Doctoral (PhD) Dissertation

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Debrecen

2025

UNIVERSITY OF DEBRECEN

FACULTY OF ECONOMICS AND BUSINESS

DOCTORAL SCHOOL OF MANAGEMENT AND BUSINESS
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EXAMINE EMERGING LEADERSHIP COMPETENCIES AND TECHNOLOGY ACCEPTANCE: A STUDY OF SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs) IN THE UPPER EAST REGION, GHANA

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This dissertation aims to obtain a doctoral (PhD) degree in the scientific field of "Management and Business"

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LIST OF THE ACRONYM

CPS	Cyber-Physical Systems
EC	European Commission
ECR	European Committee of the Regions
Ee-CF	European e-Competence Framework
ESC	Economic and Social Council
FGN	Federal Government of Nigeria
GDDEP	Ghana Domestic Debt Exchange Programme
GEA	Ghana Enterprises Agency
GEC	Global Economic Crisis
GEPC	Ghana Export Promotion Council
GFZB	Ghana Free Zones Board
GRA	Ghana Revenue Authority
GSGDA	Ghana Shared Growth and Development Agenda
GSS	Ghana Statistical Service
GTP	Ghana Trade policy
ICA	Information and Communication Apps
ITC	International Trade Centre
ITIL	Information Technology Infrastructure Library
KSC	Knowledge, Skills, and Competencies
MOE	Ministry of Education
MSMEs	Micro, Small and Medium Enterprises
MTI	Ministry of Trade and Industry
NBSSI	National Board for Small-Scale Industries
OSMEP	Office of SMEs Promotion
PHC	Population and Housing Census
REP	Russian Economy Programme
RPA	Robotic Process Automation
TACIM	Technology Acceptance Competence Integration Model
TCIM	Technology Competence Integrated Model
TCP	Technological Competencies Profile

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INTRODUCTION

There has been a wide variety of literature on labour competencies and development, especially where the small and medium-sized enterprises (SMEs) and leadership roles in economic growth appear stronger and much appreciated in employment and poverty alleviation. It is confirmed that SMEs require up-to-date competencies to improve human relations, productivity and efficiency to reduce poverty (FUGAR et al., 2013). Small and medium-sized enterprises (SMEs) are economic activities that have no regulatory legal framework to check quality and standards for productivity and labour requirements (NIÑO-ZARAZÚA & SANTILLÁN-HERNÁNDEZ 2021). Ghana's youth unemployment rate of 5.5% is attributed to the continuous collapse of SMEs (GHANA STATISTICAL SERVICE, 2024). Governments in the past and current keep struggling to stabilize the situation. Regional ministers of many regimes of the sub-regions have announced numerous programs to eliminate economic suffering among the youth and the future generation, but they failed to achieve anticipated excellent results and expected signs of sustained growth and novelty (ABISUGA-OYEKUNLE et al., 2020). The government of Ghana, for instance, in 1983 implemented the Economic Recovering Program supervised by the World Bank and the International Monetary Fund (IMF) to turn around the economy (OPOKU, 2016). Besides, the recent Debt Exchange Programme launched in 2022 is intended to meet the IMF bailout conditionality to ease the economic hardship of Ghanaians.

Most people in the Upper East Region of Ghana live under the international poverty line of US$1.90 per day (GHANA STATISTICAL SERVICE, 2021). The economic uncertainty in the region is attributed to low productivity which often leads to the continuous closure of businesses and has aggravated unemployment in the region and the country as a whole. The lack of leadership competencies and the inability of SMEs to stay long in business to complement government efforts in solving the problem of unemployment have become a major concern to everyone in the region and Ghana at large. This is manifested since many people living in the Upper East Region, one of the deprived regions in Ghana cannot have three daily square meals and access to quality health services and education (OPOKU, 2016). Figure 1 depicts the absolute locations of the Upper East Region, its municipalities and districts. The region has two tropical climatic seasons, namely the rainy season (April – November) and the dry season (December – March).

Figure 1: Upper East Region Districts and Municipalities Map

Source: GHANA STATISTICAL SERVICE (2021)

The region is endowed with natural resources such as sand, clay and rock deposits which are extracted for various purposes like construction and ceramic. There are also some deposits of gold and pockets of small-scale manual quarrying activities in some parts of the districts. The people are also involved in food processing, notably among them are ground nuts, Shea nuts and *Dawa Dawa*. Handicraft works like basket weaving and leather work are some other Economic activities in the region. According to the GHANA STATISTICAL SERVICE (2021). The region shares boundaries with Burkina Faso to the north, Togo to the east, the Upper West Region to the west, and the North-East Region to the south suggesting it has diverse economic opportunities (Figure 1).

1. INTRODUCTION OF THE TOPICS AND OBJECTIVE

The rate at which technology advances, according to the experts, has reached a stage where everything is virtually affected by its influence. Access to knowledge of the relationship between leadership competency development and technology enablers for corporate sustainability is an essential component of the current technology-driven economy. The Internet of Things emerges with dimensions of integration involving the pressures to change existing processes and competencies. However, most SMEs in Ghana do not often receive mandatory continual skill development as a requirement to improve their existing knowledge and skills (OPOKU, 2016). The development of important skills and knowledge improves productivity, better working conditions, and the promotion of decent work in the informal economy (FUGAR, et al., 2013) where firms will have access to information and valuable economic opportunities to enhance business growth (ILO, 2002). These essential skills and knowledge acquired enable people to get information about innovative tools, markets, and raw materials relevant to the development, sustainability, and expansion of businesses (MUSA et al., 2014). Companies today are faced with changes and functions under various complications which require the right worker at the right job with the right qualifications and experience to survive the competition (ROHAN & MADHUMITA, 2012). Small and Medium-sized Enterprises (SMEs) in many developing economies are not immune to these changes. Most especially, globalization has led to vigorous foreign competition among businesses, posing a significant challenge to SMEs within emerging economies (GONDA et al., 2020). SMEs, therefore, need a sustained reformation to remain competent and competitive (GONDA et al., 2020).

Moreover, managers and employees ought to have sufficient knowledge of the emerging technology-enabled competencies. Organizations that desire to recruit employees with the right competencies and skills to work through these technologies must be motivated to give appropriate support from top management. These technologies require interrelated competencies and specific problem-solving skills. The employees must be active learners, flexible and trained in the digital emerging technologies so that they can survive the shifting competencies and skills requirements of the business environment resulting from technologies. These technologies present the business communities with a change of direction and the trend will continue into the foreseeable future. Technology has come to stay such that countries can no longer take absolute advantage of their

locations and environmental characteristics. Countries are not only identified by their natural resources as they were but also by their talents and innovative abilities. Developing countries may still have a common issue regarding industrialization as they struggle to generate sufficient income to satisfy the basic demands of their citizens. Their desire to attain the status of middle-income countries (MICs) is evident. Nonetheless, regional integration demonstrates economic emancipation among nations irrespective of their locations. Therefore, the traditional skills and competency (literacy and numeracy) required for SME operations are no longer sufficient to keep up with the pace of change since SMEs in the Upper Region East perform poorly leading to a high poverty rate coupled with high unemployment rates among the youth.

There has been a wide variety of literature on African labour, especially the informal worker. These findings seem not to solve the problem of low productivity and joblessness, because there is still acute poverty coupled with an unprecedented increase in crime, alcoholism and illegal gold miners locally called Galamseyers, the most destructive venture in Ghana today. However, the private businesses and leadership roles in economic growth appear stronger and much appreciated in poverty alleviation. Leadership competencies have become a fundamental and effective instrument in the successful accomplishment of goals and objectives for a sustainable organization in this technological era (KONINGS & VANORMELINGEN, 2009) while poor access to networks and inefficient training point to the failure of SMEs in developing economies (MEYER et al., 2018). AKPAMAH and MATKÓ (2022) research on ICT applications in SME development confirmed that 61.5% of employees of public and private organizations within the most deprived regions in Ghana had not owned and used a computer at home and in the workplace. They, however, failed to link technology to competence development for sustainable SME development. This survey bridges the gap by finding out the effects of managerial leadership as a moderator of technology and competencies incorporation and socioeconomic benefits regarding perceived usefulness, perceived ease of use, attitude and behavioural intentions. The study fills the void as it finds out the impact of managerial leadership on technology and competencies integration for sustainable SMEs.

Study Aims and Objectives

The inability of SMEs to meet their core value of providing jobs to transform the economy is a major concern in less developed countries like Ghana. A study that highlights appropriate leadership competencies which every firm would want to adopt and work with is worth researching. It provides information on individual market value as it focuses on the worker's attitude and self-efficacy concerning the performance and competencies of the workforce. The study specifically sought to ascertain how emerging leadership competencies and technology acceptance in management enable SME sustainability. The study advances the technology acceptance model (TAM) to elucidate the unified nature of technology and competencies. This research explains the relationships between technology and SME leadership competencies requirements for sustainable growth and development. The investigation is crucial to business organizations as it examines the emerging competencies' compatibility with technology acceptance in the management of SMEs. The study specifically seeks to

1. Assess leadership and support dynamics' influence on leadership competencies.
2. Evaluate required competence for SME leadership behaviour.
3. Explore managerial leadership as a moderator of competence development and technology acceptance.
4. Examine the relationships of strategy development indicators.
5. Evaluate potential prospects of technologically integrated competencies.
6. Design a model that combines competencies and technology for SME leaders.

Research Questions

This study finds out to what extent SME competencies are integrated into technology to achieve business growth and sustainability in the Upper East Region of Ghana. The study answers the following specific questions.

1. What are the impacts of leadership and support dynamics on SME competence development?
2. What are the required competencies for SME leadership behaviour?

3. To what extent does managerial leadership moderate competence and technology acceptance?
4. What are the relationships between strategy development indicators
5. What are the potential prospects of technologically integrated competencies?
6. What model is recommended for competence and technology integration?

Contribution to Knowledge

It is obvious SMEs help governments accomplish their objective of providing jobs for the jobless thereby reducing the economic hardship among the citizens. These businesses can primarily be described as social interventions as the minority groups are the most involved in the business. The scientific relevance of this study cannot be overemphasised since the outcome of the study contributes substantial new knowledge of SME competencies development needs to the database of business and management studies. The results of this study present a proposal that supports technology application and encourages SME leadership and government strategies for SMEs' continuous development. Successful completion of the research is expected to add to the intellectual discourse on the changing trends of management science. The study emphasizes the importance of technology adoption on leadership competencies for SME sustainability.

The study provides empirical data for managers to view the effects of emerging technologies on leadership competencies and SME sustainability as interpretive for change in organizational settings. The results bring about an understanding of management thinking of principles underlying the process of management, the nature of management, organizational behaviour and why attention should be given to emerging technologies and their effects on leadership competencies and SMEs' sustainability in the informal sector. Besides, public and private organizations recognizing talent development boundaries may either adopt the results for implementation or improve upon their existing human resource development strategies to enable labour efficiency and high productivity. The individuals who identify their weaknesses by the results will make a fanciful effort to survive the 21st-century business environment.

The study highlights how SMEs could take advantage of the Internet of Things to achieve satisfactory performance and survive 'the Era of Cyber-Physical Systems', which is a collection of physical and computer components integrated to operate a process safely and efficiently.

Policymakers use the findings to make informed decisions on education and training programs to ensure that individuals have the necessary skills and competencies for success in the technology-driven economy. The study highlights an improvement in SMEs leadership as they form the pivot that the human capital revolves. The study provides new knowledge on companies' limitations to acquiring competencies development needs and is added to the database of management studies. Therefore, the recommendation to increase technological skills training and competence development for SME leadership in developing regions is accurate as the behaviour of the employees is influenced by attitude and leadership.

2. LITERATURE REVIEW

Much emphasis is placed on statistics on SME competencies and technology acceptance, opportunities that technology presents to SME management, and the connections between competencies development and technology. Technology-competence integration is associated with many factors and requirements to succeed. The literature captured in this study does not centre only on the study's objectives but covers the relevant-related previous studies in which cases are embedded in the study's main purpose. SMEs created numerous jobs solving over eighty per cent of economic hardship among people in less developed countries in the past but need technological empowerment and a vibrant poverty alleviation policy to match the current trend of business (ABISUGA-OYEKUNLE et al., 2020). The administrators of these enterprises are projected to change the fortunes of the organizations through leadership and competencies (MBUYISA & LEONARD, 2017) because advancement in technology demands a change in the leadership competencies requirements for organizations to succeed. Corporate organizations continue to exist for long after their establishment can only be determined by the skills and competencies of the management and general workforce (AKPAMAH, 2019). Moreover, the model of business operations is continuously evolving due to the emergence of new technologies, changing customer preferences, and global market dynamics (LAVERNE et al., 2019).

2.1. Small and Medium-Sized Enterprises in Ghana

Entrepreneurship and small and medium-sized enterprises (SMEs) have always been associated with the success stories of advanced economies and are considered key drivers of economic growth and development in developing countries (TRIPOPSAKUL, 2018). The behavioural approach explains SME as an economic activity that has no formal record in the official statistics while the definitional approach describes the SME as a sector based on whether the activity complies with the established judicial, regulatory, and institutional framework or not (OPOKU, 2016). These are enterprises that do not have a formal arrangement and legal backing (MBUYISA & LEONARD, 2017) but are particularly important in every economy. The UNDESA (2021) defined the SME as an informal sector ec2.onomic unit that produces commodities primarily for profit, where the products cannot be differentiated from household consumption and commercial intent, have no formal arrangement, and lack legal backing and recognition as a producer of the products. Small

and medium-sized enterprises (SMEs) have been described by the OECD (2018) as all economic activities that individuals or economic units perform either in law or in practice, though partially shrouded or have no formal arrangements. Until a review of the statistical standards on informality is done and a comprehensive framework to relate different statistical concepts and components about the meaning of informality, the informal economy has no common and perfect definition (ECONOMIC AND SOCIAL COUNCIL, 2021). The EUROPEAN COMMITTEE OF THE REGIONS (2019) explains the informal economy relative to the numerical strength of the workforce, annual turnover and the statement of the financial position of the firm whereas the numerous enterprises that play a substantial role in the Belgian economy with an employee numbering fifty are considered SMEs (OECD, 2011). As a common and accepted definition of SMEs has still not been established, they are defined and classified based on the number of employees, firm turnover, and value of assets (EUROPEAN COMMISSION, 2005; FEDERAL GOVERNMENT OF NIGERIA, 2013). However, a common understanding in the EU of the definition of SMEs is that they are enterprises which employ fewer than 250 persons with an annual turnover not exceeding 50 million euros, and/or an annual balance sheet total not exceeding 43 million euros (CHAS-OVSCHI et al., 2021) as demonstrated in Table 1.

Table 1: Classification of Micro, Small and Medium Size Enterprises

Size of Firm	Employees	Turnover (EUR)	Annual Balance Sheet (EUR)
Micro	<10	≤2m	≤2m
Small	<50	≤10m	≤10m
Medium	<250	≤50m	≤43m

Source: European Committee of the Region (2019)

However, there was absolute agreement at the twentieth Conference, in 2018, that the International Labour Organization (ILO) constitutes a working group to develop a coherent set of standards for presentation and discussion at the twenty-first Conference, in 2023. *"The new standards will draw from existing definitions and country practices and be aligned to the most recent statistical standards for measuring work, contributing to increasing global coverage and harmonization"* (ECONOMIC AND SOCIAL COUNCIL, 2021 p.3). The DESA (2021) further categorized

economies into formal, informal, and household own-use and community sectors as shown in Figure 2.

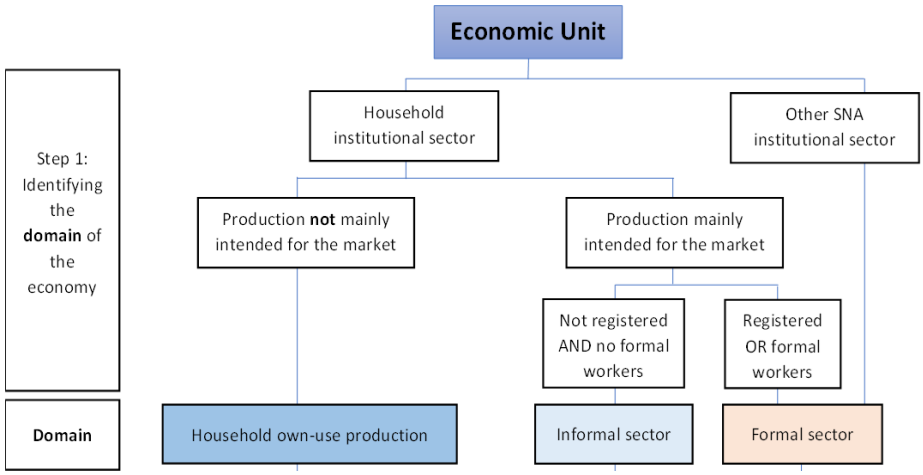

Figure 2: Forms of Informal Economy

Source: STATISTICS DIVISION DESA (2021)

Both registered and unregistered SMEs in Ghana are regarded as an informal economy creating numerous employment opportunities in cities and remote communities. Micro, small and medium enterprises (MSMEs) over the years functioned as the engines of growth, particularly the unindustrialized economies where SMEs stimulate job creation, local entrepreneurship, and income generation to alleviate poverty (AKPAMAH, 2019).

These private entities significantly reduce poverty rates and are the main contributors to economic development (HARVIE, 2008). Small and medium-sized enterprises (SMEs) are considered an integral part of the continuously growing economies all over the world. They are an integral part of Ghana's economy, promoting development throughout various sectors of the economy, and generating employment for vulnerable groups, including women, youth, and low-skilled workers in the remotest communities (MINISTRY OF TRADE AND INDUSTRY, 2019). The major forms of informal sector activities can be categorized under two broad sectors, namely: the rural informal sector and the urban informal sector (INTERNATIONAL TRADE CENTRE, 2016). The rural informal sector economy is identified with the agricultural activities which are predominantly rural folks whose lives are largely dependent on farming activities and their source of labour are family members and farming cooperative groups (INTERNATIONAL TRADE CENTRE, 2016). In rural

Ghana, informal sector work involves 75% agriculture, that is fishing and fish processing, and agro-based processing (GHANA STATISTICAL SERVICE, 2015). Agriculture provides massive employment but contributes little to the Gross Domestic Product (GHANA STATISTICAL SERVICE, 2015). The urban informal sector activities are economic activities carried out by people in towns and cities in Ghana just as it is done elsewhere in Africa (OPOKU, 2016). The urban informal sector economic activities are grouped under three sub-headings: services, construction, and manufacturing (INTERNATIONAL TRADE CENTRE, 2016). The artisans and the rural informal sector with mainly agricultural activities formed the majority of small and medium-sized enterprises (SMEs) in the Upper East Region, their inability to acquire the requisite competencies has led to a high unemployment rate, a vicious cycle of poverty, rural-urban migration, conflict, and immorality, among others in the region (AKPAMAH et al., 2023). SMEs are further categorized by sectors, kinds and activities (GHANA STATISTICAL SERVICE, 2021) but are not only limited to the demonstration in Table 2.

Table 2: Organizations and Classification

Sector	Kind of SMEs	Activities/ Purpose
Agriculture	Beverages and food products, Wearing apparel, Leather and animal-related products and Wood products (Furniture).	Crop and animal production and related activities. Growing crops, raising and breeding animals.
Manufacturing	Manufacture of basic metals and artefacts	Transformation of raw materials from agricultural and mineral into finished products, Craftworks,
Other services and activities	Repair of computers and personal and household goods. Repair and alteration of clothing, weaving. Hair washing and similar activities (hairdressing and barbering). Repairs of bicycles, motorbikes, vehicles, etc. Food and beverage service activities.	Repairs, alteration and maintenance. The provision of food and services.

Source: GHANA STATISTICAL SERVICE (2021)

SMEs are very effective in bringing the deprived closer to the affluent (MBUYISA & LEONARD, 2017). Small and medium-sized enterprises (SMEs) are the income-generating entities and avenues of employment that need protection and support to enable them to contribute significantly to the GDP (RUKSANA et al., 2021; MINISTRY OF TRADE AND INDUSTRY, 2019).SMEs are sources of income stability, economic growth, and employment, they play a significant role in regional development, poverty alleviation and economic empowerment for minority groups in any given society (HARVIE, 2008). The economy of many developing countries is characterized by both a relatively small scale of production and an extensive informal sector (UNESCO, 2007). The contribution of SMEs to the economies of undeveloped countries has been instrumental in the lives of individuals' growth and development. Small and medium-sized enterprises (SMEs) are an essential catalyst for growth and development in less developed countries (OPOKU, 2016).

