infrastructure), the ventures are starved of working capital.

The statistical "capital deficit" is therefore a direct consequence of a policy disconnect that treats commercial revenue as general school income instead of revolving business capital.

4.6.1.2 Operational Paralysis (Resource Scarcity vs. Procurement Rigidity)

The study recorded low scores for the availability of "Technical Equipment" ( $\bar{x} = 2.1$ ) and "Raw Materials" ( $\bar{x} = 2.4$ ). The qualitative narratives under Theme 2 clarify that these shortages are severely worsened by rigid procurement structures. The institutional requirement to secure three independent quotes and navigate multi-layered committee approval chains means that even when funds are released, the purchasing process takes weeks. In a fast-moving economic environment, these bureaucratic delays cause quotation values to expire and lead to missed production deadlines, such as seasonal planting windows or time-sensitive customer orders. This confirms that physical resource scarcity is deeply tied to rigid administrative supply chains.

Table 4. 13: System cross-phase interaction



Source: Researcher data (2026)

4.6.1.3 The Motivation vs. Capacity Gridlock (High Buy-In vs. Teacher Burnout)

A major finding of this synthesis is the stark contrast between stakeholder attitudes and operational capacity. Phase 1 demonstrated that project failure is absolutely not caused by ideological resistance

or low motivation, as stakeholders scored the educational value of Education 5.0 exceptionally high ( $\bar{x} = 4.5$ ).

Instead, the qualitative insights from Theme 3 reveal a operational gridlock: technical instructors are highly motivated but suffer from severe time poverty and dual-role conflict. Because they are expected to maintain full-time teaching schedules (up to 30 periods a week) while simultaneously managing complex commercial operations without specialized business training or financial incentives, systemic burnout occurs. High psychological buy-in cannot overcome the physical impossibility of running a business without dedicated management hours.

#### **4.6.1.4 Explaining the Timeline of the "Death Valley" Phenomenon**

The most critical point of synthesis lies in explaining why a striking 70% of school productive units collapse specifically between months 12 and 18. The combined data shows that during the first 6 months, projects run smoothly due to initial startup funding, new equipment, and high initial momentum. However, by the time a venture hits the 12-to-18-month mark, initial inputs have been depleted, equipment requires maintenance, and the project must survive on its own operational cycles. It is precisely during this window that the structural flaws detailed in Theme 4 - the loss of student labor during school vacations and the mandatory closure of workshops for three months during national ZIMSEC examination preparation—severely disrupt commercial continuity. A commercial venture cannot survive three-month operational freezes and zero capital reinvestment. Consequently, the project becomes operationally unsustainable due to compounded structural constraints.

#### **4.6.2 Theoretical Interpretation of Findings**

The findings of this study collectively reinforce the interconnected relevance of Constructivist Learning Theory, Education with Production (EWP), Education 5.0, and the School-as-an-Enterprise theory in explaining the sustainability challenges affecting productive units in urban secondary schools. Constructivist Learning Theory was confirmed through the study's emphasis on experiential learning and practical engagement. Students demonstrated strong appreciation for practical skills training and hands-on learning activities. However, disruptions caused by inadequate

resources, procurement delays, and curriculum overload limited continuous learner participation in productive activities, thereby weakening the full realization of constructivist learning environments. The findings also validated the principles of Education with Production (EWP), which advocates the integration of productive work with academic instruction. Although schools successfully integrated practical activities into technical learning, the productive units failed to evolve into self-sustaining enterprises because generated profits were not consistently reinvested into operational continuity. This demonstrates that productive pedagogy alone is insufficient without institutional financial support systems.

Similarly, the study exposed implementation gaps within Education 5.0. While stakeholders strongly supported the industrialisation and innovation goals of Education 5.0, the schools lacked the operational flexibility, infrastructure, governance systems, and entrepreneurial management structures necessary to sustain productive units as viable business enterprises. The findings therefore suggest that successful implementation of Education 5.0 requires structural reforms that align school administration with commercial operational demands. Finally, the findings strongly support the School-as-an-Enterprise theory. The study demonstrated that productive units fail primarily because schools continue to operate under rigid academic governance systems that are incompatible with market-oriented production models. The absence of decentralized financial systems, rapid procurement mechanisms, dedicated business management personnel, and continuous production schedules prevents productive units from surviving beyond the —Death Valley period. The findings therefore confirm that sustainable productive units require schools to adopt enterprise-based governance models rather than purely traditional educational administration systems.

#### **4.7 Discussion of Findings**

This section discusses the findings of the study in relation to the reviewed literature and theoretical framework. The discussion links the empirical evidence gathered from the four urban secondary schools in Bindura District with previous scholarly studies on Education with Production (EWP), Education 5.0, Constructivist Learning Theory, and the School-as-an-Enterprise model. The findings are discussed according to the major research themes and objectives of the study.

#### **4.6.1 Resource Availability and the Sustainability of Productive Units**

The study established that resource shortages remain one of the greatest barriers affecting the sustainability of school productive units. Quantitative findings revealed low mean scores for financial capital ( $M = 1.8$ ), technical equipment ( $M = 2.1$ ), and raw materials ( $M = 2.4$ ), indicating severe operational inadequacies across the sampled schools. Qualitative findings further confirmed that schools experience delayed procurement processes, outdated machinery, and inconsistent funding systems, all of which interrupt production continuity. These findings strongly align with previous studies by Mashingaidze (2013), Riddell (1980), and Maravanyika (1990), who argued that inadequate infrastructure, weak funding systems, and shortages of modern machinery undermine the sustainability of Education with Production initiatives in developing countries. Similarly, Gustafsson (1987) observed that school productive units often fail because they lack the operational inputs required to compete with private commercial enterprises. The present study confirms these earlier observations within the context of urban secondary schools in Bindura District.

The findings also support the arguments advanced under Education 5.0, which emphasize that industrialisation-oriented education requires strong infrastructural and technological support systems. Murwira (2019) and Togo and Gandidzanwa (2021) emphasized that productive institutions must possess adequate industrial tools, innovation hubs, and financial mechanisms capable of sustaining continuous production. However, the present study demonstrates that although workshop buildings exist, most institutions remain under-equipped and underfunded, thereby limiting their transformation into viable industrial hubs. From a Constructivist Learning Theory perspective, inadequate resources negatively affect experiential learning opportunities. Vygotsky (1978) argued that learners develop deeper understanding through active engagement and interaction with real-world learning environments. However, the shortage of workshop tools and raw materials interrupts hands-on learning activities, thereby weakening the practical learning experiences necessary for productive pedagogy. The findings further validate the School-as-an-Enterprise theory, which emphasizes that productive units require sustainable financial and operational systems to survive beyond the —Death Valley phase. The study revealed that schools lack decentralized financial systems and agile procurement structures necessary for entrepreneurial

continuity. Consequently, the productive units fail to operate as self-sustaining enterprises despite strong policy support and stakeholder motivation.