The importance of the informal economy to developed and emerging economies cannot be over-emphasized since nations provide regular information about informal employment as required by the 2030 Agenda for Sustainable Development 8.3.1 (ECONOMIC AND SOCIAL COUNCIL, 2021). This is to enable the achievement of Sustainable Development Goal 8 "*to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all"* (ECONOMIC AND SOCIAL COUNCIL, 2021). The informal economy contributes substantially to economies around the world and represents at least 90% of local businesses and rural development (EPEDE & WANG, 2022; DURST & BRUNS, 2018). The sector contributes to national wealth and creates access to employment. Small and medium-sized enterprises (SMEs) provide over 80% of jobs and employ 90% of the people worldwide (HARVIE, 2008). They are the primary source of domestic employment, providing over 50% of private output, approximately 70% of employment, and 90% of businesses in developed and undeveloped economies (MINISTRY OF TRADE AND INDUSTRY, 2019).

Similarly, SMEs are considered crucial in the market economy in Thailand, as they support the fundamental improvements in the domains of the country's economic growth and development (INTAWONG & PURITAT, 2021). The government set up the Office of SMEs Promotion (OSMEP) to oversee the promotion and support of SMEs in Thailand with the key responsibility of providing academic training and assistance to every entrepreneur and employee to ensure competencies and digital skills for competition at both domestic and national levels (INTAWONG

& PURITAT, 2021). The SME creates two-thirds of private-sector jobs and half of the total added value created in the European Union (GONDA et al., 2020). LEEK (2016) confirms that SMEs contribute to substantial economic development to the Republic of Korea's economy, they account for about 99% of all enterprises, 88% of employment, and almost half of total outputs and exports. SMEs ensure prosperity, and social stability, influence the competitiveness and employment rate in Europe by encouraging entrepreneurial spirit and innovations and have become a focus of the European Union's policy (LABUDOVÁ & JÁNOŠOVÁ, 2019). The significance of small and medium-sized enterprises cut across nations cannot be underestimated, they offered over 14 million employment opportunities to Kenyans and accounted for 24.6% of the country's national output in 2015 (REPUBLIC OF KENYA, 2016).

2.2 Ghana's Policies on SME and Trade Across Boards

The National Board for Small Scale Industries (NBSSI) by an Act of Parliament (MINISTRY OF TRADE AND INDUSTRY, 2019) Act 434 was set up in 1981 by the government of Ghana and became operational in 1985. The Act brings together all Ghanaian-owned enterprises, that is the Small and Medium-size Enterprises (SMEs) under one umbrella, the NBSSI, for holistic support initiatives in Ghana (MINISTRY OF TRADE AND INDUSTRY, 2019). However, the Ghana Enterprises Agency (GEA) Act, 2020, (Act 1043) repeals the National Board for Small Scale Industries (NBSSI) Act, 1981 (MINISTRY OF TRADE AND INDUSTRY, 2019). The rename of NBSSI to GEA has also led to minor changes in small and medium-sized enterprises (SMEs) to Micro, Small and Medium Enterprises (MSMEs) in Ghana (MINISTRY OF TRADE AND INDUSTRY, 2019), while some nations consider these forms of enterprises SMEs. Therefore, MSMEs or SMEs mean the same when used in this paper. Irrespective of the efforts that various governments in countries undergoing transition put up to enable economic growth and development through SMEs seem deteriorating. It is rather unfortunate since the establishment of NBSSI in 1981, Ghana has had no specific SME development policy until the Ghana Enterprises Agency (GEA) Policy, Ghana - January 2019 (MINISTRY OF TRADE AND INDUSTRY, 2019).

Policies relating to SME development were enshrined in other government policy documents such as Ghana Shared Growth and Development Agenda (2014-2018), and SMEs were considered a sub-sector within the Ministry of Trade and Industries (MOTI) Private Sector Development

Strategy which was skewed towards Small, Medium and Large Enterprises (MINISTRY OF TRADE AND INDUSTRY, 2019). Ghana never had a common national definition for MSMEs and lacks comprehensive data and information on MSME establishments since the operationalization of NBSSI Act 434 in 1985 (MINISTRY OF TRADE AND INDUSTRY, 2019). However, MSMEs in Ghana are classified based on size and capital (MINISTRY OF TRADE AND INDUSTRY, 2019).

SMEs in Ghana face vigorous foreign competition which poses a great challenge to their businesses and need a policy for protection (GONDA et al., 2020). “With the deepening trend in globalization and economic integration, the MSME sector is not merely a sector for protection and promotion, but more importantly as a driving force for growth and development” (MINISTRY OF TRADE AND INDUSTRY, 2019). The 4th Industrial Revolution is positioned to radically transform the 21st-century global informal sector economy (MEYER et al., 2018). Small and medium-sized enterprises (SMEs) need a policy for sustained reformation to remain competent and competitive in business because they are not just simply an economic sector that needs protection and promotion, but a driving force for growth and development (MINISTRY OF TRADE AND INDUSTRY, 2019). The SMEs need a competency development policy for a continuous update of knowledge to align with the changing business environment (BARTRAM et al., 2002). More importantly, SMEs dominate the business environment and are considered the backbone of the global economy accounting for over 50% of private output, approximately 70% of employment and 90% of businesses in Ghana (MINISTRY OF TRADE AND INDUSTRY, 2019).

Ghana a founding member of the ECOWAS signed a treaty in May 1975 to provide for trade and investment liberalization among members (GHANA TRADE POLICY, 1992). In the treaty, non-tariff barriers: licences, quotas, prohibitions, and administrative barriers be eliminated on all goods originating within ECOWAS (GHANA TRADE POLICY, 1992). The 1992 Trade Policy provides Trade and Industry among others the principal agencies in charge of trade policy formulation and implementation (GHANA TRADE POLICY, 1992). The Ghana Export Promotion Council and the Ghana Free Zones Board are some of the specific statutory authorities and agencies that provide trade-related functions (GHANA TRADE POLICY, 1992).

Ghana promotes and supports SMEs as a policy to create an enabling environment for high productivity and competitive private enterprises across the country (GHANA TRADE POLICY, 1992). Attracting Foreign Direct Investment (FDI) is an integral part of the Ghana government's market-opening measures and efforts to promote economic growth. The growth is based on establishing an open and liberal market economy to encourage private investment, both foreign and domestic (GHANA TRADE POLICY, 1992). However, the legislation reserves a few activities for Ghanaians such as petty trading, operation of taxi services (except when a non-Ghanaian has a minimum fleet of ten vehicles), pool betting businesses, lotteries (except soccer pools), beauty salons, and barber shops (GHANA TRADE POLICY, 1992). Non-Ghanaians are not allowed to engage in small-scale mining. However, the laws recognize the right of foreign and domestic private entities to own and operate business enterprises. Entrepreneurs, irrespective of nationality, can establish a business in Ghana under the provisions of the Companies Code (1963), the Partnership Act (1962), and the Business Name Act (1962) (GHANA TRADE POLICY, 1992). KAZAR & KAZAR (2016) argue that economic integration emerged in the developed countries before World War I and advanced faster immediately after World War II through multilateral trade negotiations, development in transport and communications, technology transfer and denationalization while THI HONG (2017) posits that the third world countries had experience in world economic integration only three decades ago.

Economic integration is dependent on the trade policies that a nation formulates and implements often determining its future economic status. A trade policy associated with undesirable fiscal policies such as trade restriction results in a non-globalized economy, whereas trade liberalization and openness lead to a globalized economy. The nation’s anti-technological policies result in economic stagnation while the formulation and implementation of IT policies lead to industrialization as demonstrated in Figure 3.

Globalization in the context of economic integration is measured by a comparison of two countries in which one is globalized whereas the other is not, using cross-country regression which includes various indicators to measure the ratio of trade to GDP (RODRIGUEZ & RODRIK, 2000). The impact of globalization is not the same everywhere based on the local conditions and trade policies of the individual country (RAVALLION, 2001).

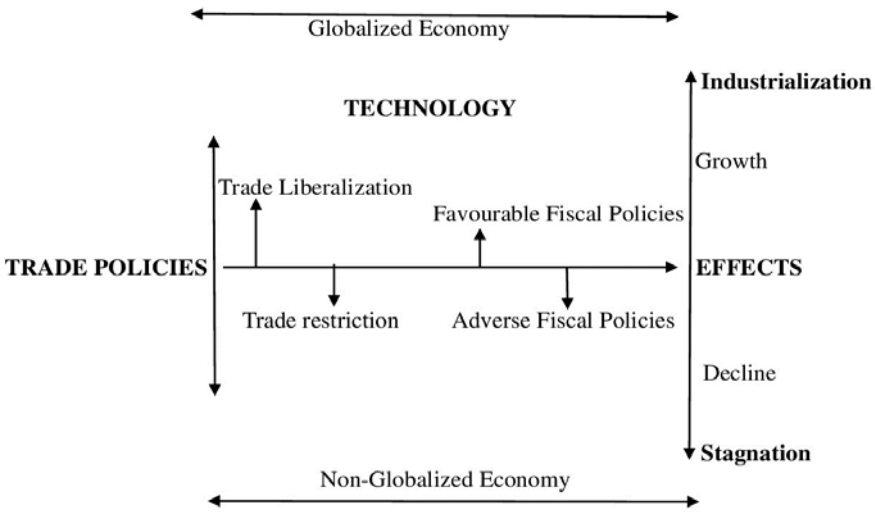

Figure 3: Effect of Technology on Trade Policies

Source: Author's Creation

The impact of economic integration and multinational trade has both positive and negative on SME employment and the social environment (MARILYN et al., 2000). Some individuals and traders found jobs and markets respectively, whilst others lost their employment and business through internationalization (PAVLOS & NIKOLAOS, 2014: MARILYN et al., 2000). Multicultural bridges the gap between different socio-cultural backgrounds giving people the opportunities to have exposure beyond their borders (OCAMPO & MARTIN, 2003). The world's economy integrates through movements of goods and services, capital, technology, and labour leading to joined economic decisions and prosperities of nations (JENKINS, 2004). Trade liberalization brings about economic integration and greater international competition driven by information technology allowing a substantial modification of production and distribution processes (MARILYN et al., 2000: THALASSINOS, 2008) because the global value-chain, labour, production, and distribution processes resulted in assorted commodities from different nations linked up.

The general cost of production, accessibility, resource availability and new knowledge are positively influenced by internationalization (BROUTHERS et al., 2018). SMEs operating in external markets can reduce the number of assets needed for operation in international markets, commercial activities are remotely managed, and the cost of location is significantly or virtually absent since people can operate from home (AUTIO & ZANDER, 2016). Trans-national fuels

trade liberation and serve as economic openness for national economies to flourish (JENKINS, 2004). Multinational has led to the rapid economic growth of China and Vietnam, integrated globally which opened their economies and drastically reduced the unemployment rates (JENKINS, 2004). Moreover, the benefits of trade liberalization are amazing since globalized countries can share knowledge, migrate, and move capital and investment across borders with minimal or no restrictions (KHAN et al., 2011). Economic integration promotes competition through foreign firms and creates income-earning opportunities for the unemployed (ZEB & QIANG, 2014: KOÇ, et al., 2013). Multinational trade increases economic growth to generate employment through technology transfers, and skills acquisition and increases labour requirements (KILIC, 2015). Regions integrate foreign direct investment, technological advancement, international trade, trade openness and labour flow are components of globalization that play important roles in economic growth and development (KHAN et al, 2011; DOLLAR, 2021). Nations capitalize on their comparative advantage to increase total output and improve the people's standard of living through international trade (ADAK, 2015).

Global trade speeds up movements of capital and technology transfers which translate into economic growth and wealth in developing countries (SIDDIQA et al., 2018). "*In terms of access to new technologies, as in the area of trade and financing, globalization offers developing countries ample opportunity to integrate themselves more fully into the world economy"* (OCAMPO & MARTIN, 2003 p12). Intercontinental trade not only sustains comprehensive economic growth but also leads to employment prospects with positive technological policies (BACCHETTA, 2009). The success of an informal enterprise is often traced to prudent management of the economy, and the joined of political, social, and technological policies with other positive environmental factors (CEPEL et al., 2018).

However, economic integration has still not gained grounds in some regions of third-world countries, because firms and individuals overestimated the potential of technology to render people redundant (HERVÉ et al. 2020: PAVLOS & NIKOLAOS, 2014), although the inability of a firm to adopt a database management system (DBMS) to enable efficient management and data integration might not operate beyond five years of its establishment as the world rotates on orbits of digitalization (AKPAMAH & MATKÓ, 2021). MUCUK and DEMIRSEL (2013) confirm that unemployment increased in Turkey and Argentina through internationalization between 1981 and

2009 but declined in Thailand within the same period. MILANOVIC (2003) states that in the 1960s and 1970s, the world economy and most countries performed far better without regional integration, and transnational even made some countries worse off. Economic integration and competition are associated with a fundamental restructuring of the economy widening the gap between market relations in various countries.

HERVÉET et al. (2020) argue that internationalization is connected to vigorous global competition, and cybercrime and lacks legal instruments for the protection of vulnerable regions and infant industries. MARILYN et al. (2000) claim that small businesses, family firms, individual producers, micro-entrepreneurs, and own-account operators cannot compete with giant companies and are more vulnerable to economic integration. JENKINS (2004) posits that economic incorporation brings about the marginalization of deprived regions and increases international inequality. With globalization, the theoretical model constructed did not take into consideration the poor thereby increasing the marginalization of the underprivileged (MBUYISA & LEONARD, 2017). The decisions on issues affecting the people in developing regions are made in international fora without the possibility of them being represented and having their voices heard (JENKINS, 2004).

PORTES et al. (1989) maintain that the SME is incompatible with economic growth and industrialization, an economically integrated economy leads to self-employment, casual labour markets and subcontracting against union contracts which appear to be a central characteristic of current economic trends of the globalized economies. A globalized economy exposes vulnerable groups to external shocks with more harm to the poor (MBUYISA & LEONARD, 2017). Besides, communication media has strongly undermined norms and cultural diversity in pursuit of the economic unification of member states (OCAMPO & MARTIN, 2003). The people feel that their unique histories and cultural values might be lost as technology gradually weakens the ethical fibre that puts them together (OCAMPO & MARTIN, 2003).

2.3 SME Digitalization

The intensification of e-commerce is evidenced by Micro, Small and Medium-sized Enterprises (MSME) determination to achieve integration, digitalization, and economic collaboration within and beyond borders (KLEIN & TODESCO, 2021). Small and Medium-sized Enterprises'

digitalization involves the process of implementing and incorporating digital technologies into operations, productions, services and business models to enhance efficiency, customer relationships, competitiveness and innovation (SHEVYAKOVA et al., 2021). The presence of 4.0 is strongly felt by economists and sociologists as a systematic approach to the formation of robust economies and political associations of nations (ŚLUSARCZYK et al., 2020). The national programme of the organized digital economy of Germany in 2012 and the Russian economy programme of 2016 are significant as these marked the official acceptances of Industry 4.0 (SHEVYAKOVA et al., 2021). It has become obligatory for organizational heads to supervise the organizations through digitization so long as they apply technology applications in their daily activities with their subordinates (HÅKANSSON-LINDQVIST & PETTERSON, 2019). Information and communication apps such as Facebook, Instagram, Zoom, Webex, and WhatsApp have become useful digital media and preferred platforms in every organization (DELACK, 2022). The struggle of firms to remain in operation to achieve sustainability ambitions indicates the zeal for sustainable transformation (KURUCZ et al., 2016). The elements of organizational sustainability include financial discipline, sustained high productivity, and a continuous customer-healthy relationship (MATKÓ, 2018). Sustainability fails where there is poor attention and neglect of innovation and where there is no IT-aided design of business models contribute to the short lifeline of organizations, especially micro, small, and medium-sized enterprises (SCHALTEGGER et al., 2016).

The connection of innovation and technologies to corporate financial sustainability became a tropical issue (PALMER, 2014) emphasizing redefining fiscal policies and designing monetary measures to establish technological sustainable development strategies for industries (ASONUMA et al., 2017). ZABOLOTNYY and WASILEWSKI (2019) posit that SME financial sustainability is the ability to generate value for owners and remain firm in business. Financial sustainability embodies a few monetary variables that constitute a framework for higher fiscal sustainability and connect value with business stability (ZABOLOTNYY & WASILEWSKI, 2019). Financial business goals generally include both monetary and non-monetary components in which the non-monetary component illustrates the SMART goal-setting method (Specific, Measurable, Achievable, Realistic and Timely) as the means to achieve the monetary objective (MATKÓ, 2018). DELAS et al. (2015) explain financial sustainability as the viability, stability and security

associated with a given SME which are signals of the firm's innovative policies on IT application. Companies are described as financially stable as they pay off both short-term and long-term liabilities within a given period (MY´SKOVÁ & HÁJEK 2017). Financially stable SMEs have been associated with technologically integrated momentary policies and innovative mindset (AKPAMAH & MATKÓ, 2021).

The application of technology in daily transactions sets productivity and efficiency as a benchmark for firms and poverty alleviation agencies (JAYAMAHA & MULA, 2011). For SMEs where one output is produced with a single input, the productivity level is determined by the ratio of output to input (ROGERS, 1998). In large organizations where multiple outputs are applied for various inputs, productivity and efficiency, and the levels of decision-making units (DMUs) are not consistent (DIEWERT, 1992). In general, productivity and efficiency are either determined by a 'partial' factor or a 'total' factor basis (COELLI, RAO et al., 1998) shown in Figure 4.

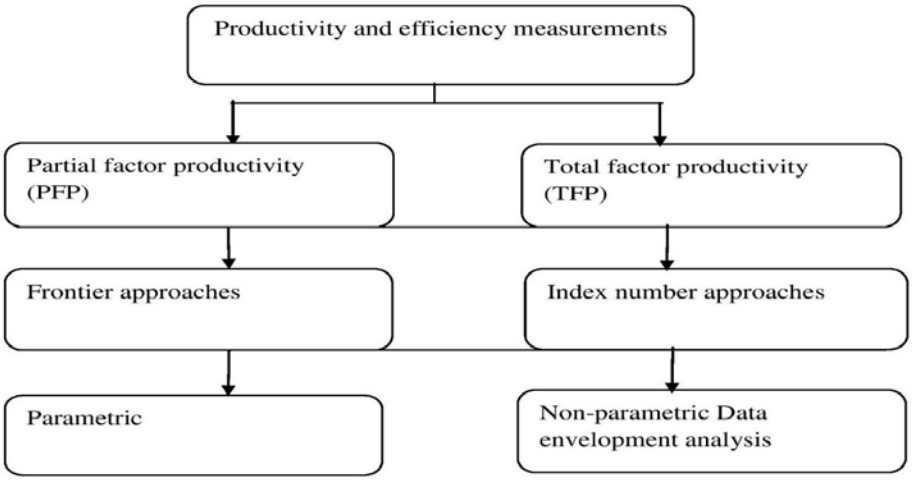

Figure 4: Approaches to Measurement of Productivity and Efficiency

Source: JAYAMAHA & MULA (2011)

Partial factor productivity (PFP) is a change that occurs in output resulting from a change in the quantity of input, whilst total factor productivity (TFP) is a change that occurs in output due to changes in the number of multiple inputs (ROGERS, 1998). According to COELLI, RAO et al. (1998), the index number approach applies all inputs and outputs to achieve a single index whereas the production frontier approach (PFA) approach deploys during the estimation of productivity and efficiency. The parametric approach practically deals with specific and restrictive data whilst

the non-parametric approach emphasizes unclear data and assumptions often related to stakeholder patronage (FRIED, LOVELL et al., 1993). Changes and developments in information and communication technologies have led to a sustained competitive stakeholder analysis (CINNIOĞLU, 2018). Organizational development and sustainability have become an integrated management approach to the current business landscape (CINNIOĞLU, 2018). The value of the classical management approach has dropped, and businesses are considered mechanical organizational structures where the human element is evaluated as a cost factor (CINNIOĞLU, 2018). Hence, the stakeholder salience model concept of analysis emerging as more critical than ever before, and human resources have been considered an essential cost element in the era of Industry 4.0.