#### **4.6.2 Practical Skills Training and Productive Pedagogy**

The study established that despite severe resource shortages, practical skills training remains one of the strongest components of Education 5.0 implementation within the sampled schools. Students highly rated teacher competence ( $M = 4.25$ ), frequency of practical lessons ( $M = 4.12$ ), and the ability of the curriculum to develop self-reliant business skills ( $M = 3.98$ ). Qualitative findings also revealed that instructors demonstrated exceptional resilience and creativity in sustaining practical learning activities despite material shortages. These findings are consistent with previous studies by Chung (1988), Mutumbuka (1986), and Mashingaidze (2013), who argued that Education with Production successfully bridges the gap between theoretical education and practical industrial skills. The findings further support Gustafsson's (1987) argument that productive units function as —critical bridges‖ that prepare students for real-world industrial and entrepreneurial environments.

The findings also strongly support Constructivist Learning Theory. Vygotsky (1978) emphasized that meaningful learning occurs when learners actively participate in socially meaningful tasks. The practical workshops, agricultural projects, and production activities observed in the schools function as —Living Labs‖ where learners apply classroom concepts to real-life production environments. This confirms the constructivist assumption that experiential learning promotes deeper cognitive engagement and practical competence development. Furthermore, the findings align with Education 5.0 principles which seek to produce innovative, industrially competent, and entrepreneurial graduates capable of contributing to national development. Murwira (2019) argued that modern education should produce tangible goods and services rather than focusing exclusively on theoretical examination performance. The strong emphasis on practical skills training observed in this study demonstrates that schools are gradually embracing the industrialisation goals of Education 5.0 despite existing operational limitations. However, the study also reveals a contradiction between effective pedagogical delivery and weak commercial sustainability. While teachers effectively deliver practical skills, the surrounding governance and financial systems fail to transform these educational activities into self-sustaining productive enterprises. This confirms the

observations made by Firomumwe (2022) and Nherera (2014), who argued that productive pedagogy alone cannot guarantee institutional sustainability without strong governance and financial reinvestment systems.

#### **4.6.3 Governance Systems and the “Death Valley” Phenomenon**

One of the most significant findings of the study is the confirmation of the —Death Valley phenomenon, where approximately 70% of school productive units collapse between 12 and 18 months after establishment. The study revealed that this collapse is primarily caused by centralized financial systems, weak reinvestment mechanisms, bureaucratic procurement systems, and governance overload among instructors. These findings strongly agree with previous literature by Murwira (2019), Mashingaidze (2013), and World Economic Forum (2020), who identified the —Death Valley phase as a critical transition period during which projects fail because initial startup resources become exhausted before sustainable operational systems are fully established. Similarly, Riddell (1980) argued that productive units in developing economies often collapse because they lack cushioning financial infrastructures capable of supporting long-term continuity. The findings also validate the School-as-an-Enterprise theory, which argues that productive units require decentralized governance systems, entrepreneurial management structures, and flexible financial models to survive within competitive market environments. The present study established that schools continue operating under rigid academic administrative structures that are fundamentally incompatible with commercial production systems. Centralized school accounts, delayed procurement systems, and the absence of dedicated business managers significantly weaken the sustainability of productive units.

The findings further align with studies by Shizha (2006) and Maravanyika (1990), who emphasized that many educators lack entrepreneurial management skills because they were trained within purely academic systems. The current study confirmed that instructors experience severe workload pressures because they are expected to simultaneously function as teachers, production supervisors, accountants, marketers, and business managers without additional support or incentives. From an Education 5.0 perspective, the findings reveal significant implementation gaps. Although the policy advocates innovation and industrialisation, the schools lack institutional structures capable of

supporting commercial sustainability. The findings therefore suggest that successful implementation of Education 5.0 requires governance reforms that align educational administration with entrepreneurial operational demands.

#### **4.6.4 Curriculum Constraints and Commercial Sustainability**

The study established that the rigid structure of the academic curriculum significantly undermines the sustainability of productive units. Qualitative findings revealed that productive activities are frequently suspended during examination periods and school holidays, resulting in disruptions to production continuity, customer supply chains, and market consistency. Participants also indicated that students face excessive academic workloads that limit their participation in large-scale commercial production activities. These findings are consistent with previous studies by Whitehouse, Mba, and Kamau (2018), who argued that curriculum implementation challenges, heavy theoretical syllabi, and insufficient practical integration weaken the sustainability of productive education programs. Similarly, Okorie (2016) observed that practical entrepreneurial programs often fail because traditional examination systems continue prioritizing theoretical academic performance over productive learning activities.

The findings also support the arguments advanced under Education with Production (EWP), which advocates the integration of productive work with academic learning. However, the current study demonstrates that the school curriculum still treats productive activities as secondary components that can easily be suspended during examination periods. This contradicts the core principles of EWP, which view productive work as an essential educational process rather than an extracurricular activity. From a Constructivist perspective, interruptions in productive activities weaken experiential learning continuity. Constructivist Learning Theory emphasizes continuous learner participation, collaboration, and active engagement in socially meaningful tasks. However, school holidays and examination shutdowns fragment students' practical learning experiences, limiting the development of stable entrepreneurial competencies. The findings further expose contradictions within Education 5.0 implementation. Although the policy seeks to industrialize educational institutions, the rigid academic calendar leaves limited room for continuous production cycles.

Consequently, productive units remain partially functional educational projects rather than fully operational business enterprises capable of sustaining long-term commercial output.

#### **4.6.5 Overall Interpretation of Findings**

Overall, the findings of the study confirm that stakeholders strongly support the principles of Education 5.0, productive pedagogy, and entrepreneurial learning. Students, instructors, and School Development Committee members all recognize the educational and economic value of productive units. However, the sustainability crisis affecting these projects is caused by systemic institutional barriers rather than negative attitudes toward practical education. The study therefore confirms the interconnected relevance of Constructivist Learning Theory, Education with Production, Education 5.0, and the School-as-an-Enterprise theory in explaining both the strengths and weaknesses of productive units in urban secondary schools. While practical pedagogy and stakeholder motivation remain strong, institutional governance systems, procurement structures, curriculum rigidity, and financial management models remain structurally incompatible with the demands of sustainable entrepreneurial production. Consequently, unless schools adopt more flexible enterprise-oriented governance systems, productive units will continue experiencing operational stagnation and collapse within the —Death Valley‖ period.

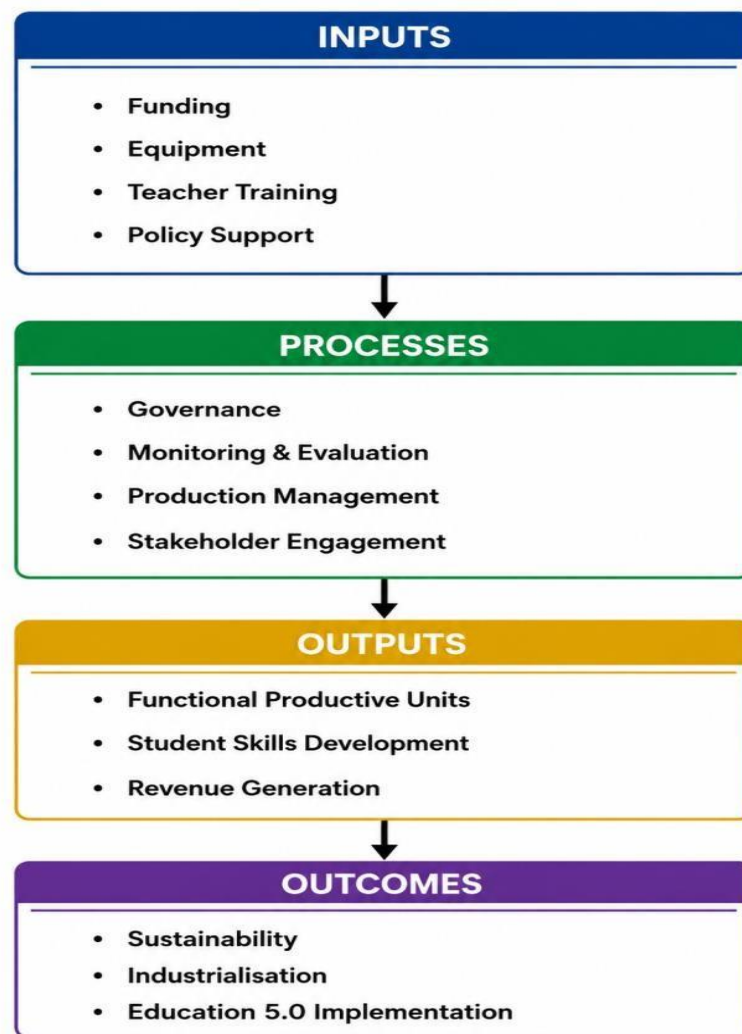
#### **4.8 Proposed Framework for Sustainable Productive Units under Education 5.0**

The proposed framework is designed to enhance the sustainability and continuity of productive units in urban secondary schools in Bindura District in line with the principles of Education 5.0. The framework integrates institutional resources, operational systems, stakeholder collaboration, and sustainability outcomes into a unified model that transforms school productive units into viable educational and economic enterprises.

The framework is grounded in:

- Education with Production (EWP),
- Constructivist Learning Theory,
- School-as-an-Enterprise Theory,
- Education 5.0 philosophy of innovation and industrialisation.

The framework operates through four interconnected dimensions namely Inputs, Processes, Outputs, and Outcomes.



Source: Researcher data (2026)

**Figure 4. 5:** Proposed Framework for Sustainable Productive Units under Education 5.0

The framework depicts a logical and sequential pathway that transforms basic resources into sustainable, impact-driven outcomes for school productive units in line with Education 5.0. The model is built on the premise that sustainability is achieved when adequate inputs are effectively managed through strong processes, resulting in meaningful outputs that ultimately lead to long-term

outcomes. The relationship between the components is continuous and cyclical, meaning that outcomes feed back into inputs to strengthen and improve future performance.

### **1. Inputs**

Inputs form the foundation of the framework. They represent the essential resources and enabling conditions required for the establishment and effective operation of productive units. Adequate funding ensures that projects have the necessary financial resources for start-up and continued operations. Appropriate equipment and infrastructure provide the physical tools needed for production and hands-on learning. Teacher training equips educators with the technical, entrepreneurial, and pedagogical skills to guide learners effectively. Policy support creates an enabling environment through guidelines, incentives, and alignment with national education and industrialisation goals. Without these quality inputs, productive units are likely to remain non-functional or unsustainable.

### **2. Processes**

The inputs are transformed into action through a set of key processes. Governance ensures transparent leadership, accountability, and strategic decision-making within the productive units. Monitoring and evaluation tracks progress, measures performance, and informs timely improvements. Production management involves planning, organising, and controlling production activities to ensure efficiency, quality, and value addition. Stakeholder engagement fosters collaboration and support from students, teachers, parents, communities, government agencies, and private sector partners. When these processes are well coordinated, they create a conducive environment for effective implementation and sustainability.

### **3. Outputs**

Effective processes yield tangible and measurable outputs. Functional productive units emerge as operational enterprises that engage students in real-world production activities. Through these units, students develop practical and entrepreneurial skills such as problem solving, innovation, teamwork, and financial literacy, which enhance their employability and self-reliance. Furthermore, productive units generate revenue through the sale of goods and services, which can be reinvested

into operations, infrastructure development, and school improvement. These outputs demonstrate the immediate value and effectiveness of the framework.