MITCHELL et al. (1997) explain stakeholder salience as the importance a firm gives to its stakeholders and their priorities when making decisions and executing work. The stakeholder salience model was introduced by MITCHELL et al. (1997) positioned the definitive Stakeholder (customer) in the centre of a Venn diagram. This illustrates possessing power, legitimacy, and urgency making the customer capable of disestablishing the operations of the organization in the event of organizational failure to meet their demand while digitization appears the most appropriate tool for change in this development and for improved operational efficiency in any given economy. Technologies sharpen SMEs' ability to strategically improve performance to remain in business (VRONTIS et al., 2022). Digital technologies are potential stoppers of external shortcomings and present better business models to enable the attainment of organizational goals (VRONTIS et al., 2022). SMEs' frequent challenges at the point of the start of operations are reduced on the back of technologies because constraints such as absolute business location and personal contact with customers are eliminated (AKPAMAH & MATKÓ, 2021). These organizations are often associated with lean management supported by information and communication applications (VRONTIS et al., 2022). An appreciation of the Internet of Things and intellectual assessment of these technologies reveal how modernization supports the economic growth of developing countries by creating value and employment for the unemployed through SMEs (LAVERNE et al., 2019).

2.4 SME Leadership

Small and medium-sized enterprises (SMEs) leadership competency development appear essential and Key to corporate sustainability (AKPAMAH & MATKÓ, 2021). The SME is an unstructured small-scale enterprise with little skills or knowledge. The proprietors or leaders of SMEs play a significant role in managing organizations' scarce resources. These leaders are expected to direct the behaviour and actions of the individual behaviour or groups towards an achievement of the organization's set objectives. A leader builds a new vision of the future and redefines a developmental path and a strategy within a new orientation that responds to new dynamics like globalization, sustainability, and organizational conflict resolution (AKPAMAH & MATKÓ, 2021). As much as the industry understands the significance of digitization, the smartest it becomes in making decisions to embrace trade liberalization (NEUBERT, 2018). An effective leader understands and uses knowledge integration to deal with the complexities of the changing trends in today's business environment to achieve preferred goals (AKPAMAH & MATKÓ, 2021). The introduction of leadership as a key to organizational management has both positive and negative influences on organizational effectiveness and performance which often depends on the decisions that the leader makes in the running of the organization (NAHAVANDI, 2002). A coherent and unified organization has largely been credited to the nature of the leadership (OLADIPO et al., 2013) and a leader that seeks continual feedback and searches for opportunities to increase productivity is consistently open to economic integration (AKPAMAH, 2019).

The prospects and significance of wide circulation of data enhance leadership orientation towards international trade and access to new knowledge and opportunities (BROUTHERS et al., 2018) whilst managers of SMEs have the responsibility to formulate policies that tighten business relationships at both local and international levels. SMEs' leadership ought to deploy social networks and mass media through which they will be able to multiply users of product communities in several countries (BROUTHERS et al., 2018).

Leadership engagement with stakeholders and opinion leaders such as chiefs and traditional leaders together with foreign investors is a necessary strategy for marketing a product. *"We are convinced that the convergence of globalization and digitalization demonstrate the need for business leaders and decision-makers to reassess their strategies"* (HERVÉ et al., 2020 p. 35).

Leadership has the responsibility to determine the management strategies for innovation, research, and development efficacy to remain competitive and productive in the current industrial revolution (AKPAMAH & MATKÓ, 2021). SME economy is a key contributor to the economic development of both developed and less-developed countries, but the success and sustainability of these businesses are greatly reinforced by technologically innovative leadership (SANDYBAYEV, 2019). An effective leader ensures the accomplishment and sustainability of the business and takes advantage of technology to understand the government's favourable fiscal policies and high interest rates that might occur in the future to stabilize or destabilize the economy (VOCHOZKA et al., 2019). Leadership capability, creativity, innovation, awareness, and motivation are essential characteristics of entrepreneurial leadership for SMEs' development and economic integration (USMAN et al., 2020).

The organizational leadership persuasively accepts digitalization in management because leaders have come to realize that technology applications are deeply rooted in contemporary business which drastically reduced costs on remotely supervised exercises (TUGBA et al., 2022). The COVID-19 pandemic propels digitization in all human institutions where supervision and some other activities were considered in a matter of weeks (KANYIMO, 2022) while existing and new projects were controlled at a distance with teamwork executed and implemented across the boundary utilizing computer-generated remote monitoring. Distance supervision has led to a transformation of leadership theories and organizational cultures to match occurrences by a sense of evidence (COLLINS & HALVERSON, 2018).

A successfully integrated business organization has been referenced to sensible leadership and judicious management of scarce resources (OLADIPO et al., 2013). The presence of technology has compelled management to accept the concept of cooperate social responsibility as important to the operation of business and not only focusing on reducing environmental burdens but also creating social engagement and consumer awareness for sustainability (MATKÓ, 2018). Leaders need to assess the behaviour of the consumer to anticipate markets and trends, act appropriately and make an experienced business decision to survive the digital environment with its attendance consequences (KANE et al., 2019).

2.4.1. Competencies for SME Leadership Development

Competencies are a set of behaviours that stand the test of time and can achieve desired results (BARTRAM et al., 2002). According to the behavioural approach, competencies are considered attributes not just about intellectual capability, but self-consciousness, self-controlled and interpersonal skills (MCCLELLAND, 1973) whilst the functional approach focuses on competencies as the collective skills and expertise required for conducting a task (MILLER, 1991). Competencies are basic attributes beyond individual personality and intellectual, though they are taught, and learned for self-development (BOYATZIS, 1982). Technologies interact with the reality of the business world and leaders must have a keen interest in upgrading their competencies to match demand. ZWOLIŃSKA (2017) argues that the current technologies require technical competencies which encompass all job-related knowledge and skills such as media skills, coding skills, knowledge management and statistical command.

TURCU (2018) claims that in the next decade, about 3.5 million people will be required for employment in specific manufacturing vacancies, but the factories will not get the number needed to fill such job positions, because Job seekers and prospective entrepreneurs require professional training in the required competencies in which a few of the labour force will meet the job specification. The various competencies summarized in Table 3 are very important in this era of Industrial 4.0 as the collaboration of several professionals with different expertise and skills is desirable (STENTOFT et al., 2019).

The rate at which an individual requires technical skills is determined by the ability to practice and learn (ZWOLIŃSKA, 2017). Competencies applied in the management of complex situations in both manufacturing and management require strategic thinking and coordination (HECKLAU et al., 2016). Methodological competencies, personal competencies, social competencies and technological competencies are associated with competencies that are required by Industry 4.0 (HECKLAU et al., 2016). Contemporary technologies require technological proficiencies that encompass data, communication, and intellectual ability (ZWOLIŃSKA, 2017).

Table 3: Emerging Technologies Required Competencies

Competencies	Context
Technological Competencies	These encompass all job-related knowledge and skills such as media skills, coding skills, knowledge management, and statistical command. Also, among these competencies are process and understanding IT security.
Methodological Competencies	These are skills and abilities required for general problem-solving and decision-making. For example, analytical and research skills, creativity, conflict-resolution skills and efficiency orientation.
Social Competencies	These are social values, motivations, the ability to transfer knowledge, leadership skills, and the expertise to work in a team. Other important social competencies include intercultural skills, communication skills, networking skills, ability to compromise and cooperate and leadership skills.
Personal competencies	Personal competencies are the individuals' social values, motivations, and attitudes. These competencies comprise flexibility, motivation to learn, ability to work under pressure, sustainability mindset, compliance, and the rate at which an individual requires technical abilities determined by the ability to practice and learn.

Source: HECKLAU et al. (2016)

The methodological competencies are very necessary for this age of technology where skills and abilities are required for general problem-solving and decision making such as analytical and research skills, conflict and problem-solving skills and creativity (GRZYBOWSKA & ŁUPICKA, 2017). Social competencies are considered essential since an organization is about people and managing the people. The social skills required of Industry 4.0 consider the individual's social values, motivations, or ability to transfer knowledge, leadership skills, and ability to work in a team (GRZYBOWSKA & ŁUPICKA, 2017). Personal competence encourages future interaction with others, and on which the individuals build and develop perceptions of their character and general behaviour towards one another (GRZYBOWSKA & ŁUPICKA, 2017).

2.4.2 SME Managerial Leadership Driven-Competencies

SATEESH and VIJAY (2021) mention that the Internet of Things has brought about a new ecosystem and identified some competencies that firms require to succeed in this era of the Industrial Revolution. Agility is a competency that the leadership requires to make critical decisions as and when necessary to stay long in technologically changing environments (SATEESH & VIJAY, 2021). These involve the organization immediately amending internal and external policies to align with current demands under the auspices of agile competency (BARLETTE & BAILLETTE, 2020). Fast-tracking and executing customer responses and new knowledge are in the domain of agile leadership which is essential managerial competency for businesses to remain focused and competitive in this era of the Industrial Revolution (KAHLE et al., 2020). Entrepreneurial intelligence demonstrates a managerial ability to set achievable organizational objectives (SHET et al., 2021). It is a competence to complement the applications of emerging technologies. Entrepreneurial intelligence is a competency that embodies linguistic intelligence to enable effective communication with shareholders and the expression of vital knowledge for viable and sustainable business plans (SUN, 2018). Entrepreneurial intelligence leaders recognize interpersonal and intrapersonal talents and act capable of employee development and business extensions (SHEARER, 2020). Business acumen is a critical industrial competency for leaders to be well-grounded in concepts regarding financial management, leadership development and marketing (GALUSHKIN et al., 2019). Competency of business acumen gives managers the ability to strategically embark on organizational transformation by designing a roadmap to embrace a technology-driven economy (GALUSHKIN et al., 2019). Business acumen competency is often required in volatile business environments characterized the emerging technologies and their applications (GALUSHKIN et al., 2019).

Moreover, design thinking as a managerial leadership competence supports organizational leaders to appreciate customers' complaints and work to resolve them. It involves innovative ideas, critical thinking, decisive decisions and information and communication technology applications (OCHS & RIEMANN, 2017). These advanced applications may include Artificial Intelligence and Robotics. Design thinking is a blend of technology and human capital (VRONTIS et al., 2021). Human resources review the problems based on strength, weakness, opportunities and threats (SWOT) analysis and recommend the appropriate tool that technically and positively advances the

course of the organization (DILAN & AYDIN, 2019). Leadership recruits people with desirable skills and talents to take advantage of Industry 4.0 (PATEL, 2020). These are competencies implicitly specified by the tool that detains business operations of the day and leaders must be dependent on mental computerization to turn around the fortune of their businesses (KAO, 2018). Most importantly, disruptive leadership is best suited for the introduction of emerging technologies such as AI and IoT to restructure and reposition firms to meet the persistent challenges of customer demand and preferences (SATEESH & VIJAY, 2021).

Industry 4.0 demands teamwork, openness, a listening ear and pleasantries across units or departments to achieve organizational success (MAJCHRZ & WANG, 1996). Today, breakthrough businesses have gone beyond the simple introduction of the Internet of Things to boost production. A collaborative mindset leader seeks ideas from workers of diverse professional backgrounds to make the right decisions in digitalization (VILLALBA-DIEZ et al., 2019). This competency is very necessary, emerging technologies require that people with unique knowledge and skills be put together to understand technologically innovative tools (IT) to execute work daily in any given firm (EISENBERG &WITTEN, 1987). Problem-solving and decision-making are an integral part of technology applications and leadership with such competencies easily integrate technology and societal demands at the workplace for effective productivity (LEUSIN et al., 2018).

The managers serve as mediators between manufacturing processes and the human elements. They make decisions after effective analysis of data, evaluation, and observation of human behaviour, and thereafter the implementation of safe and cost-effective technologies (VILLALBA-DIEZ et al., 2019). A problem solved is as good as a decision made to maximize scarce resources and enable organizational sustainability (AKPAMAH & MATKÓ, 2021). The Industry 4.0 applications are programmed to work not in isolation. The Internet of Things (IoT) emphasizes unification and computerization to ensure the synchronization of processes (SATEESH & VIJAY, 2021). Concepts such as big data analysis and cyber-physical systems (CPS) work in connection and simultaneously to achieve results (LINS & OLIVEIRA, 2020) as the architecture of Industry 4.0 is sensitive to competencies connectivity. Hence, firms employ technologically structured and connected technology architecture (CTA) to meet the needs of consumers' preferences (SATEESH

& VIJAY, 2021) as business transactions have become faceless due to emerging competencies and technologies and their innovative tools (AKPAMAH & MATKÓ, 2021).

Industrialization has become critical in every economy, with smart factories functional under the process of big data, the IoT, and cyber-physical systems (KIRAZ et al., 2020). This calls for the leadership to have sufficient knowledge of robotic applications in manufacturing because an introduction of Robotics to production processions limits human errors and reduces the cost of production. FRAGAPANE et al. (2020) state that the implementation of robotic process automation (RPA) speeds up production processes especially where the application of cognition is not required as again the space when the human capital is involved. Hence, industry 4.0 requires that leaders have to understand and accept robotic process automation to be competitively viable. The approval and application of Industry 4.0 as a requirement of the business environment. Firms managers ought to link production processes to Computer Production Systems (CPS) because these systems are integrated into Industry 4.0 coupled with Al, big data and cloud computing (LIN & OLIVEIRA, 2020). Therefore, every business activity has been associated with emerging technologies, since these technologies detain the processes and data digital intelligence where modelling must incorporate into the running of the businesses (MARQUES et al., 2017).

2.4.3 Effects of Industry 4.0 on SME Leadership

Industry 4.0, the fourth industrial revolution associated with the increasing digitization of the entire value chain leading to the interconnection of people, objects, and systems through real-time data exchange (KAGERMANN et al., 2013) described as the radical transformation of industry because of its integrated emerging technologies (HERNANDEZ-DE-MENENDEZ et al., 2020). The Industrial Revolution began with Industry 1.0 in the late 18th century with the discovery of mechanical production using waterpower and steam while Industry 2.0 emerged in the 19th century and early 20th century with a rapid phase of industrialization marked the use of power plants and internal combustion engines (TULASI et al., 2020).

The discoveries at the time included telephone sets, cars, and aeroplanes, among others. Then, followed Industry 3.0 in the early 1970s when computers electronics, and internet-based information technology were seen in use and thereafter came the term Industry 4.0 in the 21st century (TULASI et al., 2020). Though, nations and unions may term it differently; at the European

level, the catchword is “Factories of the Future”, “Industrial Internet” in the USA and “Internet +” in China (MRUGALSKA & WYRWICKA, 2017). The sensors, cyber-physical systems, the Internet of Things (IoT), or smart networks which affect people from all walks of life are referred to as the fourth industrial revolution, also known as “Industries 4.0 as widely being used (MRUGALSKA & WYRWICKA, 2017). Industries 4.0 is known by the term “Industrie du future” in France, or the “Industrial Internet” (GRANGEL-GONZÁLEZ et al., 2016). Industrial 4.0 is considered the “Internet of Things”, “Internet of Everything”, “Smart Factory” or “Digital Transformation” in the international context (GRANGEL-GONZÁLEZ et al., 2016).

Industry 4.0 has effects on leadership and incorporates the entire activities that leaders do in the organization, ranging from decision-making to leadership styles (KASAPOĞLU, 2018). Leaders must be proactive and responsive to perceive the changing patterns and signals demonstrated by network data in the era of Industry 4.0 (KELLY, 2018). Leaders must initiate and promote a working environment of a collective effort with multiple agents in a constant field of growth, change, and opportunity, and link organizations with networks to achieve the science of connectivity and organizational network learning (KELLY, 2018). Industry 4.0 requires guided decision and leadership (GUZMÁN et al., 2020) where leaders need innovative approaches, new communication, and collaboration such that organizations derive values from digitalization and connected smart devices.

Industry 4.0 requires that leadership styles be open-guided, and leaders must learn to be culturally innovation-oriented with an emphasis on improving knowledge and accurate decision-making (SIVATHANU & PILLAI, 2018). *“The implementation of Industry 4.0 requires investment and openness to cultural change”* as leadership needs to understand that digitalization is beyond just the application of new technologies but using these applications appropriately for their maximum benefits (BOLTE et al., 2018). For the constant changes in the business world, leaders themselves must be prepared to update their knowledge, skills and understanding of the various leadership characteristics that contribute to the digitalization of their companies and make them more responsive to the industry 4.0 effects (GUZMÁN et al., 2020). Emerging technologies are changing the requirements in the labour market, particularly in the competencies and abilities in which new professional profiles of job seekers are required (RUBMANN et al., 2015).

Firms will soon not be able to get the required 3.5 million people to recruit due to skills mismatch as job requirements would have changed requiring new competencies for employment (TURCU, 2018). These competencies are varied, ranging from managing complex manufacturing systems to requiring more creativity, strategic thinking, and coordination skills (HECKLAU et al., 2016). The four major competencies required of Industry 4.0 include technical, methodological, social, and personal competencies (HECKLAU et al., 2016). STENTOFT et al. (2019) posit that to achieve organizational objectives, *"is for people to learn to work with, and complement, the new technology with the most important thing, the human skills that cannot be replaced"*.

Technologies are no longer seen as performing tools in large businesses and financial institutions (ANDY & SINAN, 2017) but as a perfect complement in all situations and leadership knowledge of technology comprises the ability to use computers to communicate, solve problems, collect, organize, and share information (INTEL TEACH, 2007). Information technology (IT) is the ultimate alternative for gathering and analyzing information required for evaluating employees' performance (STROHMEIER, 2007).

The access and use of technologies have become a necessity in every aspect of leadership for economic growth and development (WACHIRA, 2010). Information technology initiates and redefines organizational culture to align socioeconomic development with the information and knowledge economy (GRZYBOWSKA & ŁUPICKA, 2017). Mechanization has been identified as crucial among other management strategies as an effective tool for building competencies and changing skills requirements in all aspects of leadership and organizational growth (LEPAK et al., 2005). The fastest and smartest company adopts Industrial 4.0 quickly turns around the fortunes of the company and is initiated and supported by competent leadership (NAGY et al., 2018).

A search for better opportunities to train the employees, and a continuous development of new technologies lead to an improvement in competencies and skills which are considered basic requirements for Industry 4.0 (HERNANDEZ-DE-MENENDEZ et al., 2020). Industry 4.0 is associated with changes that *"we will be able to design the world and change the reality around us with changes in atoms and molecules, changes in nanotechnology coupled with everything in the world connected to the Internet"* (NAGY et al., 2018).

The emerging technologies are associated with innovative ideas for the new global economy causing the business environment to be fuelled by brain power and intellectual capitalism (YAW, 2006). Global reformation of the economy comes in three dimensions: the transnational movement of capital and the relative immobility of labour, the international mobility of large companies and the relative immobility of small and micro businesses, and finally, the reorganization of production and distribution into comprehensive value chains (MARILYN et al., 2000). A failure to introduce technology to management has an inevitable outcome as workers require significant training and development in technologies to prepare them for present and future jobs (BISWAS, 2019). Organizations that could not stay in operation after a few years of establishment are often attributed to not deploying technologies in management for various reasons and limitations (RAHMAN et al., 2018). Organizations that still rely on the traditional approach to management may not only cause a delay in document processing but also an economic burden that translates into organizational deficiencies and poor-quality service delivery (ASHBAUGH & MIRANDA, 2002). The world is englobed in hyper-competition causing increased demand for improved competencies and skills to enhance the socio-economic development fortunes and corporate sustainability among nations (TOTTY, 2001).

The components of globalization are key factors accountable for the swift transformation of the business environment. Information and communication technologies cause sustained competition, compelling organizations to accept the new approach to management in today's business landscape (CINNIOĞLU, 2018). With these developments, the value of the classical management approach has dropped, and businesses are considered mechanical organizational structures where the human element is evaluated as a cost factor (CINNIOĞLU, 2018) whilst the concept of corporate sustainability emerges as more critical than ever before as competence development constitutes an essential requirement in the era of Industry 4.0. According to INDEED EDITORIAL TEAM (2023), *"Although many people use the words "skills" and "competencies" interchangeably, there are some differences in what these terms mean in the workplace. While a skill typically relates to a single proficiency, competencies more often encompass a group of related strengths"*.