#### **4. Outcomes**

The outputs contribute to long-term outcomes that transform schools and communities. Sustainability is achieved when productive units remain viable, self-reliant, and resilient over time, even beyond initial support. Industrialisation is promoted as schools evolve into centres of production, innovation, and enterprise, contributing to local and national economic development. Ultimately, the framework supports the full implementation of Education 5.0 by integrating teaching, research, community service, innovation, and industrialisation into a practical, production-oriented model. These outcomes not only benefit schools but also empower learners and communities to thrive in a rapidly changing world. In essence, the framework presents a cause-and-effect pathway where strong inputs enable effective processes, which produce valuable outputs that lead to sustainable, industrialised, and future-ready educational outcomes. The cyclical nature of the model encourages continuous improvement, learning, and innovation. This transforms schools from purely academic institutions into centres of production, innovation, and sustainable development. The framework assumes that sustainable productive units cannot emerge without adequate foundational inputs such as funding, equipment, trained personnel, and policy support. These inputs activate institutional processes including governance, monitoring, production management, and stakeholder collaboration. When effectively coordinated, these processes generate outputs such as functional productive units, practical student competencies, and school-based revenue generation. Over time, the outputs contribute to broader developmental outcomes including sustainability, industrialisation, and successful implementation of Education 5.0. The framework therefore presents productive units not merely as income-generating projects, but as integrated educational-production systems capable of supporting national development and institutional transformation.

##### **4.8.1 Link to Findings and Literature**

The proposed framework for sustainable productive units was developed from the empirical findings of the study and supported by existing literature on Education 5.0, productive pedagogy,

sustainability, and Education with Production (EWP). The framework reflects the major issues identified through both quantitative and qualitative findings, particularly the challenges affecting the sustainability of productive units in urban secondary schools in Bindura District. The findings of the study revealed that inadequate funding significantly affected the continuity and operational efficiency of productive units. Many schools lacked sufficient financial resources to purchase raw materials, maintain equipment, and expand production activities. These findings are consistent with studies by Mashingaidze (2013) and Shizha (2006), who observed that financial constraints remain one of the major barriers to the successful implementation of productive pedagogy in Zimbabwean schools. Consequently, funding was incorporated into the framework as a critical input necessary for sustainability.

The study also established that limited equipment and inadequate infrastructure negatively affected production quality, learner participation, and innovation. Schools with inadequate machinery and outdated tools struggled to maintain productive activities. These findings support observations by Nherera (2000), who argued that practical-oriented education cannot succeed without adequate infrastructure and technological support. Therefore, equipment and infrastructure form an important component of the framework inputs. Another major finding was the shortage of adequately trained teachers to supervise productive units effectively. Participants indicated that many educators lacked entrepreneurial, technical, and managerial competencies required for Education 5.0 implementation. This finding aligns with the views of Murwira (2019), who emphasised that Education 5.0 requires a transformation in teacher competencies towards innovation, industrialisation, and production-oriented learning. As a result, teacher training was integrated into the framework as a strategic input for sustainability.

The findings further revealed that weak policy implementation and limited institutional support contributed to the collapse of productive units in some schools. Respondents highlighted inconsistencies in policy interpretation, inadequate monitoring systems, and lack of strategic guidance. These findings resonate with the School-as-an-Enterprise Theory, which emphasises the importance of institutional structures, governance systems, and policy alignment in sustaining

school enterprises. Consequently, policy support was included as a foundational input in the framework.

In terms of processes, the study found that effective governance systems played a significant role in sustaining productive units. Schools with transparent financial management, strategic planning, and active School Development Committees demonstrated greater project continuity and productivity. These findings support literature by Chinyoka and Naidu (2014), who noted that governance and accountability are essential determinants of successful educational innovation projects. Therefore, governance was incorporated as a key process variable in the framework. The study also identified monitoring and evaluation as an important sustainability mechanism. Schools that regularly monitored financial performance, production levels, and learner participation were more likely to sustain productive units over time. This finding is supported by sustainability management literature, which emphasises continuous assessment and feedback as critical drivers of institutional improvement and resilience.

Furthermore, the findings revealed that stakeholder engagement significantly influenced the success of productive units. Collaboration among parents, teachers, communities, private sector actors, and school administrators enhanced resource mobilisation, technical support, and market access. These findings align with Constructivist Learning Theory, which emphasises collaborative learning, community participation, and experiential engagement in educational processes. Thus, stakeholder engagement was incorporated into the framework as a central operational process. The outputs identified in the framework directly emerged from the study findings. Schools with functional productive units reported improved student participation in practical learning activities, acquisition of entrepreneurial skills, and generation of supplementary income. These findings are consistent with the principles of Education with Production (EWP), which advocate for the integration of education, production, and community development.

The framework outcomes are also strongly linked to the broader objectives of Education 5.0. The findings demonstrated that sustainable productive units contribute to innovation, industrialisation,

skills development, and self-reliance among learners. This supports the Education 5.0 philosophy advanced by the Government of Zimbabwe, which seeks to transform educational institutions into centres of production, innovation, and industrial development. Overall, the framework synthesises empirical findings and theoretical perspectives into a practical sustainability model that addresses the identified gaps affecting productive units in urban secondary schools. The framework therefore provides a contextually relevant strategy for strengthening productive pedagogy, improving institutional sustainability, and enhancing the implementation of Education 5.0 in Zimbabwean secondary schools.

#### **4.9 Chapter Summary**

This chapter presented and analyzed the quantitative and qualitative findings regarding the sustainability of productive units in urban secondary schools within Bindura District under the Education 5.0 framework. The quantitative findings revealed strong stakeholder support for productive pedagogy despite severe operational resource deficits, particularly in financial capital, technical equipment, and project management structures. Statistical evidence further confirmed the existence of a critical —Death Valley‖ period during which most projects collapse between 12 and 18 months after implementation. The qualitative findings expanded these statistical trends by uncovering the institutional and administrative mechanisms driving project stagnation. Centralized revenue systems, procurement rigidities, governance overloads, and curriculum scheduling conflicts collectively undermine the sustainability of school-based enterprises. The cross-phase synthesis ultimately demonstrated that project failure is not caused by negative stakeholder attitudes, but rather by structural incompatibilities between traditional school systems and commercial operational requirements. The findings presented in this chapter demonstrate that the sustainability crisis affecting productive units is not rooted in stakeholder resistance or pedagogical weakness, but rather in institutional structural incompatibilities between traditional educational administration systems and market-oriented production models. The evidence further confirms that sustainable implementation of Education 5.0 requires governance restructuring, decentralized financial systems, and curriculum flexibility capable of supporting continuous productive activity. These findings therefore provide the foundation for the conclusions, recommendations, and policy implications presented in Chapter 5.

## **CHAPTER 5**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents a synthesis of the study findings, draws conclusions based on the evidence generated, and proposes recommendations for policy and practice. The study investigated the sustainability of productive units in urban secondary schools in Bindura District within the framework of Education 5.0. The inquiry was motivated by persistent concerns regarding the inability of many school-based productive enterprises to achieve long-term operational viability despite strong policy support for innovation, industrialisation, and entrepreneurship.