2.4.4. Digital Management Skills for SME

MUMFORD et al. (2007) argue that IT-related management skills are acceptable and needed to establish firm sustainability. These skills are organized and classified into four groups; cognitive skills are needed by organizational leadership to understand the complexity of human behaviour patterns. The cognitive requirement involves creative thinking, accurate decision making and strategic problem-solving (ZACCARO, 2001) whereas interpersonal skills are defined as the *"goal-directed behaviours used in face-to-face interactions, to bring about a desired state of affairs"* (HAYES, 2002). For business skills, organization, negotiation, and management of personal, financial, and material resources are most important and considered (KEARNS et al., 2015) while conceptualization of the mission and vision of an organization are associated with strategic skills (KALARGYROU, 2012).

Organizations are moving towards new economic, social, and ecological conditions in which corporations must recognize the importance of technology in transforming organizational culture to enable sustainable business development through organizational change (MIHAI et al., 2012). Technologies describe the current changing business landscape in the direction of a connected and automated manufacturing system where there exists a natural link among the factors of production in an industry termed Smart Factory (KAGERMANN et al., 2013; KASAPOĞLU, 2018) which depends largely on real-time data obtained from sensors, and with separate industrial components (HURTS et al., 2019). The changes occurring in today's business environment due to IT mandate certain competence and skills requirements because corporate sustainability is beyond the enforcement of new directives to demand change in employee behaviour (AKPAMAH et al., 2021).

CAPUTO et al. (2021) argue that management gives attention to prospects for decision-making, the horizontal bar against problem-based prospects, vertical bar to develop desired skills for sustainability. The idea of developing quantitative and technical-skilled professionals with specialized knowledge and experience in a given field called the I-shaped skills is no longer desirable (HAYAJNEH et al., 2022). The emphasis is on the T-shaped professionals, they are often considered generalists, professionals who possess sufficient skills and experience in diverse disciplines (HANSEN & VON OETINGER, 2001). However, the π-shaped skill is found feasible

for dealing with emerging technologies and innovations (HAYAJNEH et al., 2022). "*The π-shaped skills are both analytical and data-driven, yet understand brands, storytelling, and experiential marketing" (*AKAY, 2015) *"… this group will have a broad mastery of general management skills atop a few spikes of deep functional or domain expertise" (*MICHELS, 2019). HECKLAU et al. (2016) identified skills and the required actions that the Fourth Industrial Revolution (FIR) demanded of organizational leadership are summarized and presented in Table 4.

Table 4: Key Skills Required for the 4th Industrial Revolution

Skills	Definition	Required Action
Creativity	The ability to perceive the world in new ways, and to find hidden patterns	Make connections between seemingly unrelated phenomena and generate solutions.
Entrepreneurial thinking	The ability to identify marketplace opportunities.	Make appropriate ways and time to capitalize on opportunities.
Solving problems	It involves both analytical and creative skills.	Comparing, evaluating, and selecting. Provide a logical framework for problem-solving.
Resolving conflict	Managing and resolving conflict requires emotional maturity, self-control, and empathy.	Develop a skill of positive manners as against practice.
Decision making	A process of making choices.	Identifying a decision, gathering information, and assessing alternative resolutions.
Analytical	Thought processes are required to evaluate information effectively.	Visualize, gather information, articulate, analyse, solve complex problems, and make decisions.
Research	Explain one's ability to use reliable sources for continuous learning in changing environments.	Provide in-depth information and advice on a given topic, an important skill required.
Efficiency orientation	An approach that stresses the efficient use of resources.	Efficiency orientation is inevitable.

Source: HECKLAU et al., 2016; MUMFORD et al. (2007)

Today's leadership is mainly motivating, inspiring, and accepting views of the people so that the vision of a new future can be achieved (KWIOTKOWSKA et al., 2021), especially where leaders take absolute advantage of the capabilities and skills of the workers in pursuit of technological benefits. In cyberspace, the application of leadership in the organizational setting is enhanced by leadership skills and increasing personal skills as it is easy to access and accumulate knowledge from different fields with no restrictions (KWIOTKOWSKA et al., 2021). Leaders who promote integrated management and innovation in organizations achieve corporate sustainability and understand a crucial role in Industry 4.0 (GUZMÁN et al., 2020). Leadership skills development has become compulsory in anticipating a change in markets and trends they need to act appropriately and make precise business decisions to remain competitive in the digital environment (KANE et al., 2019).

The recognition of individual differences in cognitive capacities, personalities, temperaments, and abilities to control emotions, identities and values followers' cultural context and personal experience are required leadership skills for growth and sustainable organization in this era of emerging technologies (LORD, 2005), therefore, corporate leadership has to deal with change in a constructive transformation with a clearly defined direction and aligning the human resource with the strategies to attain organization's goals (KOTTER, 2001). These technologies bring about new systems in the manufacturing process where organizational innovation is gradually being replaced by jobs demanding specific requirements of the employee (FAN et al., 2021). There has been a paradigm shift of organizations from labour-based groups to highly qualified skilled professionals to work with technologies because the Internet of Things requires advanced techniques for processing large amounts of data coupled with the management of numerous changes in the working environment, solving complex and multidisciplinary problems within and beyond the organization (MATTSSON, 2020).

2.5 Determinants of Skills and Competencies Development

The small and medium-sized enterprises (SMEs) intrinsic vulnerability concerns competencies requirements and is compounded by restricted financial resources, limited managerial capacity and poor industrial knowledge (TENÓRIO et al., 2022). The applications of digital manufacturing technologies can have negative effects on business operations. SZALAVETZ (2022) states that

emerging technologies cannot be a universal remedy to business operational inefficiencies, and organizational projects often fail to achieve objectives resulting from the advert effects of the Internet of Things. The application of technology does not produce the expected results until the organization heavily invests in training human resources and the development of physical infrastructure which comes at a cost to the organization (SZALAVETZ, 2022). Over two-thirds of digitized programs installed on a pilot did not meet the expected returns on investment and are often seen as seemingly contradictory qualities for operational efficiency (GEBAUER et al., 2020). The use of technology applications requires preparation, anticipation, positioning of the business and the knowledge of the system to adequately react to external threats that might be a detriment to the organizational culture (DUROWOJU, 2017). However, when SME leadership understands the significance of digitization, it becomes easier to make decisions (NEUBERT, 2018). Contemporary leadership sets hope for the future and redefines a developmental route and cogent strategies in response to new dynamics like globalization, sustainability and organizational conflict (AKPAMAH & MATKÓ, 2021) because they involve extensive consultations, data and trend analysis to stay stable and competitive.

The fundamental determinant of SME competencies development is the accessibility of technology to enhance productivity (GONDA et al., 2020). SMEs' inability to stay in business for many years is due to a lack of education and training coupled with the individuals' interest in competencies development which mostly occurs in less developed countries (MEYER et al., 2018). *"Management is not to manage knowledge that has already been created and become explicitly and available, but to manage the people who act as points of origin for the creation, storing and sharing (or not sharing) of knowledge"* (FEKETE FARKAS & TÖRÖK 2011). Management may be associated with challenges such as ignorance of networks, shortage of skilled labour, market and insufficient training (OLAWALE & GARWE, 2010). However, socio-economic, managerial and technological factors play a crucial role in determining competencies development in any organization. These determinants are therefore summarized and presented in Figure 5.

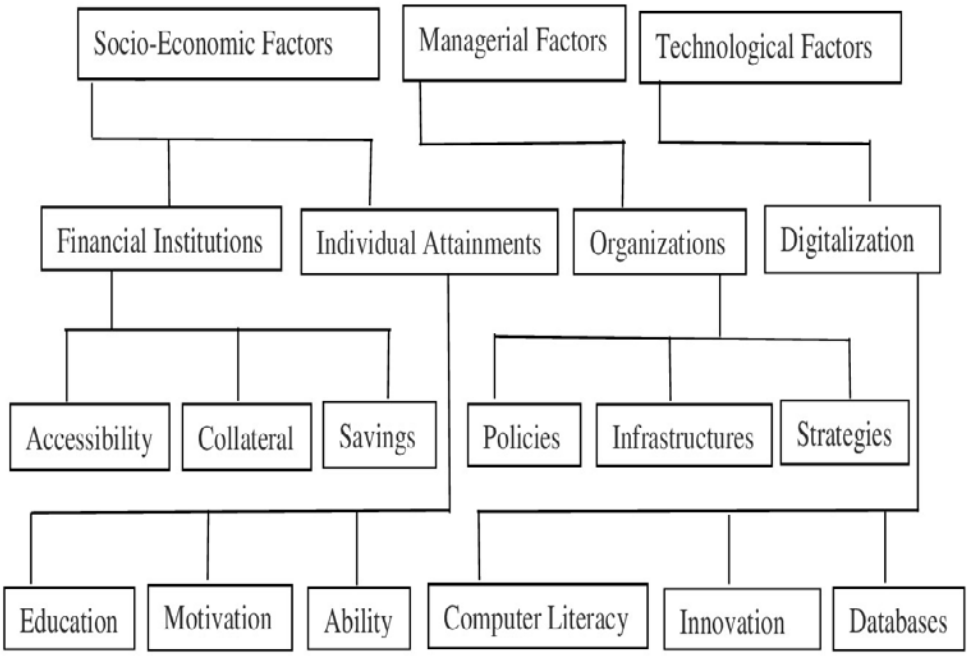

Figure 5: Determinants of Skills and Competencies Development

Source: Author's Creation

Besides, the synergy within these competencies remains a major factor regarding SME development. The study relates some selected competencies and technologically emerging skills to determine their connectedness for effective leadership. ISENBERG (1984) posits that various competencies work efficiently as leadership understands that they are not dissimilar and autonomous. The acquisition of multiple competencies and skills is essential for any organizational growth, the combined effect of these variables has the potential to avert an organizational threat (YUKL, 2013). Leadership competencies are interrelated and corresponding, exhibited in unity and are indeed Paradoxical (WHETTEN & CAMERON, 2016).

Socio-Economic Factors

The provision of social amenities and solid economic policies enables the prosperity of the labour, and high productivity and improves networking opportunities (SANDA & NTSIFUL, 2013). Common challenges of SME competence development are external factors; legislation, technology and politics (CHAS-OVSCHI et al., 2021). Establishments in deprived regions are not capable of recruiting competent labour and lack the business training needed for efficiency to withstand competition in a dynamic business environment (MEYER et al., 2018). Besides, private businesses

continue to struggle for infrastructure needs and support to gain opportunities for extension (CHAS-OVSCHI et al., 2021). NIÑO-ZARAZÚA & SANTILLÁN-HERNÁNDEZ (2021) maintain that workers in the informal economy never honour tax obligations on income earned and are non-contributors to the social security insurance scheme. Additionally, there has not been a mandatory requirement for SMEs in most developing countries to establish an employee development scheme (AKPAMAH & MATKÓ, 2021).

Moreover, SMEs in developing countries where there are low levels of institutional and infrastructural development have challenges in securing financial support for the training and development of their employees, and they lack the protection of property rights (BECK & DEMIRGUC-KUNT, 2006). The lack of collateral to secure credit is yet another common problem among the youth in developing countries. Women, tend to use family members rather than hired labour and base their businesses in their homes to balance business with household chores (INTERNATIONAL TRADE CENTRE, 2016).

SMEs located in the peripheral have limited potential to develop collaborative arrangements with training institutions or invite experts to train their employees. O'FARRELL and WOOD (1998) argue that networking plays a significant role in business development and that firms found in the cities are closer to networks and easily interact with clients than firms in rural settings. The proximity of firms to resources and infrastructure coupled with ownership structures allows these firms to acquire training and development at a lower cost (STOREY, 1994). Some private organizations do not often produce standardized commodities to meet the demand of both domestic and international markets (AMOAH et al., 2021) and are susceptible to bankruptcy (DVORSKY et al., 2021). Government policies on the distribution of available resources to firms for training and development among others often take into consideration these variables (OUM et al., 2014).

The individual attainment of talent in most cases depends very much on the person's capability and interest in accepting skill training and development courses (KYOBE, 2009). The employee's desire to attain self-development takes place at different levels thereby posing a serious challenge for an organization to organize training and development for the workforce, though employee development is an important human resource policy to ensure a continual improvement of individual and organizational growth (POPESCU et al., 2010). The individual's desire to manage

a business with reasonable risk to make a profit as against the willingness to undergo training and development is a hidden factor for the failure of today's SMEs (ONALAN et al., 2020).

The development of essential skills and knowledge is a tool for improved productivity, better working conditions and the promotion of decent work in the informal economy (FUGAR et al., 2013) which is lacking in the management of SMEs in deprived regions. Talent development brings about work-intensive and safer technologies that boost productivity, increase income, and reduce occupational hazards (ILO, 2002), though skills development is not common within SMEs. FUGAR et al. (2013) talent development improves employees' knowledge, skills, and behaviour, enhances performance, increases output, and multiplies profits. Skill requirement is a potential motivator that leads to both short-term and long-term benefits for SMEs (AIDAH, 2013). Acquisition of additional knowledge and skills bridges the gap between existing performances and expected future performance (WEIL & WOODALL, 2005). Nonetheless, Managers of small businesses do not often get trained to acquire skills as compared to larger firms in developing economies (MTHABELA, 2015). Companies today are faced with changes in functions under various complications which require people with the right qualifications and rich experience to survive the surrounding competition (NEUBERT, 2018).

Managerial Factors

The managers of SMEs do not understand and appreciate the requirements and procedures governing international trade to enable them to acquire a competency framework to meet international standards (MAYNE, 2006). The management of SMEs understands that continuing formal training is an "*unaffordable luxury"* that involves course fees and a decline in labour output during training creating double losses and a heavy bearing on the employer (WESTHEAD & STOREY, 1996). SMEs are extremely worried about the high level of uncertainties, and investment in employee training and development (WESTHEAD & STOREY, 1996) in the long term allows employees to compete for high office positions or search for a new job elsewhere. Therefore, SME training and development for employees are mostly on the job with little or no provision for employee development and are often considered informal (STOREY, 1994). Competence development for employees appears unattractive to some firms as these organizations

perceive training and development as an employee's specialization that might not have a direct positive connection with skills and output (STOREY, 1994).

Competence development is a multi-skilled workforce requirement for the flexible nature of jobs (STOREY, 1994; SMITH et al., 2002). The multi-skills and the technology-based firms over the period have become an integral part of innovation systems in advanced countries (DUTTA & FOLTA, 2016). However, about 20% of SMEs fail in their first year of operation, 30% in the second year while the remaining percentage folds up in the fifth year of operation in developing economies for lack of technology applications and continuous competency development (MCLNTYRE, 2018). A competency framework explains the knowledge, skills, and attributes that an organization needs for its growth (HUGUES, 2020). Studies reveal that one out of ten employees of SMEs acquire training, and development needs as compared to large organizations (MTHABELA, 2015). SMEs acquiring competence development have been harmed by their size, employees' skills, number of years of their establishment and the degree of exposure to international markets (ISLAM & HOSSAIN, 2018). Poor access to networks, skills training, deficient operational experience, poorly skilled labour, and no knowledge of marketing point to the failure of SMEs in developing economies (MEYER et al., 2018). Technologically integrated competencies applications in firms are crucial for sustainable development and growth in both developed and undeveloped countries (OECD, 2011; NEUBERT, 2018).

OPOKU (2016) states that informal workers, mainly the artisans, reliance on outmoded and traditional practices is a constraint to enterprise and skill development in any given economy. The apprenticeship literature frequently refers to as perpetuation of traditional systems as a major drawback of developing the informal worker (WORLD BANK, 2013). The continuous update of knowledge, mastering of the art and efficiency of firms through technology and its associated accessories appears unacceptable and achievable by the numerous SMEs in most developing countries (AKPAMAH & MATKÓ, 2023). The culture of an organization either increases the acceptance and consumption or the rejection and failure of a service. According to the World Information Technology and Services Alliance (WITSA, 2014), about 45% of Mexican executives see IT integration in business and management as not beneficial supported by 15% of respondents from highly competitive and industrialized nations. It was found that 26% of Mexicans will invest in future technologies while 43% of respondents will decline.

In the Upper East Region of Ghana, less than 15% of artisans and local manufacturers deploy IT in the operations of their businesses (AKPAMAH & MATKÓ, 2023) while others claim that technology defies their traditional character and therefore modifies the taste of their products or norms. In Ghana, for instance, most SMEs and their employees do not often receive continual skill development as an obligation that is required to improve upon their existing knowledge and products (OPOKU, 2016). The traditional role of the African woman that restricts female involvement in activities outside the domestic chores coupled with lack of access to certain positions denies women the right to developmental needs (WORLD BANK, 2013). The poor performance on cost control, quality, and productivity, and the general stagnation of SMEs attributed to a lack of compulsory development and vibrant regulatory agencies appear normal in most developing countries (AKPAMAH & MATKÓ, 2021).

The SME sector is confronted with various challenges which include, the working environment, hazardous climate, political vindictiveness, tribal bigotry, fiscal denials by the financial institutions and are not covered by any insurance scheme against retirement (CANELAS & NIÑO-ZARAZÚA, 2022). Firms that had no formal arrangement and legal framework, for so many years, lack financial stability, and prudent management and in recent times face vigorous competition (NORTH & BABAKHANLOU, 2016). SMEs often do not have a long-term strategy and laid down sustainable policies for successful management (SANDA & NTSIFUL, 2013). The absence of a comprehensive state policy framework on MSMEs' development coupled with no existing data is a serious obstacle to Ghana's attempt to improve the sector (MINISTRY OF TRADE AND INDUSTRY, 2019).

Therefore, SMEs are faced with common restrictions to accessing required competency development to enable them to compete fairly with their counterparts in other parts of the world. Health and safety measures are very important personal needs and must be not only provided for the formal sector workers but workers at all levels. The informal sector economy associated with developing countries, particularly Ghana has the poorest business environment and working conditions (INTERNATIONAL TRADE CENTRE, 2016). Most SMEs have no insurance scheme for their firms and employees. Workers in the sector operate from their residential premises whilst others work from public places in temporary sheds and structures (MITULLAH, 2003).

Technological Factors

The response to technological competencies is simply the digitization and digitalization of business processes (MOLEFE, 2018). INTAWONG and PURITAT (2021) state that industries deployed innovation and technology as a means of taking advantage of the 4th Industrial Revolution. Firms face peculiar problems with technological capabilities and knowledge bases to train their personnel (LEE & LIM, 2001). Organizations' inability to achieve competence development is attributed to a lack of information and misconceptions of government regulations in both less developed and developed economies (HULLA & RAMSAUER, 2020). Limited access and application of information technology (IT) facilities on business processes and high illiteracy are common factors that militate against SMEs acquiring training and development needs in most developing countries (ORFORD et al., 2004). These combined effects of resource limitations have rendered SMEs inefficient and vulnerable to liquidation (AKPAMAH & MATKÓ, 2021). The absence of innovation-related institutions such as technology parks and the provision of continuous training is the result of scarce opportunities for SMEs to experience growth and development (HADJIMANOLIS, 2000).

Organizational leaders, particularly managers of SMEs, use IT for personal activities but hardly think of its impact on business development and sustainability (CANDOLFI-ARBALLO et al., 2022). The developing countries have still not realized that the development of human capital in the informal sector is a requirement for economic development (REYNAGA OBREGÓN, 2003) and the engine of growth where the operators need constant training and self-education. Leaders in the informal sector must have an innovative vision and demonstrate an attitude that supports teamwork and peaceful collaboration within and beyond the industry to achieve organizational goals (PORTER, 2002). The integration of technology in the development of the informal sector economy brings about significant benefits to individuals and nations at large because efficiency, growth and development of a firm are linked to innovative technologies (CARRILLO & GOMIS, 2003). However, SMEs have little or no knowledge of current technologies and poor access to digital information which poses serious challenges to these enterprises regarding constant changes in demand and sustainability (NORTH & BABAKHANLOU, 2016).

SMEs in most developing countries do not have access to relevant information, innovation, electronic marketing for their products, sustainability and general growth of the business (ILO, 2002). The individuals in businesses are deprived of IT-aided resources and have no access to valuable economic opportunities to improve their businesses (INTERNATIONAL TRADE CENTRE, 2016). Many SMEs in deprived regions often fail to accept and recognize the value of implementing information and communication systems as part of processes for competence development (CANDOLFI-ARBALLO et al., 2022) as the state institutions and individuals' investment in technology is insignificant to improving businesses (IFT, 2018). *"The lack of investment in technology hinders its appropriation by human resources and shows, that entrepreneurs do not have a clear perception of the opportunities for improvement offered by ICTs in terms of productivity or administrative efficiency"* (CANDOLFI-ARBALLO et al., 2022). Most especially, in the deprived communities, where SMEs experience poor internet services and lack infrastructure development, see no benefit in investing in technology to increase productivity (IFT, 2018).

Competencies-related Theories for SME Development

Competencies theories are frameworks that focus on identifying and understanding the specific skills, behaviours and traits that contribute to effective performance in each role or context (MISRA & SHARMA, 2017). These theories have developed significantly over time, inspired by various fields such as management, psychology and education. Competency theory aims at bridging the gap between the person's capabilities and organizational needs, providing a structured approach to human development and talent management as its main function (MERRILL, 2002). The concept of competency was described as *"the characteristics underlying superior performance"* by McClelland in 1976 who was the first to integrate competency into human resource management (MISRA & SHARMA, 2017). *"A competency is a set of skills, related knowledge and attributes that allow an individual to successfully perform a task or an activity within a specific function or job"* (UNIDO, 2002).

The competency-based theory is defined as intentionally and appropriately designed activities logically arranged to achieve professionalism and organizational development (BELÉNYESI & DOBOS, 2022). The theory is described as a system or a mapping tool in which available resources

are rightly connected to maximize profit and minimize organizational losses (BELÉNYESI & DOBOS 2015). The approach identifies individuals with various talents and relates these capabilities with appropriate workloads in an organizational setting (Figure 6). The competency-based approach to management recognizes the employee based on *"knowledge, skills, self-image, trait and motive"* constituting the know-how of the individual, the person's ability (physical and mental) to perform a task, personal assessment (manners, intents and general behaviours) acquired through training and learning and can be translated into organizational development (MISRA & SHARMA, 2017).

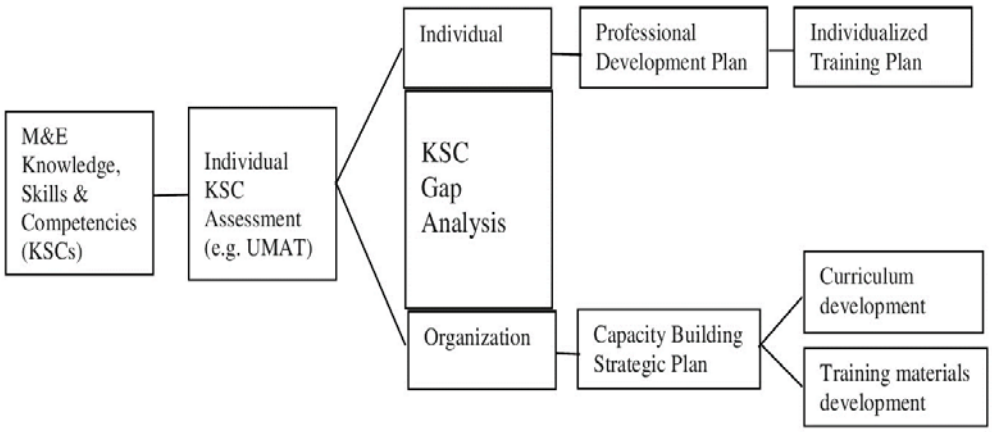

Figure 6: KSC Capacity Building Framework

Source: FLETCHER et al. (2015)

Organizations often achieve set targets when training and learning for advancement are intensified. Most especially where the concept of learning is divided into aspects such as the knowledge to understand, the skills to get work done and the competencies to fuse knowledge and skills to resolve challenging tasks (MERRILL, 2002). Competencies are more into managerial and interpersonal relationships than technical aspects of the work (FLETCHER et al., 2015). The *knowledge, skills, and competencies (KSC) capacity-building framework* was designed by FLETCHER et al. (2015). Figure 6 demonstrates the capacity building of the employee and the essence of monitoring and evaluation for organizational development. This framework focuses on specific learning objectives to ensure that the right materials are provided to the individual to acquire the needed knowledge, skills and competencies for organizational development.

PORTER'S (1989) argument that successful organizations are often traced to internal resources and capabilities forms the basis of resource-based theory (UTAMI & ALAMANOS, 2023) in which organizational characteristics are not just for modification, but rather an efficient combination of capabilities and resources. BARNEY (1991) and PETERAF (1993) maintain that Resource-Based Theory (RBT) or Resource-Based View (RBV) is a competition influenced by the judicious application of the organization's internal and external resources. The Resource-Based Theory is an approach that assesses the organization's general prospects within and beyond to explain the superiority of the company (LECOCQ et al., 2013). Companies competing fairly to attain a firm position indicate sensible application of resources (PENROSE, 1959) as these resources represent the firm's uniqueness and special talents. RUBIN (1973) posits that organizations' huge resources are meaningless until competent and skilful labour is deployed on these resources to gain a competitive advantage and, also obtain sustainability. The resource-based theory is a predictive instrument in strategic management where the firms' resources determine the viability and sustained comparative advantage of the firm in the hyper-competitive environment (UTAMI & ALAMANOS, 2023). The resource-based view can be defined as a firm's creation of worth by using both implicit and explicit resources to the benefit of the organization and its customers (GRANT, 1991).

However, a firm maximizes profit when it concentrates on the products demanded by the consumer as against the available resources that it possesses (WERNERFELT,1984). Organizational resources are no longer by inheritance and location, but by education and training to acquire knowledge, skills and competencies to meet the consumers' demand and also to increase the productivity of the firm (UTAMI & ALAMANOS, 2023). The significance of resource heterogeneity for economic growth which might serve as a barricade to competition, is necessary to introduce a mechanism to assess the prevailing market for a continued stay in business (BARNEY, 1991). According to GRANT (1991), a resource-based view is associated with a firm ability to combine its resources with capabilities to gain and maintain a competitive advantage over its competitors. The company resources are the basis for its unique strategy development with which the right capabilities are deployed to transform the resources effectively and efficiently into profit and economic stability (TEECE, 1984).

The conceptualization of human capital theory in management is said to have derived from research in the early 1960s where human capital was explained regarding the knowledge, skills and abilities of the people employed in an organization (SCHULTZ, 1961). Human capital theory originated from the macroeconomics development theory in the 1950s where production was supported by factors of production and prudent management (BECKER, 1993) while physical capital was recognized as the best for economic growth and development of the US economy in the 1960s (MINCER, 1974). Human capital theory refers to the cost element of organizations' investment in training employees to acquire new knowledge, competencies and skills to enable them to increase productivity and also for sustainable growth (LEPAK & SNELL, 1999). BONTIS et al. (1999, p.391) define human capital as "*the human factor in the organization; the combined intelligence, skills and expertise that gives the organization its distinctive character. The human elements of the organization are those that are capable of learning, changing, innovating, and providing creative thrust which if properly motivated can ensure the long-term survival of the organization"*. Human capital demonstrates an organization's consistent support for the competence and skills development of employees to enhance sustainable organizational growth (PASBAN & NOJEDEH, 2016). The idea behind the organization's implementation of human capital theory is to encourage employee development through education and training for values demanded in the contemporary business environment to increase productivity and for organizational sustainability (HATCH & DYER, 2004).

Human capital as a store of skills, abilities, competencies, experience and conduit for motivation stems from education and training (BECKER, 1993) and developing countries must spend much of their resources on education and leadership development to help turn round their economic fortune (ZUBAIDI et al., 2018). SALAU et al. (2014) definition of human capital considers the already-mentioned cognitive attributes but seeks to add leadership traits being shown in one's ability to perform a task reasonably and efficiently to attain economic value. Human capital is an embodiment of knowledge and skills that employees acquire at the expense of their organizations or self-sponsorship for a common goal, that is an economic benefit (SINGH et al., 2021). AMAN-ULLAH et al. (2022) posit that human capital is an essential component of organizational growth. They claim that competencies, knowledge of current trends and skills and abilities of the human capital are significant for growth. Leadership is critical in the harmonization of human resources

and development, especially innovative leadership. Its flexible nature motivates and encourages employee creativity to enhance growth (MAWLAWI et al., 2019).

However, the contribution of innovative leadership as a moderator between an organization's human capital and high productivity has not been established while BILAN et al. (2020) confirm a positive relationship between employees' competencies and increased productivity. With the aid of technology, human capital has always been converted to knowledge and skills to enhance growth and sustainability (TANG, 2020). Despite the advancement of technology negatively affecting employees by laying off labour (HAMADAMIN & ATAN, 2019), human capital remains creative and inimitable (MUBARIK et al., 2020). Training and development enable human capital creativity, competencies and potential to effectively and efficiently explore new ideas to increase productivity and also for sustainable growth (KIRCHNER et al., 2021). As mentioned by AKPAN et al. (2022) current technologies fuel hyper-competition putting extensive pressure on firms to support the knowledge of culture to survive the volatile business environment. ENKHJAVA and VARGAA (2023) argue that human capital at this time of technology is very necessary for the survival of organizations. They emphasized "digitization, robots, machine learning, automation, and artificial intelligence (AI)" as components of the Fourth Industrial Revolution (IR 4.0) are essential for the enhancement of human learning, analysis, easy understanding of complex situations and free flow of communication among employees.

Moreover, the social exchange theory traced as far back as I759 in a study by Smith is defined as a voluntary exercise with the employees' expected returns for their benefits (BLAU, 1964). "*The roots of this theoretical orientation can be found in earlier philosophical and psychological work deriving from utilitarianism on the one hand and behaviourism on the other"* (COOK et al., 2013) with emphasis on influence, conformity, status, leadership, and justice (HOMANS, 1961). Social exchange theory is applied in the organizational setting as attitudes and behaviours are clearly defined for every employee to follow (DÜGER, 2020) while the laid down rules, norms, channels of information, expectations, and obligations are embedded in the structures of social organizations and are also linked to the leadership interest in having the best out of the employee for organizational growth (DAVLEMBAYEVA & ALAMANOS, 2023). The emerging technologies have serious implications for leadership and employee behaviour. For instance, organizational

development, modification of culture and emerging leadership styles have significant impacts on social exchange theory and cause employee behaviour in the workplace (DÜGER, 2020).

Social exchange theory determines leadership in the workplace since the leader will like the subordinates to show behaviour which can lead to organizational growth (MAYER et al., 2018) and the subordinates will, however, expect a style of leadership in which they can trust the system. The development of a strong social exchange bond between leadership and employees is seen in organizations where leaders are associated with truthfulness, motivation, honesty, and a sense of morality and are trusted by employees for their returns after hard work (BROWN & TREVINO, 2006). Social exchange theory tightens the relationship between leaders and employees (HARRIS & BROWN, 2021) and stimulates high performance, employee behaviour and commitment, and subsequently general growth and organizational sustainability (HANSEN, 2011). THIBAUT and KELLEY (1959) argue that social exchange theory is founded on agreement between different parties where there is motivation for hard work and high productivity is rewarded in return.

The theory considers both material and psychological benefits such as social status, loyalty and professional development (BLAU, 1964). Social exchange theory is the foundation of employment contracts where the tasks and economic benefits are well explained and documented. The employee gets to know his or her role and wage or salary based on the social exchange document while the employer monitors the employee by high productivity and progress of the organization. Besides, the individual is entitled to other intangible resources such as trust, respect, promotion, motivation, and collaboration with co-workers to accomplish a given task (FULLER et al., 2006). Social Exchange theory has a significant impact on leadership development through relational awards. Continuous interaction of employees with management, exchange of ideas with colleague employees and teamwork impact knowledge and skills among the labour (LEVINGER & HUESMANN, 1980).

Technology Acceptance Model (TAM)

The most widely accepted model for assessing the use of technology is the Technology Acceptance Model designed and tested by Davis in 1989. The Technology Acceptance Model (TAM) explains the degree of information systems acceptance by the users (MARIKYAN & PAPAGIANNIDIS, 2023). The model demonstrates that one’s acceptance of technology is determined by the

behaviour intention which is translated into perceived usefulness and perceived ease of its use (DAVIS et al., 1989). The TAM was propounded based on theoretical gaps identified with the Theory of Reasoned Action (TRA) developed by Ajzen and Fishbein to predict the determinants of behaviour towards certain tasks across firms (AJZEN, 2011). The TRA did not accurately measure specific variables regarding technology and information systems-related research (DAVIS et al., 1989 BAGOZZI, 1981) which necessitated the modification leading to TAM to solve the limitations and weaknesses of the theory in the field of technology. The TAM added perceived usefulness and perceived ease of use to the behavioural intention (JOHNSON & PAYNE, 1985) demonstrated in Figure 7. The model was successfully tested and has been recommended in studies within the technology and information system (ROBEY, 1979). However, there have been suggestions that additional variables are needed to make TAM more efficient in the assessment of people's acceptance of Technology (LEGRIS et al., 2003). Hence, this study seeks a continuous improvement of the model to make it effective in evaluating technological-aided competencies.

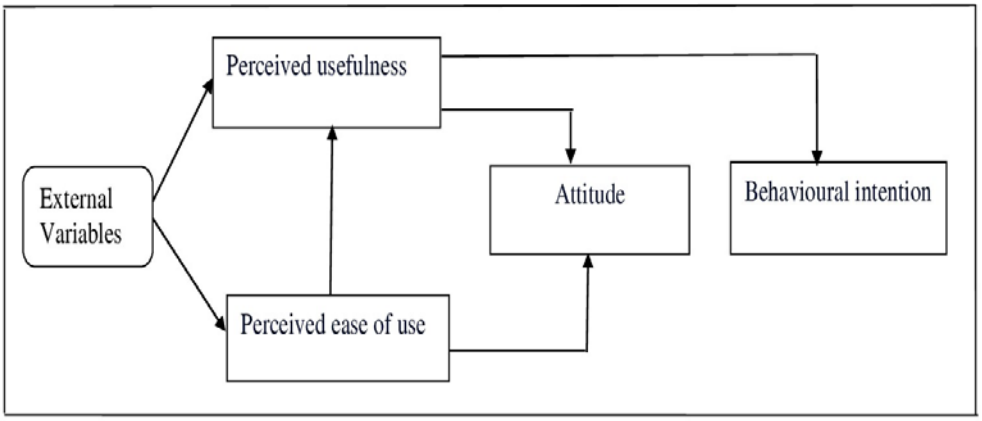

Figure 7: Technology Acceptance Model (TAM)

Source: DAVIS, et al. (1989)

Conceptual Framework

Figure 8 shows that organizational sustainability depends on acceptance of Industry 4.0 required competencies and skills. When properly adopted and implemented, then, technologies are regarded as an enabler for fast and easy performance of organizational tasks, access to information, increase in productivity and subsequent stability of firms. Individual knowledge of technology applications

and private ownership of technology facilities within the workforce in organizations leads to easy access and a smooth transition from the existing traditional way of leadership to innovative leadership as required (see Figure 8). It also illustrates the possible impacts that Industry 4.0 had as an enabling tool for socio-economic development in an organization. The "Internet of Things" is dramatically changing our way of life. Information, knowledge and technology are increasingly becoming the key drivers for socio-economic development worldwide (CHAS-OVSCHI et al., 2021). The emergence of technologies has made the business environment very volatile and restructured the existing leadership competencies and skills requirements illustrated in Figure 8.

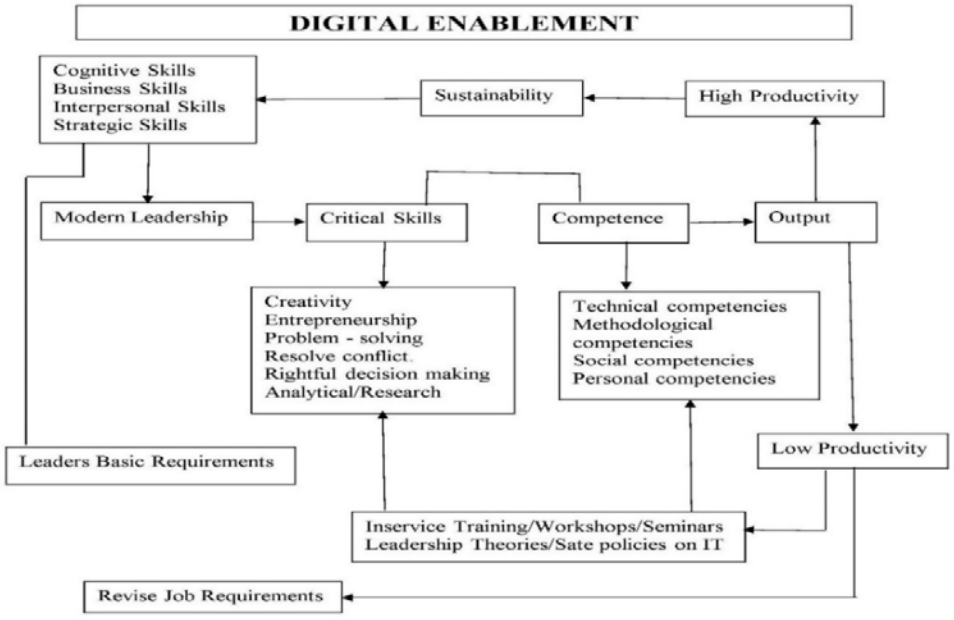

Figure 8: Conceptual Framework

Source: Author's Creation

Communication, relationship-building (interpersonal competencies) and empowerment (digital enablement) are desired in the firms to enhance internal and external collaboration for high productivity and sustainability. Leaders require certain skills prescribed in Figure 8 at the job entry level, their leadership is considered modern when they can combine critical skills and competencies for sustained growth in their organizations. However, in-service training, conferences, workshops, and seminars are established for leaders who might not be able to produce at the maximum to gain the necessary knowledge of leadership theories to facilitate skills and

competencies development. State policies are influential in this regard because a country's policies on industrialization, internalization, and digitalization are the basis for IT infrastructure development. SMEs like other firms require knowledge of trade policies and these competencies and skills to stay in business in this era of Industry 4.0. Modern leadership styles describe leaders who share, engage, and inspire teams and individuals to do their best for organizational development and are themselves critical thinkers (VRONTIS et al., 2022) they demonstrate leadership as an art and science that requires practice and mastering of the three "Cs" (Competence, Commitment and Character).

Technology Competence Integrated Model and General Description of Variables

This study focuses on the concept of technological acceptance in the analysis of competencies regarding SME development and sustainability in the Upper East Region of Ghana. How effective is technology in leadership development and how supportive technology and innovation are for SME development in the region were considered paramount in the analysis. Technological competencies are often referred to as technical skills or technological capacity (CANDOLFI-ARBALLO et al., 2022). It requires detailed discussions and analysis to get its proper context in the development of SMEs. For this study, the research adopts ARBALLO et al. (2019) definition of technological competency as *"A set of cognitive and attitudinal dispositions that the human capital of an organization develops to interact and master the conscious or unconscious use of Information, Communication and Collaboration Technologies, as referred to the technological appropriation and incubation for innovation in services, processes or products that generate benefits and growth for the company and are strictly based on the collaborative work of its staff"*.

The definition of technological competence emphasizes cognitive ability which consists of sensitivity, motivation, and innovative skills required for an evaluation of leadership competency (CANDOLFI-ARBALLO et al., 2022). Based on the literature and the adopted definition of technological competency, a Technological Competency Profile (TCP), a multidisciplinary approach with a focus on knowledge, abilities and attitudes was built. The Technological Competencies Profile (TCP) determines the tools based on the context and objectives of an investigation (CANDOLFI-ARBALLO et al., 2022), then an assessment of how impactful technological competencies on leadership and organizational development with TCP as a

benchmark is considered the right approach to the investigation. The technology competence integration model (TCIM) is an additional technological acceptance model (TAM). TACIM is a model designed to assess competencies required for the effective adoption and utilization of technologies within organizations (Figure 9).