The findings revealed a complex relationship between educational objectives, institutional governance structures, resource availability, and enterprise sustainability. Although stakeholders demonstrated strong commitment to productive learning and practical skills development, productive units continued to experience operational difficulties that limited their contribution to educational and economic outcomes. This chapter therefore summarises the major findings, presents conclusions in relation to the study objectives, and outlines practical measures that may strengthen the sustainability of productive units in secondary schools.

#### **5.2 Summary of the Study**

The primary purpose of this study was to examine factors affecting the sustainability of productive units in urban secondary schools and to develop a framework capable of enhancing their long-term viability under Education 5.0. Specifically, the study sought to assess the status of existing productive units, identify resource-related challenges, investigate institutional and operational barriers to sustainability, analyse the causes of project failure during the critical developmental stage commonly referred to as the —Death Valley‖ period, and formulate a sustainability framework informed by empirical evidence.

The study was guided by the Pragmatist Paradigm and employed an Explanatory Sequential Mixed-Methods Design. Quantitative data were collected through questionnaires administered to students and School Development Committee members, while qualitative data were generated through interviews, focus group discussions, and observations involving school heads and technical department leaders. The integration of quantitative and qualitative evidence provided a comprehensive understanding of both measurable trends and stakeholder experiences.

The findings indicated that productive units remain an important component of practical education and are widely viewed as essential for promoting entrepreneurship, innovation, and employability skills among learners. Participants expressed strong support for productive pedagogy and recognised its relevance to the objectives of Education 5.0. However, this positive perception was not matched by the operational performance of the productive units.

The study identified substantial deficiencies in financial resources, equipment availability, raw material supply, and project management capacity. These challenges were compounded by institutional factors such as centralised financial controls, lengthy procurement procedures, competing academic responsibilities, and limited entrepreneurial expertise among project coordinators. Consequently, many productive units struggled to maintain continuity and profitability.

The findings further established the existence of a critical sustainability gap during the first eighteen months of project implementation. During this period, many productive units experienced declining production levels, resource depletion, and management difficulties that ultimately resulted in project stagnation or collapse. The study therefore confirmed that sustainability challenges are primarily structural and institutional rather than attitudinal in nature.

Drawing on these findings, a framework was developed to promote sustainability through strengthened governance systems, improved financial management, stakeholder collaboration,

monitoring and evaluation mechanisms, entrepreneurial capacity development, and enhanced policy support.

### **5.3 Conclusions of the Study**

#### **5.3.1 Conclusion on Objective 1: Status of Existing Productive Units**

The study concludes that productive units remain active in most urban secondary schools and continue to provide valuable opportunities for experiential learning and skills development. Their existence demonstrates institutional recognition of the importance of practical education and aligns with the aspirations of Education 5.0. Nevertheless, the majority of productive units operate below their potential due to inadequate resources and weak operational systems. As a result, many projects function as educational activities rather than sustainable productive enterprises.

#### **5.3.2 Conclusion on Objective 2: Resource Gaps Affecting Productive Units**

The study concludes that resource inadequacies constitute one of the most significant barriers to productive unit sustainability. Financial constraints, obsolete equipment, insufficient raw materials, and inadequate infrastructure undermine production efficiency and limit opportunities for growth. Sustainable operation cannot be achieved when productive units lack access to the resources necessary for continuous production, innovation, and market competitiveness.

#### **5.3.3 Conclusion on Objective 3: Structural and Systemic Challenges Affecting Sustainability**

The evidence generated by this study demonstrates that institutional and administrative systems significantly influence the sustainability of productive units. Centralised decision-making structures, restrictive procurement procedures, governance overload among teachers, and curriculum pressures collectively reduce the capacity of schools to operate productive units effectively. The study therefore concludes that existing school management systems are often incompatible with the operational requirements of enterprise-based activities.

#### **5.3.4 Conclusion on the “Death Valley” Phenomenon**

The study confirms the existence of a critical transition period during which productive units become highly vulnerable to failure. This period is characterised by declining financial support, inadequate reinvestment mechanisms, operational interruptions, and management challenges. The findings suggest that project collapse is not inevitable but occurs when institutions fail to provide the support structures required for enterprise growth and continuity. Addressing this phase is therefore essential for improving long-term sustainability.

#### **5.3.5 Conclusion on Objective 4: Framework for Sustainable Productive Units**

The proposed framework provides a practical and context-sensitive model for enhancing the sustainability of productive units within secondary schools. By integrating governance reform, stakeholder participation, financial accountability, entrepreneurship development, monitoring systems, and policy alignment, the framework addresses the principal barriers identified during the study. The framework therefore offers a viable pathway for transforming productive units into sustainable centres of innovation, production, and skills development.

#### **5.3.6 Overall Conclusion**

The study concludes that the sustainability challenges affecting productive units in urban secondary schools are rooted primarily in institutional, managerial, and resource-related constraints rather than a lack of stakeholder commitment. Learners, teachers, administrators, and community members generally support productive pedagogy and recognise its educational value. However, without structural reforms that align school governance systems with enterprise management requirements, productive units are unlikely to achieve long-term sustainability.

The successful implementation of Education 5.0 requires schools to move beyond traditional administrative models and adopt approaches that encourage innovation, flexibility, entrepreneurship, and continuous reinvestment. Sustainable productive units have the potential to contribute significantly to skills development, innovation, industrialisation, and economic

empowerment among learners. Their success therefore represents an important component of Zimbabwe's broader educational transformation agenda.

## **5.4 Recommendations**

### **5.4.1 Establish Dedicated Financial Management Systems**

Schools should establish ring-fenced financial systems that allow productive units to retain and reinvest a proportion of generated income. Such systems would improve operational continuity and reduce dependence on external funding sources.

### **5.4.2 Streamline Procurement Procedures**

Procurement processes should be simplified and decentralised to enable timely acquisition of raw materials, equipment, and maintenance services. Reduced bureaucratic delays would enhance production efficiency and responsiveness to market opportunities.

### **5.4.3 Strengthen Infrastructure and Equipment Provision**

Government ministries, development partners, and private-sector organisations should support schools through the provision of modern equipment, production facilities, and technical resources required for sustainable enterprise development.