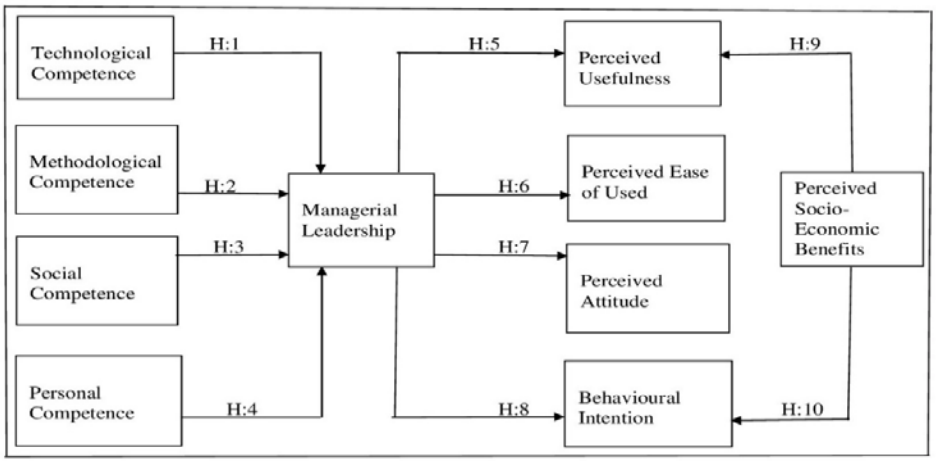

Figure 9: Technology Competence Integrated Model (TCIM)

Source: Author's Creation

This model incorporates aspects of TAM into the emerging competencies to appreciate SME management requirements. It suggests that for technology to be effectively adopted, users must not only be willing to use it but also possess the necessary competencies. The TCIM is drawn from existing models such as the Technology Acceptance Model (TAM) where the following concepts were highlighted.

- *Perceived Usefulness* is the degree to which the individual trusts the use of technology enhances performance (DAVIS et al., 1989).
- *Perceived Ease of Use* explains the extent to which the person believes that technology usage or a system use does not require any substantial effort (DAVIS et al., 1989).
- *Perceived Attitude:* Attitude towards use is the desire and action of the individual regarding accepting and using a product. The potential user of the system's initial response to pleasant or unpleasant conditions for a given product determines the attitude of the user (DAVIS, 1993).
- *Perceived Behavioural Intention:* People's behaviour predicts the outcomes. Behavioural intention to adopt and use internet applications is an indicator for continuous use or seize applications in the future (JACKSON et al., 1997).

- *Managerial Leadership:* is a changing and complex process that integrates the professional skills of management with the inspirational qualities of leadership. Managerial leaders fix the rules and standards that are no longer on track to match the changing business environment (TIAN-SYUNG et al., 2019) and encourage subordinates' intellectual stimulation to enhance their knowledge, creativity, self-confidence, attitude, ideology, and emotional intelligence through their style of leadership.
- *Perceived Socioeconomic Benefits:* refer to an individual belief or organization's anticipations that there are profits to gain from an action, policy, investment or development project. These benefits can be subjective and based on personal expectations and cultural perspectives. An application that comes with positive expectations and is easy to apply is most likely to receive attention (DAVIS et al., 1993).
- *Competence:* describes one's ability and knowledge to effectively engage in the application of the Internet of Things to complete a task with ease. Competence is considered a cross-functional integrated and coordinated skill required of the individual to complete a task within a specified period (TORKKELI & TUOMINEN, 2002) which includes managerial competencies, technological competencies, personal competencies and social competencies.
- *Supportive Factors* are additional variables deemed effective for the analysis of technologically aided competencies which focus on external factors, particularly state readiness for Internet adoption because implementation of IT comes with huge costs as the purchase of the facility and training personnel are involved. The available and accessible credit facilities coupled with state policies on IT development or usage are necessary for Internet applications that require state budgetary allocation. AKPAMAH and MATKÓ (2021) recommend that the government of Ghana and countries with analogous problems provide and mandate management and leadership in various organizations to have IT in their budgetary allocations to enhance availability, accessibility and utilization of the Internet for higher productivity.
- *Leadership behaviour:* the supposed user of the system of technology in the job application perception of people's opinions and comments informs the decision and behaviour towards the system (FISHBEIN & AJZEN, 1975).

- *Perceived Risks of Internet Usage:* refers to the concern and fear that people and organizations may express about the potential threat associated with the Internet of Things applications. Perceived risk is a critical concept in understanding the leadership attitude toward the IT-associated strategy implementation. Technologies are entirely not a remedy to the organization's inefficiency, it has diverse effects on organizations' resources, and the application of technology does not guarantee expected outcomes (SZALAVETZ, 2022). Internet usage is full of anticipation and needs preparation, repositioning of the business and the knowledge of the personnel to effectively respond to external threats that might cause the organization (DUROWOJU, 2017).
- *Human Capital:* relates to the capability of the labour force that an organization and its leadership rely on for changes and strategy implementation. BONTIS et al. (1999, p.391) define human capital as '*the human factor in the organization; the combined intelligence, skills and expertise that gives the organization its distinctive character. The human elements of the organization are those that are capable of learning, changing, innovating, and providing creative thrust which if properly motivated can ensure the long-term survival of the organization*. Human capital demonstrates an organization's consistent support for the competence and skills development of employees to enhance sustainable organizational growth (PASBAN & NOJEDEH, 2016).
- *Competence Development Potentials:* the organization's provision of essential technological resources to enhance staff training for efficiency, and most importantly, a supportive environment inspires interest, and willingness of the employees to accept and effectively apply technology-competence integrated template to their daily work schedules. Technology acceptance is based on Internet accessibility coupled with satisfactory knowledge and interest of the employee in IT and its applications (AKPAMAH & MATKÓ, 2021). The person's ability and confidence to successfully apply the Internet forms his or her self-efficacy and competence (TAYLOR & TODD, 1995).

Relationships and Hypotheses Development

The integration of the SME competencies and emerging technologies is critical in the performance and sustainability of SMEs in the Upper East Region of Ghana. Given the keen competition among businesses and the SME's limited resources coupled with management challenges, SMEs ought to

strategically align competence to innovative management to achieve efficiency and sustainability. The development of SME leadership and support dynamics to influence leadership competencies incorporation across the various sectors of the informal economy contributes significantly to the growth and development of nations. Competence integration impacts SME leadership behaviour as leaders are open to data and trends made available by the application of IT in business operations. Management having adequate knowledge in the technologies application will efficiently equip leadership to play a moderating role in incorporating technology acceptance with SME competencies development to enhance productivity and growth within the SME in the Upper East Region of Ghana.

H1: Leadership and support dynamics influence leadership competencies

Supporting dynamics factors include socio-economic factors: effective partnership, easy transfer of information and knowledge across the global markets, creating and sustaining market relationships, constant touch with customers and business advertisement across borders. Leadership behaviour: leaders' style of management and decision-making regarding IT acceptance, leader's mindset regarding the incorporation of culture, beliefs, and norms of the organization and technology adoption, and leader's attitude towards employee skill training. Supportive factors: available and accessible credit facilities, state policies on IT development or usage and mandatory budgetary allocation for IT Training and competence development using the Hierarchical regression analysis to determine the impact of multiple independent variables on a single dependent variable. The approach allows the inclusion of independent variables in order of their importance.

The combination of technology and competencies is necessary for cross-sectional performance (DEKONINCK & BRIDGE, 2023). The examination of Industry 4.0 effects on leadership is crucial because the competencies of leadership determine the growth and continuous being of businesses in this globalized world. KONINGS and VANORMELINGEN (2009) argue that leadership is everything needed in all things. The existence or collapse of organizations is dependent on leadership competencies and the application of technology.

Therefore, organizational growth is in connection with the kind of competencies combined with technology that apply at the workplace. An approval of technology at work is first determined by

its perceived benefits DAVIS et al. (1989). The application of technology-coupled competencies to enhance performance and productivity remains a major concern of every potential user of the system.

The individual may perceive gains and present positive acts but decline the usage as he or she perceives losses (DISZTINGER et al., 2017). Also, the person's intention to continue an application into the future is predicted by the current behaviour (JACKSON et al., 1997). Hence, competence development is dependent on the socio-economic benefits of the application, the leadership behaviour and supportive factors hypothetically tested:

H1a: Socioeconomic benefits significantly and positively influence SME competence development.

H1b: Leadership behaviour has a significant and positive impact on SME competence development.

H1c**:** Supportive factors have a significant influence on SME competence development.

H2: Competence significantly impacts SME leadership behaviour

In this context, competence as a variable influences leadership behaviour. The relationship between leadership and competence development is complex as the behaviour of leadership might be determined by the competence acquired which means the kind of competence exhibited has an impact on leadership behaviour. A change in competence has effects on leadership behaviour while leadership influences business sustainability. Leadership behaviour demonstrated in an organization is consistent with the competence and skills acquired for the enhancement of sustainable organizational growth (PASBAN & NOJEDEH, 2016). *"A competency is a set of skills, related knowledge and attributes that allow an individual to successfully perform a task or an activity within a specific function or job"* (UNIDO, 2002). Hence, the association of competencies with leadership behaviour was hypothetically tested:

H2a: Social competence has a positive influence on SME leadership behaviour.
H2b: Methodological competence has a direct and positive effect on leadership behaviour.
H2c: Personal competence significantly influences SME leadership behaviour.
H2d: Technological competence has a significant and positive effect on SME leadership behaviour.

H3: Managerial leadership moderates the impact of TAM on competencies development

Whatever leadership an organization demonstrates has effects on its operations. The survival of a business venture depends greatly on leadership, and the zeal and commitment of employees to work. The activities of the leader either have a positive or negative impact on the lives of ordinary workers. RAVALLION (2001) argues that organizations where workers are reluctant to put up their best to increase productivity are an indication that the leadership lacks certain competencies and skills. Organizations need to recognize the required emerging competencies to enhance productivity (KONINGS & VANORMELINGEN, 2009). Leaders in any given organization must possess certain competencies to be able to transform available resources to align with the socially accepted norms and core values (MATKÓ, 2013). This hypothesis test the relationship between different competencies and various components of the technology acceptance model (TAM) within the SMEs in Ghana. Empirical testing of these hypotheses will identify the essential competencies that drive technology acceptance and provide an understanding of how SMEs can improve their competence development to advance technology acceptance. Hypothetically.
H3a: Managerial leadership moderates the effects of socioeconomic benefits and Perceived usefulness.
H3b: Managerial leadership moderates the effects of socioeconomic benefits and perceived behavioural intentions.

3. MATERIALS AND METHODS

The study adopts a quantitative method with an open questions approach to data collection to explore the integration of emerging leadership competencies and technology acceptance within the SME in the Upper East Region of Ghana. The questionnaire was designed based on the four theoretical frameworks: Competency-Based Theory (CBT), Resource-Based Theory (RBT), Human Capital Theory (HCT) and Social Exchange Theory (SET) and guided by Technological Competencies Profile (TCP), the European e-Competence Framework (FTI, 2012). CBT guides the development of the questionnaire by helping to identify specific competencies and behaviours that contribute to effective leadership within SMEs. RBT was applied in developing the questionnaire through the categorization of SME internal IT infrastructure and leadership competencies. HCT formed part of the questionnaire designed to justify and examine the level of training and education of leadership. It was particularly useful in the demographic characteristics section of the questionnaire. SET took centre stage in the questionnaire as it offered into insight relational dynamics, specifically in the context of technology acceptance and implementation. The entire questionnaire design was under the guidance of the Technological Competencies Profile (TCP), the European e-Competence Framework regarding technological competencies, internal and external environment and communication, training, and innovation constructs. The quantitative methodology leverages surveys with Likert-scale questions to gauge leadership competencies and technology acceptance with the SME. The technology acceptance model (TAM) forms the background for evaluating SME leaders' behavioural intent, perceived usefulness and perceived ease of use.

Sampling Procedures

There was no confirmed data on the entire SME population in the region either from the websites or the authorities in the selected municipality and the districts. However, data on registered SMEs in various sectors were obtained from the office of the Ministry of Trade and Industry, Bolgatanga. The data were not representative of the SMEs as they represented only a few registered SMEs in the region. Therefore, the COCHRAN'S (1977) sampling technique where both the population size and proportion are unknown was applied as illustrated below.

$$n_0 = \frac{Z^2.\ P.\ (1-P)}{e^2}$$

Where

n_0 = required sample size

Z = Z-score (based on confidence level, e.g. 1.96 for 95% confidence).

P = estimated proportion of the population with the characteristics of interest (If the unknown, use for maximum variability).

e = margin of error (e.g. 0.05 for ±5% error).

For a 95% confidence level, 50% variability (P = 0.5), and a 5% margin of error (e = 0.05).

$$n_0 = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2} = 384$$

The application of the COCHRAN (1977) sampling technique shows that a sample of 384 respondents was deemed appropriate for this study. The study deployed stratified sampling in which SMEs in these two districts and a municipal were considered in the survey. The stratified random sampling ensures a broad representation across different business sectors and sizes. The decision to settle on the Builsa North District, the Tempane District and the Bolgatanga Municipal was based on their geographical locations. Regarding growth and sustainability resulting from technologically aided competencies, organizational leaders, and those who owned firms or occupied managerial positions were targeted. Through the stratified sampling of SMEs, the artisans and local manufacturers as respondents were contacted for responses on their technological skills and competencies.

OLÁH et al. (2017) posit that sampling is a process of choosing from a much larger population, a group that a generalized statement made from selected parts and can simply represent the entire group. Sampling is a technique employed for gathering information from a smaller group that could accurately represent the entire population (ADEBI-CAESAR, 2012).

The data on each sector obtained from the office of the Ministry of Trade and Industry together with the results (384) obtained from COCHRAN'S (1977) sampling technique were used to

calculate the stratum for various sectors in each participating district and municipality and presented in Table 5. The population was divided into subgroups (strata) based on common characteristics, using the stratum proportional allocation formula.

$$n^h = [\frac{Nh}{N}] \times n$$

Where

N^h = Population of strata (145)

N = Total population size (857)

n = Total sample size (384)

n^h = Stratum

Table 5: Sampling Participated Sectors

Sector	Bolga Municipal	Stratum	Builsa District	Stratum	Tampane District	Stratum
Agriculture	145	65	120	54	65	29
Manufacturing	48	21	45	20	34	15
Services/activities	200	90	104	47	96	43
Total	**393**	**176**	**269**	**121**	**195**	**87**

Source: Author's Creation

3.1. Data Collection Methods

The studies collected two types of data namely primary and secondary data. The primary data were obtained from SME leaders (artisans and local manufacturers) whose firms operate in the Builsa North district, Tempane district and the Bolgatanga municipality while the secondary data was obtained from libraries, the internet and literature earlier authored by others in textbooks and journals. The five Likert scale questionnaires which one section, number one (1) representing "Strongly Disagree" and number five (5) representing "Strongly Agree", and another sector, number five (5) represents "Very Important" and one (1) representing "Not Important" with the three open questions at the bottom were administered to the 384 respondents supported by the

services of four (4) graduate students. They distributed questionnaires directly to members of the management team (Business owners, General managers, HR managers, and unit or department heads of artisans and local manufacturers). A pre-testing of the questionnaire was done on thirty (30) SMEs outside the sample started on 18th – 30th June 2023. Minor restructures and corrections of errors were made on the instrument after the pre-testing of it. The actual data collection began on 5th July – 10th September 2023.

Irrespective of the full cooperation pre-established with the firms, a few respondents in some SMEs were not that cooperative in response to the questionnaires for reasons best known to them. Their action would have badly affected the outcome of the study, but for patience, persistent visits and persuasion, the survey was a successful exercise. It was the continuous meetings and opportunities to explain and appeal to respondents that yielded the successful collection of the data for the study in some of the organizations.

3.2 Analysis of the Data

A total of 384 questionnaires were distributed to three hundred and eighty-four SMEs targeting leaders or owners or managers in two districts and a municipality in the Upper East Region, Ghana. A total of 372 questionnaires were retrieved representing 97%. At the end of the fieldwork, only 360 responses were suitable for data analysis due to duplication and incomplete questionnaires. The data collected were transcribed, coded and checked for consistency. Data will be presented using the SPSS software with multiple regression analysis employed, and the partial least square approach Smart PLS 4.0 (RINGLE et al., 2015) to determine the extent of leadership influence on technology acceptance. This approach facilitates statistical validation of key hypotheses and regional business insights.

The study analyses the effect of leadership as a moderator between technology acceptance and SME competence development using nine (9) constructs with fifty (50) variables and three open questions to answer the main research question, *"To what extent does SME competencies development coupled with technology achieve business growth and sustainability in the Upper East Region of Ghana?"* The data on the open questions are analyzed using thematic analysis to extract key patterns to understand leadership opinions regarding potential prospects of technologically integrated competencies within SME competence development. "*Thematic*

Analysis is a method for systematically identifying, organizing, and offering insight into, patterns of meaning (themes) across a dataset. Through focusing on meaning across a dataset" (BRAUN & CLARKE 2012). The manual thematic analysis is more appropriate and practical. Description-focused coding that describes the responses of the respondents to the specific questions will be applied and followed by a descriptive report with verbatim quotations from the respondents.

4. RESEARCH FINDINGS AND EVALUATION

The chapter presents the findings of data collected for the study. The reliability and validity of the instrument were tested with the factor analysis to create a summated scale while the demographic characteristics of the respondents were analyzed using the SPSS software.

4.1 Results of Respondents' Demographic Characteristics

The sex distribution of the respondents in Figure 10 indicates that the male respondents were 55.3%, while 44.7% represented the female respondents. The results imply that about 11% more were males engaged in manufacturing and artisanry than females at the time of the study.

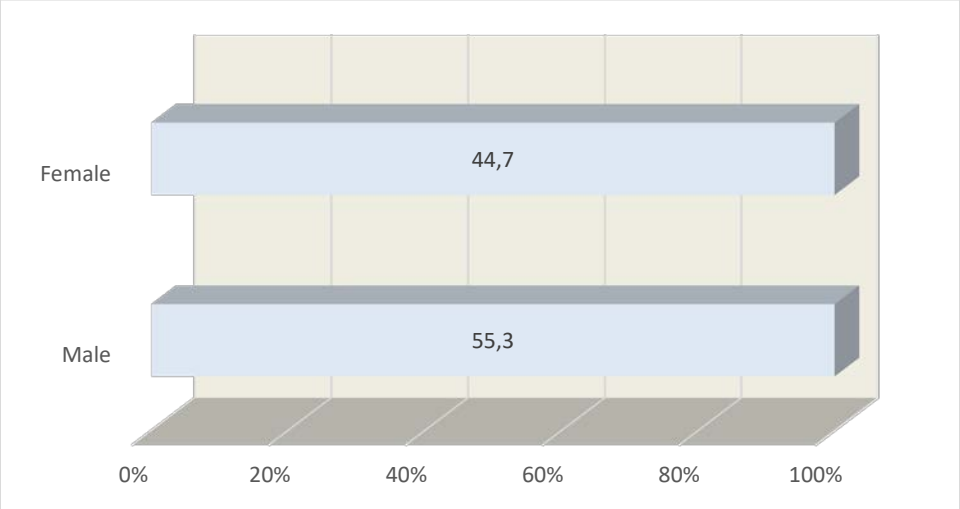

Figure 10: Sex of Respondents

Source: Author's Creation

The age distribution of the respondents involved in the business was assessed and presented in Figure 11. The results show that most of the respondents were between the age bracket of (31–45), representing 50.3% followed by 36.9% for age brackets 18 to 30. The least representation of the respondents' age group was 2.5% with ages 55 and beyond. The remaining 10.3% was among the middle age groups ranging from 46 to 55.

The results suggest that about 87% of the respondents were between the ages of 18 – 45, indicating that there is an active working age engaged in the informal sector economy.

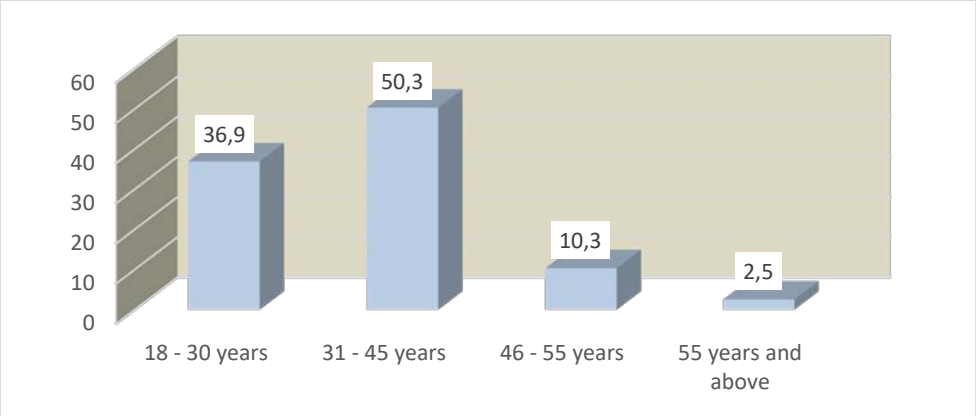

Figure 11: Age of Respondents

Source: Author's Creation

The educational background of the respondents was investigated, with the results presented in Figure 12. The results show the levels of education attained by the respondents, the West African Senior Secondary School Certificate Examination (WASSCE) holders represented 44% followed by 21% of persons who had passed the Basic Education Certificate Examination and were awarded certificates.

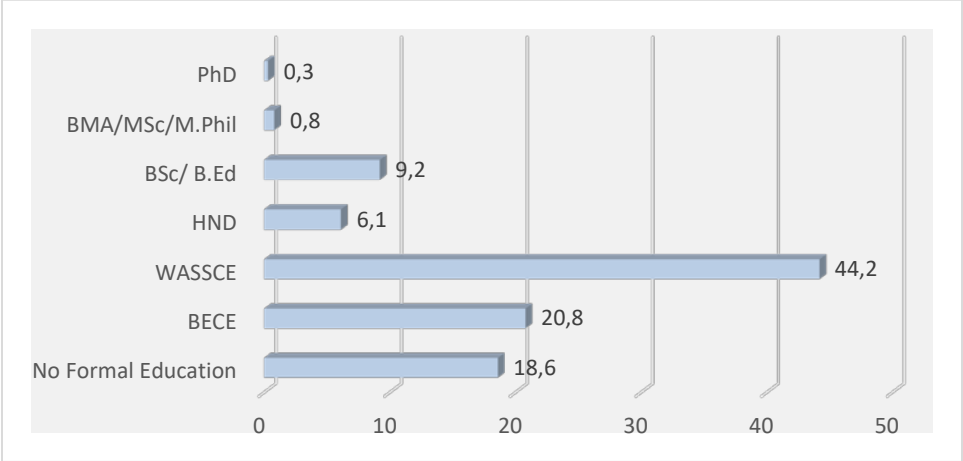

Figure 12: Respondents' Level of Education

Source: Author's Creation

The lowest percentages 0.8 and 0.3 represented MBA/MSc/M.Phil. and PhD respectively. However, a little over 18% of the research participants had no formal education as illustrated in Figure 8. The results revealed that people do not require a higher academic qualification to engage

in SME. The SMEs are not restricted to a certain class of people as PhD/ M.Phil./MBA/MSc/ holders were captured in this study, though with an insignificant representation.

It was necessary to find out the number of years that the respondents have been in their present business. The results presented in Figure 13 indicate that 64% of the respondents served their respective organizations within a range of 5-10 years, while 25% have been in the business for 11 to 15 years.

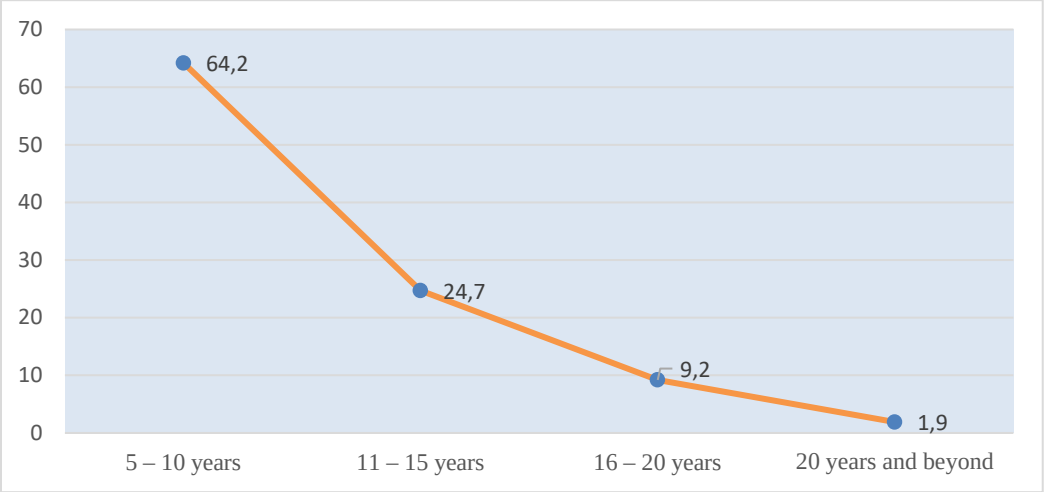

Figure 13: Years in Business

Source: Author's Creation

It is, however, interesting to note that only 2% of respondents had their businesses survived 20 years after their establishment. The respondents who operate their businesses within a range of 16 to 20 years were represented by 9%. The results further revealed that many SMEs do not exist beyond fifteen (15) years and attributed it to leadership behaviour and little or no technology application (Figure 13). An assessment of the numerical strength of staff in those firms was important as continuous recruitment demonstrates business growth (Figure 114).

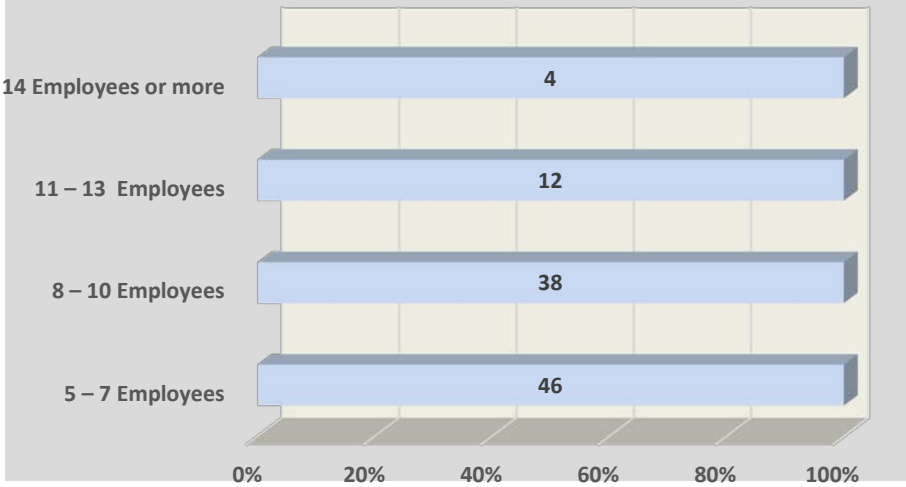

Figure 14: Numerical Strength of Staff

Source: Author's Creation

The results in Figure 14 show that firms that had employees between 1 and 7 represented 46.4% of the respondents followed by 38.1% represented firms with employees between 8 and 10, while 3.9% represented firms that had employees numbering 15 and beyond.

4.2 Analytical Methods

Factor Analysis

The factor analysis assesses the relationship between multiple variables and explains those variables concerning their common causal factors (HAIR et al., 2014). It finds hidden intent beyond the individual scores on specific aspects of factors influencing the overall responses. In factor analysis, the researchers apply either the principal component analysis (PCA) or principal axis factoring (PAF). The principal component analysis has the primary objective of transforming the original variables into a new set of uncorrelated variables that capture as much of the variance in the dataset as possible. The principal axis factoring (PAF) is specifically designed to identify the underlying latent factors that explain observed correlations among variables.

The PAF allows for the possibility of unique variances that are unique to each variable and assumes that there are both common and unique factors contributing to variance. The principal component analysis (PCA) assumes that all the variance in the variables is due to common factors with no

considerations for unique variance or measurement error. The study used the principal component analysis (PCA) to understand if there are underlying factors explaining the relationship between competence development and technology acceptance model within the SME in the Upper East Region of Ghana. Therefore, the observed, individual scores for various variables for instance form an integral part of PCA. The latent factors are the hidden influences that might not be directly measured but could affect the overall responses.

The factor loading is paramount in considering PCA for analysis. It represents the strength of the relationship between each feedback metric and the latent factor. The factor loading indicates the factor or variable that contributes strongly to the overall response or achievement of the research objective. The factor loading is the correlation coefficient for variables and factors. It shows the variance explained by the variable on that factor. In the SPSS approach, as the rule of thumb, 0.5 or higher factor loading is acceptable. TABACHNICK and FIDELL (2007) suggest stringent cut-offs, .32 — poor, .45 — fair, .55 — good, .63 — very good and .71— excellent. Eigenvalues and communality are associated with PCA analysis. The eigenvalues play a significant role in data analysis as it shows variance explained by that factor out of the total variance. Communality as part of PCA enables the researchers to understand how much each response metric shares with the common factors. It helps in showing how much of the individual response scores are explained by the underlying factors. MACCALLUM et al. (2001) maintain that all items in a factor model should have commonalities of over 0.60 or an average commonality of 0.7 to justify performing a factor analysis. Moreover, the average variance extracted (AVE) demonstrates the average squares of the loading.The AVE values, just like the composite reliability (CR) values, are not considered significant if the values are beyond 0.5, the recommended value.

Cronbach Alpha Reliability Test

Reliability of a dataset explains the consistency of findings of research which is associated with multi-scale items. The reliability of the constructs is tested and presented in Table 6. A construct is considered reliable and acceptable when an α is greater than or equal to 0.6. The Cronbach Alpha reliability test was used to ascertain the reliability coefficient of the constructs under consideration. The results show a strong reliability coefficient for each construct. The Cronbach Alpha obtained

a maximum coefficient of .981(98.1%) and a minimum coefficient of .843 (84.3%) indicating that constructs had excellent internal consistency demonstrated in Table 6.

Table 6: Cronbach Alpha Reliability Test

Constructs	Codes	Cronbach's Alpha	No. of Items
Technological Competence	TC	.946	5
Methodological Competence	MC	.884	7
Social Competence	SC	.881	7
Personal Competence	PC	.940	5
Supportive Factors	SF	.930	3
Managerial Leadership	ML	.880	3
Perceived Usefulness	PU	.981	7
Perceived Ease of Use	PEU	.943	6
Leadership Behaviour	LB	.915	6
Human Capital	HC	.942	5
Attitude Towards Usage	ATU	.857	5
Perceived Risks of Use	PRU	.843	6
Perceived Behavioural Intention	PB	.896	5
Competence Development	CD	.930	5
Socio-Economic Benefits	SEB	.894	5

Source: Author's Creation

The Kaiser-Meyer-Olkin (KMO) Measure of Adequacy

The KMO test measures the suitability of data for factor analysis. The KMO tests the adequacy of the sample size. It measures the adequacy of each variable in the data set. KMO values vary from 0 to 1. Values between 0.8 to 1.0 suggest that sampling is adequate whereas .90 and above indicate excellent sampling adequacy. However, KMO values less than 0.6 indicate that sampling is not good for the intended analysis, and the data must be reassessed (SHRESTHA, 2021). In this study, the KMO test results of .95 shown in Table 7 suggest that the data have excellent sampling adequacy and by implication, factor analysis is highly appreciated for this dataset. Moreover, the results show that there is a strong correlation among variables.

Table 7: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.945
Bartlett's Test of Sphericity	Approx. Chi-Square	2.462E4
	df	2775
	Sign.	.000

Source: Author's Creation

Bartlett's Test of Sphericity determines whether the correlation matrix is an identity matrix which suggests that the variables are unrelated and unsuitable for structure detection such as factor analysis or principal component analysis (FORNELL & LARCKER, 1981). The Chi-Square value of 2.462E4 (24,260) with 2775 degrees of freedom and a P-value of .000 indicates that the correlation among the variables is not random, hence factor analysis is the most appropriate in the data set. The results are supported by BEAVERS et al. (2013) argument that the Kaiser-Meyer-Olkin Test of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity give appropriate measurement and determine the strength of the relationships among factorability of the variables.

Total Variance Explained

The analysis of the Total Variance Explained in Table 8 revealed significant insights into the underlying dimensions of technology acceptance in SME competency development. The initial eigenvalues indicated that the first fifteen components accounted for a cumulative variance of 74.611 highlighting the multidimensional nature of competency development and technology integration. Specifically, the first component alone explained 35.005 of the variances, underscoring the predominant factors influencing competency development and technology integration. The analysis is confirmed by BEAVERS et al., (2013) position that the application of PCA in data analysis with specific reference to Kaiser Criterion, five, six and seven factors retained is a sufficient representation of the dataset.

The extraction method of factor analysis, the principal component analysis (PCA) in which the eigenvalues and variance are explained is shown in Table 8. Eighty linear components were identified within the data set before extraction. Fifteen distinct linear components within the data set for the eigenvalue >1 were identified after extraction and rotation. The combined effect of sixteen factors extracted accounted for 74.6% of the total variance. It proposed that the variables

with loading equal to 0.3 or above are significant, however, the minimum loading value threshold is 0.4 (HAIR et al., 2014). The results indicated that 74.6% of the common variance shared by the eighty variables can be accounted for by fifteen factors. This has reflected the KMO value of 94.5% which is excellent and by implication, the factor analysis is appropriate for the variables. It is, therefore, concluded that the final solution will extract not more than fifteen factors. The first component has an explained value of 35.0% of total variance with an eigenvalue of 28.04% while the fifteenth last component has an explained total value of 1.03% with an eigenvalue of 1.29% as shown in Table 8.

Table 8: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	28.004	35.005	35.005	28.004	35.005	35.005	6.839	8.549	8.549
2	4.536	5.670	40.675	4.536	5.670	40.675	5.064	6.329	14.879
3	3.805	4.756	45.432	3.805	4.756	45.432	4.595	5.744	20.622
4	2.797	3.496	48.928	2.797	3.496	48.928	4.145	5.181	25.803
5	2.636	3.295	52.222	2.636	3.295	52.222	4.139	5.174	30.977
6	2.566	3.208	55.430	2.566	3.208	55.430	4.128	5.160	36.137
7	2.372	2.965	58.394	2.372	2.965	58.394	4.041	5.052	41.189
8	2.256	2.820	61.215	2.256	2.820	61.215	3.979	4.974	46.163
9	2.052	2.565	63.780	2.052	2.565	63.780	3.916	4.895	51.058
10	1.894	2.367	66.147	1.894	2.367	66.147	3.895	4.868	55.927
11	1.567	1.959	68.106	1.567	1.959	68.106	3.723	4.653	60.580
12	1.485	1.857	69.963	1.485	1.857	69.963	3.376	4.220	64.800
13	1.468	1.834	71.797	1.468	1.834	71.797	3.373	4.216	69.016
14	1.221	1.526	73.323	1.221	1.526	73.323	2.348	2.935	71.950
15	1.030	1.288	74.611	1.030	1.288	74.611	2.129	2.661	74.611
16	.939	1.174	75.785						
	.....								
80	.043	.053	100.000						

Source: Author's Creation

The results confirm ZWOLIŃSKA's (2017) statement that the current technologies and competencies are integrated which encompass all job-related skills and knowledge of leadership behaviour in an organizational setting. The analysis of the explained variation measuring the discrepancy between the technology-accepted model (TAM) and actual data aligns with the study's main objective to examine the emerging competencies compatibility with technology acceptance in the management of SMEs in the Upper East Region of Ghana.

Pattern Matrix

The threshold for factor loading in the pattern Matrix is a requirement often associated with the output of exploratory factor analysis. It refers to the minimum absolute value of loading which is considered significant for factor interpretation. The threshold determines which variables' loadings indicate factors' internal relationships and strong correlations. A factor loading of ±0.3 or higher is considered a minimum threshold as there is no universal rule for factor loading threshold because of different sample sizes. However, a commonly used cut-off for factor loading interpretations includes 0.4, 0.5 and 0.6 depending on the sample size and the purpose of the study. A smaller sample size may set higher cutoff thresholds as low factor loading might be influenced by random errors whereas the larger sample size allows low loadings to attain confidence in the interpretation. Factor loading values closer to ±1 suggest a stronger relationship between the variable and the factor. Moreover, loading values more than the commonly used threshold shows that the variables are strongly related to that of the factor and can be interpreted within that factor's context. In this study, all factors loading are above the commonly used and accepted threshold (0.4, 0.5 and 0.6) with a higher value of .903 and the lowest value of .855 which implies 90.3% and 85.5% respectively.

The results show that items are aligned with their intended factors. These factors include technological competence with 5 items, methodical competence with 7 items, and three items (Conflict solving MC3, Decision making MC4 and Efficiency MC7) were removed due to low loading orientation. Also, Social competence with 7 items, 2 items (Ability to compromise and cooperate SC5 and Ability to transfer knowledge SC6) were removed for low loading and personal competence with 5 items.

These items' loading confirmed the construct validity of those constructs representing competencies. Technological factors comprise perceived usefulness with 7 items, perceived ease of use with 6 items, attitude towards usage with 5 items, the perceived risks of use with 6 items, perceived behavioural intention with 5 items and finally, socio-economic benefits with 5 items are aligned with their intended factors where items loading established the construct validity of those constructs.

Finally, factors involving supportive factors with 3 items, managerial leadership with 3 items, leadership behaviour with 6 items, human capital with 5 items and competence development with 5 items loading confirmed the construct validity.

Communality Measures

Communality measures the proportion of the variance explained by the extracted factor (Table 9). The factor accounted for by the factor solution and obtained values above .60 indicates high communalities and large variance in a variable are extracted (MACCALLUM et al., 2001). Higher communalities are indications that large amounts of variance in a variable are extracted by the factor solution. The results met the threshold of 40% where most of the proportion of the variance explained by the extracted factor had a large amount of variance in the variables that were extracted by the factor solution (FIELD, 2009). The higher score of 93% is represented by Internet usage increases my knowledge of the international market (PU1), for by 91% for both Internet usage reduces the shortage of skilled labour (PU3) and Internet usage increases my skills and general business knowledge (PU4), all within perceived usefulness of technology. However, the lowest score was represented by efficiency orientation (MC7) within the methodological competence accounted for 52%. The results in Table 9 show that all communalities met the threshold of 40%.

Table 9: Communalities

Variables	Initial	Extraction	Variables	Initial	Extraction
TC1	1.000	.777	PEU4	1.000	.852
TC2	1.000	.878	PEU5	1.000	.723
TC3	1.000	.853	PEU6	1.000	.820
TC4	1.000	.852	LB1	1.000	.638
TC5	1.000	.812	LB2	1.000	.801
MC1	1.000	.686	LB3	1.000	.796
MC2	1.000	.682	LB4	1.000	.757
MC3	1.000	.538	LB5	1.000	.691
MC4	1.000	.563	LB6	1.000	.755
MC5	1.000	.613	HC1	1.000	.850
MC6	1.000	.708	HC2	1.000	.823
MC7	1.000	.517	HC3	1.000	.789
SC1	1.000	.630	HC4	1.000	.798
SC2	1.000	.613	HC5	1.000	.827
SC3	1.000	.558	ATU1	1.000	.649
SC4	1.000	.676	ATU2	1.000	.699
SC5	1.000	.661	ATU3	1.000	.697
SC6	1.000	.618	ATU4	1.000	.672
SC7	1.000	.675	ATU5	1.000	.637
PC1	1.000	.853	PRU1	1.000	.571
PC2	1.000	.791	PRU2	1.000	.593
PC3	1.000	.856	PRU3	1.000	.596
PC4	1.000	.783	PRU4	1.000	.636
PC5	1.000	.800	PRU5	1.000	.580
SF1	1.000	.840	PRU6	1.000	.631
SF2	1.000	.897	PB1	1.000	.685
SF3	1.000	.881	PB2	1.000	.778
ML1	1.000	.764	PB3	1.000	.631
ML2	1.000	.782	PB4	1.000	.748
ML3	1.000	.806	PB5	1.000	.731
PU1	1.000	.926	CD1	1.000	.724
PU2	1.000	.893	CD2	1.000	.816
PU3	1.000	.912	CD3	1.000	.830
PU4	1.000	.912	CD4	1.000	.876
PU5	1.000	.891	CD5	1.000	.744
PU6	1.000	.864	SEB1	1.000	.600
PU7	1.000	.903	SEB2	1.000	.675
PEU1	1.000	.833	SEB3	1.000	.769
PEU2	1.000	.795	SEB4	1.000	.783
PEU3	1.000	.747	SEB5	1.000	.778

Extraction Method: Principal Component Analysis

Source: Author's Creation

Correlation

The "rs" indicates Spearman's rank-order correlation, a non-parametric measure of the strength and direction of association between two ranked variables. The correlation coefficients range from negative one (-1) to positive one (1) with general values indicating .70 to 1.00 as strong, .40 to .69 as moderate and .10 to .39 as weak correlations. The p-value indicates the significance of the variable's association. In social science the threshold of $p<.05$ shows it is statistically significant and $p<.001$ indicates higher significance. The results in Table 12 show that all the variables are

statistically significant and positively correlated. A few of these variables are further explained to enhance a better understanding of the study's objective (s).