### **5.4.4 Appoint Dedicated Productive Unit Coordinators**

Schools should designate specialised personnel responsible for managing productive units. This would reduce teacher workload and ensure greater attention to business planning, production management, and market development.

#### **5.4.5 Enhance Entrepreneurship and Management Training**

Continuous professional development programmes should be introduced to strengthen teachers' competencies in entrepreneurship, financial management, marketing, and project administration.

#### **5.4.6 Align Curriculum Structures with Productive Activities**

Curriculum planners should create greater flexibility within school timetables to accommodate productive activities without compromising academic requirements. This would improve continuity and learner participation.

#### **5.4.7 Promote Strategic Partnerships**

Schools should strengthen collaboration with industry, local businesses, universities, non-governmental organisations, and community stakeholders to enhance technical support, resource mobilisation, and market access.

#### **5.4.8 Develop Monitoring and Evaluation Systems**

Comprehensive monitoring and evaluation frameworks should be implemented to assess project performance, identify operational weaknesses, and guide continuous improvement efforts.

#### **5.4.9 Strengthen Policy Implementation Support**

Education authorities should provide clearer operational guidelines, technical assistance, and institutional support mechanisms to facilitate effective implementation of Education 5.0 initiatives at school level.

#### **5.4.10 Encourage Enterprise-Oriented Governance Models**

School governance structures should incorporate principles of entrepreneurship, innovation, and commercial accountability in order to improve responsiveness to the demands of productive enterprises.

#### **5.4.11 Introduce Incentive Mechanisms**

Appropriate incentive systems should be developed to motivate teachers and learners participating in productive activities. Incentives may include recognition programmes, profit-sharing arrangements, and opportunities for professional development.

#### **5.4.12 Expand Market Linkages**

Schools should actively pursue partnerships with local industries, retailers, and community markets to improve product visibility, increase revenue generation, and strengthen business sustainability.

### **5.5 Areas for Further Research**

Future studies may investigate the long-term performance of productive units in rural secondary schools and compare their sustainability outcomes with those observed in urban settings. Additional research may also examine the effectiveness of different governance models for school-based enterprises and evaluate the implementation of Education 5.0 across diverse educational contexts.

Further studies should explore strategies for strengthening market competitiveness, technology adoption, and digital entrepreneurship within school productive units. Longitudinal research tracking productive units over several years would also provide valuable insights into sustainability dynamics and the factors influencing enterprise growth beyond the initial implementation period.

### **5.6 Chapter Summary**

This chapter synthesised the findings of the study, presented conclusions linked to each research objective, and proposed recommendations aimed at strengthening the sustainability of productive units in secondary schools. The study established that while productive pedagogy enjoys broad stakeholder support, significant resource, governance, and institutional challenges continue to undermine sustainability. The chapter further demonstrated that sustainable implementation of Education 5.0 requires structural reforms, improved resource management, stronger partnerships,

and enterprise-oriented governance systems. The recommendations and framework proposed by this study provide practical guidance for policymakers, school administrators, and other stakeholders seeking to enhance the effectiveness and long-term viability of productive units in Zimbabwean secondary schools.

## REFERENCES

- Awang, H., Taib, C. A., & Muda, H. (2020). *Innovation, entrepreneurship and technology integration in education systems*. Routledge.
- Banerjee, A., & Chaudhury, S. (2010). Statistics without tears: Populations and samples. *Industrial Psychiatry Journal*, 19(1), 60–65.
- Brigham, E. F., & Ehrhardt, M. C. (2016). *Financial management: Theory and practice* (15th ed.). Cengage Learning.
- Brigham, E. F., & Ehrhardt, M. C. (2022). *Financial management: Theory and practice* (16th ed.). Cengage Learning.
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and implementing cross-sector collaborations: Needed and challenging. *Public Administration Review*, 75(5), 647–663.
- Chabaya, O. (2024). *Education 5.0 and productive unit sustainability in Zimbabwean educational institutions*. Zimbabwe Open University Press.
- Chabaya, O. (2024). *Productive units and sustainable school development under Education 5.0 in Zimbabwe* [Unpublished manuscript].
- Chung, F. (1988). *Education with production: A model for Zimbabwe*. Harare Publishing House.
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.
- Comte, A. (1853). *The positive philosophy*. Calvin Blanchard.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th ed.). Sage.
- Creswell, J. W. (2017). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (5th ed.). Pearson.

- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative and mixed methods approaches* (5th ed.). Sage.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage.
- Dewey, J. (1933). *How we think*. D.C. Heath.
- Dewey, J. (1938). *Experience and education*. Macmillan.
- Durkheim, E. (1895). *The rules of sociological method*. Free Press.
- Epstein, J. L. (2011). *School, family, and community partnerships: Preparing educators and improving schools* (2nd ed.). Westview Press.
- Etzkowitz, H., & Zhou, C. (2018). *The triple helix: University–industry–government innovation and entrepreneurship*. Routledge.
- Firomumwe, T. (2022). *Entrepreneurship education and productive units in Zimbabwean secondary schools* [Unpublished manuscript].
- Firomumwe, T. (2022). *Productive units and entrepreneurship development in Zimbabwean secondary schools*. Zimbabwe Educational Review.
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.
- Fukuda, K. (2019). Science, technology and innovation ecosystem transformation toward Society 5.0. *International Journal of Production Economics*, 220, 107460.
- Gay, L. R., Mills, G. E., & Airasian, P. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). Pearson.
- Gibb, A. A. (2002). In pursuit of a new ‘enterprise’ and ‘entrepreneurship’ paradigm for learning. *International Journal of Management Reviews*, 4(3), 233–269.

- Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, 11(3), 255–274.
- Hisrich, R. D., Peters, M. P., & Shepherd, D. A. (2020). *Entrepreneurship* (11th ed.). McGraw-Hill.
- Hoy, W. K., & Miskel, C. G. (2013). *Educational administration: Theory, research and practice* (9th ed.). McGraw-Hill.
- Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D., & Newman, T. B. (2013). *Designing clinical research* (4th ed.). Lippincott Williams & Wilkins.
- James, W. (1907). *Pragmatism: A new name for some old ways of thinking*. Longmans, Green & Co.
- Kelly, M. J. (1988). *Education in a declining economy: The case of Zambia, 1975–1985*. World Bank.
- Kuratko, D. F. (2005). The emergence of entrepreneurship education. *Entrepreneurship Theory and Practice*, 29(5), 577–598.
- Kusek, J. Z., & Rist, R. C. (2004). *Ten steps to a results-based monitoring and evaluation system*. World Bank.
- Kvale, S. (2007). *Doing interviews*. Sage.
- Leng, J., Ruan, G., Jiang, P., Xu, K., Liu, Q., Zhou, X., & Liu, C. (2020). Industry 5.0: Prospect and retrospect. *Journal of Manufacturing Systems*, 65, 279–295.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Lingard, B., Hayes, D., & Mills, M. (2003). *Teachers and productive pedagogies*. Allen & Unwin.
- Maravanyika, O. E. (1990). *Implementing education with production in Zimbabwean schools*. University of Zimbabwe.

- Mashingaidze, T. (2013). *Sustainability challenges affecting school-based productive projects in Zimbabwe* [Unpublished manuscript].
- Mashingaidze, T. (2013). *Sustainability challenges in school productive projects in Zimbabwe*. Zimbabwe Journal of Educational Research.
- Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development. (2024). *Education 5.0 implementation report*. Government of Zimbabwe.
- Ministry of Primary and Secondary Education. (2023). *Education 5.0 implementation guidelines for schools*. Government of Zimbabwe.
- Morgan, D. L. (2007). Paradigms lost and pragmatism regained. *Journal of Mixed Methods Research*, 1(1), 48–76.
- Murwira, A. (2019). *Heritage-based Education 5.0: A philosophy for Zimbabwe's development*. Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development.
- Murwira, A. (2019). *Heritage-based education 5.0: Philosophy, principles and national development strategy for Zimbabwe*. Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development.
- NCSET. (2005). *School-based enterprises: A resource guide*. National Center on Secondary Education and Transition.
- Nherera, C. (2014). *Education with production and entrepreneurship in Zimbabwean schools*. Zimbabwe Educational Studies.
- Nherera, C. (2014). *Education with production and entrepreneurship development in Zimbabwean schools* [Unpublished manuscript].
- Nzirasasanga Commission. (1999). *Report of the Presidential Commission of Inquiry into Education and Training*. Government of Zimbabwe.

- O'Leary, Z. (2012). *The essential guide to doing your research project* (2nd ed.). Sage.
- Pallant, J. (2020). *SPSS survival manual* (7th ed.). McGraw-Hill.
- Pandey, P., & Pandey, M. M. (2015). *Research methodology: Tools and techniques*. Bridge Center.
- Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). Sage.
- Porter, M. E. (1998). *Competitive advantage: Creating and sustaining superior performance*. Free Press.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.
- Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118–137). Sage.
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2), 63–75.
- Sterling, S. (2004). *Higher education, sustainability, and the role of systemic learning*. Higher Education Academy.
- Stufflebeam, D. L., & Shinkfield, A. J. (2007). *Evaluation theory, models and applications*. Jossey-Bass.
- Tashakkori, A., & Teddlie, C. (2010). *Sage handbook of mixed methods in social and behavioral research* (2nd ed.). Sage.
- Teresi, J. A., et al. (2022). Pilot studies and instrument development in social science research. *Research Methodology Review*, 18(2), 45–58.
- Togo, M., & Gandidzanwa, C. P. (2021). Education 5.0 and industrialisation in Zimbabwe: Implications for educational institutions. *Journal of Education and Development*, 5(2), 45–58.

- Togo, M., & Gandidzanwa, C. P. (2021). The role of Education 5.0 in accelerating the implementation of Sustainable Development Goals and challenges encountered at the University of Zimbabwe. *International Journal of Sustainability in Higher Education*, 22(7), 1520–1535. <https://doi.org/10.1108/IJSHE-05-2020-0158>
- UNESCO. (2017). *Education for sustainable development goals: Learning objectives*. UNESCO Publishing.
- UNESCO. (2019). *Futures of education: Learning to become*. UNESCO Publishing.
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations.
- Von Bertalanffy, L. (1968). *General system theory: Foundations, development, applications*. George Braziller.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Weber, M. (1947). *The theory of social and economic organization*. Oxford University Press.
- World Economic Forum. (2020). *The future of jobs report 2020*. World Economic Forum.

## Appendix 1: Research Questionnaire: Sustainability of School Productive Units

**Target Participants:** Students and Teachers

**Research Site:** Bindura District Secondary Schools

**Confidentiality Note:** All responses are anonymous and will be used for academic purposes only. Please do not write your name on this form.

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### Section A: Demographic Profile

Please tick (✓) the appropriate box.

1. **School:**  
Chipadze Chiwaridzo Chipindura Hermann Gmeiner
2. **Role:**  
Student (Current 2026) Teacher/HOD
3. **Primary Area of Involvement:**  
Agriculture/Poultry Textiles Metalwork/Workshop Other: \_\_\_\_\_

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### Section B: Effectiveness of "Productive Pedagogy"

Please rate the following statements on a scale of 1 to 5:

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

| Statement                                                                                  | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------------------------------------------------------------|---|---|---|---|---|
| 1. There is a clear link between classroom theory and practical workshop practice.         |   |   |   |   |   |
| 2. Working in the "Living Labs" (gardens/poultry units) has improved my vocational skills. |   |   |   |   |   |
| 3. The school projects are successfully transitioning from "learning" to "production."     |   |   |   |   |   |
| 4. Participation in productive units is a core part of the daily school schedule.          |   |   |   |   |   |

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### Section C: Resource Availability & "Death Valley" Challenges

Note: "Death Valley" refers to the phase where projects often fail (12–18 months).

| Statement                                                                          | 1 | 2 | 3 | 4 | 5 |
|------------------------------------------------------------------------------------|---|---|---|---|---|
| 5. Our school has adequate technical equipment to sustain production.              |   |   |   |   |   |
| 6. There is a consistent supply of raw materials (feed, seeds, etc.) for projects. |   |   |   |   |   |
| 7. Most school projects fail or decline after the first year of implementation.    |   |   |   |   |   |
| 8. Fluctuations in the local Bindura economy (mining/farming) impact our projects. |   |   |   |   |   |

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**Section D: Governance & Management**

| Statement                                                                           | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------------------------------------------------------|---|---|---|---|---|
| 9. The School Development Committee (SDC) provides enough financial support.        |   |   |   |   |   |
| 10. Financial records for productive units are transparent and well-managed.        |   |   |   |   |   |
| 11. Teachers and students are involved in the decision-making process for projects. |   |   |   |   |   |

**Section E: Open-Ended Insights**

1. In your opinion, what is the biggest reason school-based business units fail in this district?

- 
2. Suggest one way the school could make these projects more sustainable.
-

## **Appendix 2: Semi-Structured Interview Guide: School Heads**

### **I. Introduction & Warming Up**

1. Could you briefly describe the current "Productive Pedagogy" projects running in your school?
2. In your view, how does the Education 5.0 mandate align with your school's strategic vision?

### **II. The "Death Valley" Phenomenon**

3. Most school projects face a critical period 12 to 18 months after starting. Have you observed this "Death Valley" phase in your projects? If so, what did it look like?
4. What do you believe are the primary administrative "bottlenecks" that prevent a project from becoming self-sustaining?

### **III. Governance & Financial Management**

5. How would you describe the relationship between the School Development Committee (SDC) and the technical departments regarding financial governance?
6. What challenges do you face when trying to mobilize community or local resources for these productive units?

### **IV. Pedagogical vs. Productive Balance**

7. As the chief accounting officer, how do you manage the "symbiosis" between classroom theory and actual workshop or garden production?
8. To what extent do local economic factors in Bindura (like mining or agriculture) influence your management of these units?

### **V. Policy & Sustainability**

9. Can you describe any instances of "policy friction" where national mandates felt difficult to implement at the local school level?
10. If you had the power to change one aspect of how productive units are governed to ensure their survival, what would it be?

### **VI. Closing**

11. Is there anything else about your experience with school-based business units that we haven't covered today?

## **Appendix 3: Semi-Structured Interview Guide: Heads of Technical Departments**

### **I. Role & Project Overview**

1. Which specific "Living Labs" (e.g., poultry, horticulture, workshops) do you currently oversee?
2. How do you personally perceive the transition from a traditional "teacher" role to managing a "productive unit"?

### **II. Experiencing the "Death Valley" (12–18 Months)**

3. Reflecting on a project that struggled or failed, can you describe the moment you realized it was entering a "crisis" phase?
4. What specific resource gaps (tools, feed, seeds, expertise) usually emerge during that 12-to-18-month window?

### **III. The Symbiosis of Pedagogy and Production**

5. How do you balance the requirement for students to learn syllabus theory with the pressure to produce a profit for the school?
6. Can you share an example of how you've used the local Bindura environment (e.g., local farming techniques or mining equipment needs) to make your unit more relevant?

### **IV. Governance & Resource Friction**

7. Describe your experience requesting funds or materials from the School Development Committee (SDC). How does their financial oversight impact your daily operations?
8. When a project faces a technical setback (like a disease in the poultry unit or equipment breakdown), what is the process for recovery?

### **V. Essence of Sustainability**

9. In your "lived experience," what is the single most important factor that keeps a school project alive after the initial funding runs out?
10. What "unfiltered" advice would you give to another HOD starting a new productive unit to help them survive the first two years?

### **VI. Closing**

11. Are there any other challenges or successes in your department that you feel define the reality of Education 5.0?

#### Appendix 4: Structured Observation Schedule: School Productive Units

School Name: \_\_\_\_\_

Unit Observed: (e.g., Poultry, Garden, Workshop) \_\_\_\_\_

Date/Time: \_\_\_\_\_

| Observation Category                           | Specific Indicators to Record                                                                                             | Evidence / Field Notes | Condition Rating (1-5) |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|
| <b>1. Physical Assets &amp; Infrastructure</b> | State of specialized equipment (e.g., incubators, sewing machines, welding kits). Are they functional or dormant?         |                        |                        |
| <b>2. Resource Availability</b>                | Availability of consumables (e.g., stock feed, seeds, timber, fabric). Is there evidence of "resource scarcity"?          |                        |                        |
| <b>3. Pedagogical Integration</b>              | Presence of students. Are they performing "productive" tasks? Is there a visible link between the lesson and the project? |                        |                        |
| <b>4. Maintenance &amp; Sustainability</b>     | General upkeep of the site. Evidence of recent activity vs. signs of neglect (the "Death Valley" indicators).             |                        |                        |
| <b>5. Financial/Output Tracking</b>            | Presence of production logs, sales records, or inventory books within the unit.                                           |                        |                        |

#### Observation Protocol (The "Positivistic" Check)

- **Asset Utility:** Don't just list that a tool exists; record if it is actually being used or if it's gathering dust.
- **The "Symbiosis" Factor:** Look for visual cues of "Productive Pedagogy"—for example, are students using mathematical formulas to calculate feed ratios in the poultry unit?
- **Safety & Standards:** Note if the environment meets the technical standards required for that specific industry (e.g., biosecurity in poultry units).

## Appendix 5: Ethical Clearance

### RESEARCH ETHICS COMMITTEE



**P. Bag 1020**  
**BINDURA**, Zimbabwe  
Email : rid@buse.ac.zw

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### BINDURA UNIVERSITY OF SCIENCE EDUCATION [BUSE]

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**11 June 2026**

Fortunate C Kamphinda  
Bindura University of Science Education  
Graduate School of Business  
P. Bag 1020  
Bindura

Dear Fortunate C Kamphinda

**RE: INSTITUTIONAL RESEARCH COMMITTEE ETHICAL CLEARANCE-APPROVAL NUMBER:  
BUSEREC/0208/2026**

Your application for research ethical clearance related to the topic '**A framework towards enhancing sustainability and continuity of Productive units in line with Education 5.0. A case study of 4 High Schools in Bindura Urban District**' has been approved and allocated approval Number: **BUSEREC/0208/2026**. You are to quote this approval number for all correspondences inclusive of consent forms and any other documents as and when appropriate. The approval period is as stated below:

|                 |   |                                                    |
|-----------------|---|----------------------------------------------------|
| Type of Meeting | : | 19 <sup>th</sup> Research Ethics Committee meeting |
| Approval Date   | : | 11/06/2026                                         |
| Expiry date     | : | 10/06/2027                                         |

The project will automatically discontinue on the expiry date. You can apply for renewal three months before the expiry date. The renewal application should be accompanied by a progress report.

You are not expected to make any changes/adjustments to the protocol including the consent documents. Any trials involving drugs, devices and biologics require approval of the Medicines Control Authority of Zimbabwe before commencement. All problems to do with the safety of participants must be reported to BUSEREC within three (3) working days.

Upon termination of the study, a report has to be submitted to BUSEREC.

Yours sincerely

**BUSEREC CHAIRPERSON**