There is a strong and statistically significant positive correlation between methodological competence and social competence (rs = .746, p-value = .001). This implies that leaders who are methodologically skilled in problem-solving, planning, and analytical thinking, for instance, tend to be socially competent in communication, collaboration, negotiation, and empathy. There is a statistically significant, moderately strong positive correlation between technological competence and methodological competence (rs = .633, p-value = .001) indicating that leaders with higher methodological competence demonstrate higher technological competence.

Table 12: Key Constructs

V	M	SD	TC	MC	SC	PC	SF	ML	PU	PE	LB	HC	AT	PR	PB	CD	SE
TC	4.38	.829	1														
MC	4.33	.684	.633**	1													
SC	4.29	.732	.588**	.746**	1												
PC	4.35	.861	.460**	.607**	.602**	1											
SF	4.47	.864	.497**	.556**	.512**	.453**	1										
ML	4.37	.909	.477**	.566**	.481**	.448**	.480**	1									
PU	4.37	.929	.407**	.464**	.407**	.360**	.417**	.441**	1								
PE	4.35	.904	.455**	.540**	.539**	.516**	.467**	.521**	.314**	1							
LB	4.17	.911	.403**	.420**	.458**	.464**	.420**	.311**	.337**	.362**	1						
HC	4.37	.912	.542**	.555**	.532**	.517**	.438**	.438**	.368**	.508**	.481**	1					
AT	4.18	.800	.446**	.459**	.406**	.360**	.400**	.451**	.414**	.454**	.229**	.322**	1				
PR	4.07	.862	.472**	.541**	.421**	.482**	.387**	.438**	.335**	.416**	.306**	.442**	.454**	1			
PB	4.23	.802	.420**	.521**	.493**	.361**	.423**	.415**	.350**	.417**	.283**	.390**	.379**	.443**	1		
CD	4.20	.904	.384**	.515**	.449**	.454**	.410**	.452**	.310**	.439**	.269**	.372**	.357**	.432**	.460**	1	
SE	4.16	.828	.404**	.465**	.434**	.352**	.461**	.340**	.398**	.407**	.389**	.358**	.374**	.330**	.341**	.354**	1

****.** Correlation is significant at the 0.01 level (2-tailed)

Source: Author's Creation

Variables (V), Mean (M), Standard deviation (SD), Technological competence (TC) Methodological competence (MC), Social competence (SC), Personal competence (PC), Supportive Factors (SF), Managerial Leadership (ML), Perceived usefulness (PU). Perceived Ease of Use (PE), Leadership Behaviour (LB), Human Capital (HC), Attitude Toward Use (AT), Perceived Risk of Use (PR) and Perceived Behavioural Intention (PB).

Leaders in this category initiate and accept innovative management and technological competence integration. The relationship between Perceived Usefulness (PU) and Attitude toward usage (AT) (rs = .454, p-value = .001) demonstrates a moderate positive significance, the association of these variables is not perfect though it is within the threshold of $p<.05$ which suggests a clear tendency of both variables move in the same direction. Leaders who perceive IT as more useful are more likely to have a favourable attitude toward using IT. The results support the technology acceptance model in which it is stated that the person's response to using a particular product, service or system determines the attitude of the user (DAVIS et al., 1989).

There is a moderate positive relationship between managerial leadership (ML) and Perceived Usefulness (PU) (rs = .441, p-value = .001) suggesting that as managerial leadership improves, the perceived usefulness also increases. The results show that leadership speaks in clear communication, given full support and guidance has a significant influence on how employees will perceive the usefulness of a system or a product. The moderately significant relationship of these variables in practical terms is that an improvement of leadership training and development has a direct impact on how employees value and accept change within the organization. Hence, organizations must invest heavily in IT infrastructure development and leadership training to achieve integrated competence development for high productivity and sustainability. The results demonstrate high mean scores and moderate standard deviation scores, for instance, the perceived usefulness (PU) mean and standard deviation scores M=4,37 (SD = 0.929) indicate respondents generally perceive technology acceptance competence integration as important in SMEs, though with moderately consistent agreement across the study sample. The results in Table 12 emphasize the crucial role of leadership in moderating and supporting the integration of competencies into the technology acceptance model (TAM).

4.3. Data Analysis and Hypotheses Testing

It is critical for testing the interest of people in competencies development. Technology-competence development comes with huge costs to the individual and organization. Both hardware and software as well as infrastructure are key to successful technological competencies development. Therefore, the study tries to relate supporting dynamics factors to SME leadership competence development.

H1: Support dynamics influence leadership competencies

The Cronbach's alpha reliability analysis in Table 6 shows that socio-economic benefits = .89, leadership behaviour = .92, competence development = .93 and supportive factors = .93. The analysis met the assumption of multicollinearity given that the tolerance value ranges from 0.67 to 1.00 while the value inflation factor (VIF) ranges from 1.00 to 1.49 indicating that multicollinearity is not found in this study, because tolerance values greater than 0.1 and VIF less than 10 are acceptable (SHRESTHA, 2021). The results of hierarchical regression in Table 10 conclude that the inclusion of H1a: socioeconomic benefits accounted for 12.5% variance in competence development R^2 =0.13, ΔR^2 = 0.13, F (1, 358) = 51.21, P < .001 and evidence of significant effects of socioeconomic benefits on the SME competence development (ß = .35, CI = .28, .49, P < .001).

Table 10: Hierarchical Regression Results

Competencies Development						
	Model 1		Model 2		Model 3	
Variables	**ß**	**CI**	**ß**	**CI**	**ß**	**CI**
SEB	.354***	.280, .492	.294***	.280, .492	.191***	.091, .327
LB			.159***	.247, .257	.071***	.034, .175
SF					.292***	.191, .420
Model Fit Statistics						
F - Values	51.206***		8.450***		28.515***	
R^2	.125 (12.5%)		.145 (14.5%)		.207 (20.7%)	
ΔR^2	.125 (12.5%)		.025 (2.5%)		.061 (6.1%)	

Note: ***P < .001.

Source: Author's Creation

The inclusion of H1b: leadership behaviour added 12% variance in predicting SME competence development R^2 = 0.25, ΔR^2 = 0.12, F (1, 357) = 58.9, P < .001, and an indication of significant effects of leadership behaviour on SME competence development (ß =.38, CI = .28, .47, P < .001). The addition of H1c: supportive factors (available and accessible credit facilities and favourable state policies on IT) added 2.4% variance in predicting SME competence development R^2 = 0.27,

$\Delta R^2 = .02$, $F(1, 356) = 11.6$, $P < .001$, and showing evidence of significant effects of a supportive factor in SME competence development (ß =.19, CI = .08, .31, $P < .001$). Therefore, the entire hypothesis H1: demonstrated a positive and statistically significant influence on SME leadership competencies development and it is accepted.

The assertion that supportive factors have a significant impact on SME competence development as supportive factors added 2.4% variance in predicting SME competence development demonstrates evidence of significant effects of supportive factors in SME leadership competence development. The results indicate that competency development is often supported by an individual's interest, level of education to enable an understanding of basic rules and procedures, and stable and reliable financial sources to enhance the purchases of training materials if any.

The results confirm MEYER et al. (2018) statement that SME deficiency could be attributed to a lack of training material and financial backing and where organizations struggle to have adequate training infrastructure for employee growth. The results further support the argument that SMEs will not have the competent workforce to increase productivity if training employees for a better understanding of emerging technologies and their effects on a person's performance and general productivity (CHAS-OVSCHI et al., 2021) and SMEs' continuous reliance on benevolence for support is a clear indication that the sector still needs assistance to explore and expand (CHAS-OVSCHI et al., 2021).

The findings also show that competencies and technology are intertwined, and appropriate for businesses, especially, start-up businesses in developing countries. Technology tools such as mobile phones or cell phones coupled with competencies such as 'technique and science' and 'socialization and conscience' are available and accessible to every entrepreneur. This agrees with DEKONINCK & BRIDGE's (2023) statement that a technology-competence integrated business plan has the potential for cross-sectional growth The extensive use of the Internet of Things in the region demonstrates an understanding of technology and the zeal to continue its usage in the foreseeable future. However, the technology acceptance model (TAM) propounded in the late 1980s might not be sufficient for today's analysis of the business landscape. TAM requires additional variables to make it effective for assessing levels of technological acceptance among potential users. The effectiveness of technology acceptance into competence development lies in

synergy. Leadership knowledge of technology and its significance on SME development is a signal to technology integration in management. Leadership competence and technology are considered resourceful as leaders appreciate that these constructs are not dissimilar and autonomous. Organizational efficiency and development are tied to advanced technologies and leadership behaviours.

H2 Competence Significantly Impacts SME Leadership Behaviour

The hypothesis in Table 11 tests if the perceived required competencies which included social competence, methodological competence, and personal competence have a significant impact on leadership behaviour.

Table 11: Leadership Competencies

Competence	Unstandardized Coefficients		Standardized Coefficients	T	Sign.
	B	Std. Error	Beta		
Social	.308	.073	.262	4.242	.000
Methodological	.387	.080	.307	4.849	.000
Personal	.192	.043	.203	4.497	.000
Technological	.031	.055	.030	.568	.570
Model fit statistics					
F values	(4, 73.304)***				
R Square	.452				
Adjusted R square	.446				
VIF values	(1.318, 2.605)***				

Source: Author's Creation

The study further follows up with a sub-hypothesis. The dependent variable leadership behaviour (LB) was regressed on the predicting variables social competence (SC), methodological competence (MC), personal competence (PC) and technological competence (TC).

The results significantly predicted leadership behaviour (LB), $F(3, 355) = 73.304$, $P < .001$, which indicates that the H2a: social competence SC ($ß = .262$, $t = 4.242$, $p < .001$) plays a significant role in SME leadership behaviour. The study further predicts H2b: a positive correlation between SME leadership behaviour and methodological competence which MC ($ß = .307$, $t = 4.849$, $p < .001$)

shows a positive correlation between the leadership behaviour and methodological competence, The testing of the 2Hc: personal competence influence on the SME leadership behaviour revealed that personal competence PC (ß = .203, t = 4.97, p < .001) have a significant influence on leadership behaviour. Therefore, the test of perceived required integrated social, methodological and personal competencies influence on leadership behaviour is statistically significant, hence H2a, 2Hb and 2Hc are all accepted.

However, testing 2Hd: if there is a positive connection between leadership behaviour and technological competence, the results revealed that technological competence H2d: TC (ß = .030, t = .568, p < .570) has no bearing on the SME leadership behaviour and is statistically not significant (Table 11). Therefore, H2d is rejected.

In general, these results indicate that social competence, methodological competence and personal competence have a significant impact on leadership behaviour within the SME in Ghana. Moreover, the $R^2 = .452$ shows the model explains 45.2% of the variance in leadership behaviour. Also, the value inflation factor (VIF) ranges from 1.318 to 2.605, showing that there is no issue of multicollinearity in this study because the VIF is less than 10 which is considered acceptable (Table 11).

The hypothesis tests if the perceived required competencies have a significant impact on leadership behaviour. The dependent variable leadership behaviour (LB) was regressed on the predicting variables social competence (SC), methodological competence (MC), personal competence (PC) and technological competence (TC). The results significantly predicted that social competence (SC) plays a significant role in leadership behaviour (LB). The study further predicts a positive correlation between leadership behaviour (LB) and methodological competence (MC) which shows a positive correlation within the SME while personal competence (PC) significantly influenced SME leadership behaviour (LB) in the region. Testing if there is a positive connection between leadership behaviour (LB) and technological competence (TC), the results revealed that no impact of technological competence on the SME leadership behaviour at the time of the study and is statistically not significant (Table 11).

The results suggest that leadership requires certain competencies for shaping characters, problem-

solving and self-retrospection. Social competencies for instance are critical to employee motivation and networking and as a matter-of-fact conflict resolution strengthen relationships.

The study further concludes that organizational sustainability largely depends on organizational efficiency, strategy decisions and flexibility of leadership approach. Besides, self-awareness and resilience coupled with integrity and accountability define the personal attributes of leaders. The results, therefore, are indications that social, methodological and personal competencies are essential requirements for successful leadership as an application of one will suggest the implementation of others.

The negative results suggesting that technological competence H2d: TC (ß = .030, t = .568, p < .570) has no impact on SME leadership behaviour and is statistically not significant raised doubt about leadership thinking towards technology-integrated leadership within SMEs in the Upper East Region of Ghana. The respondent's assertion that technological competencies have no significant relevance in leadership behaviour might not necessarily be contextually true, however, research results come with various views and must be accepted as they are supported by data and statistically established. Nonetheless, the results demonstrate that leadership behaviour is human-centred and requires no technological influence. The results show leadership behaviour is about interpersonal skills, setting goals and accomplishing aspirations. Besides, the core duties of leadership such as emotional intelligence, protecting the organization's ethics, people management and conflict resolution heavily rely on the ability to influence, guide and motivate rather than technical expertise. Moreover, leadership might consider technology-driven competence as a mere tool instead of an induce factor. Leadership behaviour is modelled by organizational culture and personal values, though it may accept technology as a facilitator, but not a determinant of leadership behaviour.

H3: Managerial leadership significantly influences technology acceptance in SME competence development - SmartPLS Analysis

The Partial Least Square is a variance-based technique allied to the Structural Equation Model (SEM). The SmartPLS is applied to research objectives seeking theory development and prediction of constructs (HAIR et al., 2017). SmartPLS is well performed in complex models with no assumption regarding data distribution. Besides, SmartPLS performs reflective formative

measurement models such as constructs with single and multi-item measures without constraint (Al-EMRAN, 2023). SmartPLS is associated with a higher statistical power and can render a particular relationship positive as it appears in the population. Partial Least Squares models are mostly used when there is prior knowledge of structural model relationships, measurement construct and exploration but not confirmation (HAIR et al., 2017). In SmartPLS models, both factors and composites are accepted in various contexts as the right approach to analyzing data on innovative technology and information systems (HENSELER, 2016). SmartPLS acceptance and continued use in information systems (IS) are evidence that it is an appropriate method for research that the objective is an extension of the existing structural theory (Al-EMRAN, 2023), especially, for exploratory research, complex models and development of a theory (HAIR et al., 2017).

The model assessment gives an empirical estimation of the relationship between the indicators and the construct designed to answer the research question. An assessment of the model makes users compare the theoretically designed measurement and structural models with reality and how well the theory fits the data (HAIR et al., 2017). There are two-step approaches to model assessment.

The measurement model assessment encompasses convergent validity, the common criterion to assess internal consistency reliability using Cronbach's Alpha to measure reliability on intercorrelations of observed indicator variables. However, Cronbach's Alpha allowed the measurement of internal consistency using composite reliability. Composite reliability considers different outer loadings of the indicator variables. Both Cronbach's Alpha and composite reliability values are ranged between "0 and 1" while the higher values represent higher reliability levels. Generally, the exploratory research accepted values range from 0.60 to 0.70 whereas values 0.70 to 0.90 are excellent or satisfactory.

Convergent validity measures the extent to which variables positively correlate with alternative measures of the same construct (HAIR et al., 2017). The convergent validity measures the reliability of reflective constructs indicating reliability and average variance extract (AVE). A higher outer loading on the construct shows that the related measures have much in common presented by the construct. The outer loading values ≥ 0.70 are acceptable whereas the AVE, the grand mean value squared loadings of indicators associated with the construct, "the sum of the squared loadings divided by the number of indicators" with accepted values ≥ 0.50 (HAIR et al.,

2017). The results showed statistically significant outer loading indicators ranging from 0.712 to 0.958 and perfectly aligned with the guiding principle of measurement model assessment.

Table 13: Construct Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
ATU	0.858	0.865	0.898	0.637
MC	0.884	0.887	0.910	0.591
ML	0.882	0.889	0.927	0.809
PB	0.896	0.897	0.924	0.708
PC	0.940	0.941	0.955	0.808
PEU	0.944	0.945	0.955	0.782
PU	0.981	0.981	0.984	0.896
SC	0.882	0.884	0.908	0.585
SEB	0.895	0.897	0.922	0.705
TC	0.947	0.948	0.959	0.825

Source: Author's Creation

Internal consistency is critical to the instrument's accuracy and reliability. It was confirmed by the Cronbach alpha test as demonstrated in Table 13. The Cronbach alpha is considered a test result > 0.7 (70%) as an adequate threshold value for analysis. The attitude towards technology usage is represented by 85.8%, methodological competence showed 88.4% managerial leadership is represented by 88.9% and perceived behavioural intention is shown by 0.90 in Table 13.

The rest are personal competence with 0.94, perceived ease of use is 94.4% and perceived usefulness is 98.1%. Finally, social competence is shown by 88.2%, socioeconomic benefits represented 89.5% and technological competence represented 94.7%. Generally, all the results shown are greater than 0.7, hence, the instrument is deemed accurate, reliable and appropriate for this study. The Cronbach Alpha coefficient of factors with total scale reliability ranging from 0.859 > 0.7 to 0.981 > 0.7 confirms that the variables are internally consistent and demonstrated a strong correlation within their groupings.

The convergent validity is established when the average variance extracted is ≥ 0.5, that is 50%. The AVE corresponding values for attitude towards technology usage is 63.7%, methodological competence is represented by 59.1% while managerial leadership was confirmed by 80.9%. The perceived behavioural intention is 70.8%, personal competence was shown by 80.8% and

perceived ease of use was indicated by 78.2%, Furthermore, the perceived usefulness is 89.6%, social competence is represented by 58.5%, socioeconomic benefits are shown by 70.5% whereas technological competence is designated by 82.5%. The AVE ≥ 0.5 confirms the convergent validity of the variables (FORNELL & LARCKER, 1981).

This study demonstrates a strong convergent validity as all the variables scored above the "AVE ≥ 0.5" scale (Table 13). For the composite reliability (rho_c) attitude towards technology usage is 89.8% methodological competencies represented by 91%, managerial leadership is shown by 92.7%, and perceived and behavioural intention is indicated by 92.4%. Table 13 presents personal competence 95.5% and perceived ease of use 95.5% while perceived usefulness recorded 98.4% and social competence 90.8%. Finally, socioeconomic benefits scored 92.2% and technological competence was confirmed by 95.9% shown in Table 13.

The structural model in Smart-PLS involves the significance of the path coefficients in Table 14. The path coefficients explain the hypothesized relationship among constructs. The values of the path coefficients range between -1 and +1, the values closer to +1 suggest strong and positive correlations.

Table 14: Path Coefficient

Constructs	Original sample (O)	Sample Mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
MC -> ML	0.349	0.347	0.074	4.725	0.000
ML -> ATU	0.460	0.460	0.063	7.353	0.000
ML -> PB	0.132	0.136	0.047	2.820	0.005
ML -> PEU	0.527	0.526	0.066	7.944	0.000
ML -> PU	0.217	0.218	0.055	3.915	0.000
PC -> ML	0.133	0.130	0.059	2.247	0.025
SC -> ML	0.048	0.054	0.064	0.743	0.458
SEB -> PB	0.030	0.031	0.053	0.561	0.575
SEB -> PU	0.159	0.160	0.055	2.877	0.004
TC -> ML	0.165	0.160	0.060	2.756	0.006
SEB x ML -> PB	-0.261	-0.259	0.030	8.707	0.000
SEB x ML -> PU	-0.163	-0.163	0.035	4.698	0.000

Source: Author's Creation

The p-values are the most used determinants of significance levels by researchers. The P-value < 0.05 indicates the significance level of the finding which means the significance level is 5% revealing that the relationship under observation is statistically significant. Besides, the interpretation of the path coefficient results is based on the assessment of the significance of all the structural model relationships using the t and p-values coupled with the confidence intervals (HAIR et al., 2014). The application of the cross-validated redundancy technique is considered the best and perfect fit for SmartPLS because the technique builds on the path model measure of both the structural and the measurement model of data prediction.

Figure 15 demonstrates the relationships between variables. The SmartPLS research model comprises a structural model and a measurement model. The inner model specifies the relationship between unobserved or latent variables, whilst the outer model specifies the relationship between a latent variable and its observed or manifest variables. The SmartPLS estimates the relationship between the strength of latent variables and determines how well the model explains the target constructs of interest (RINGLE et al., 2015).

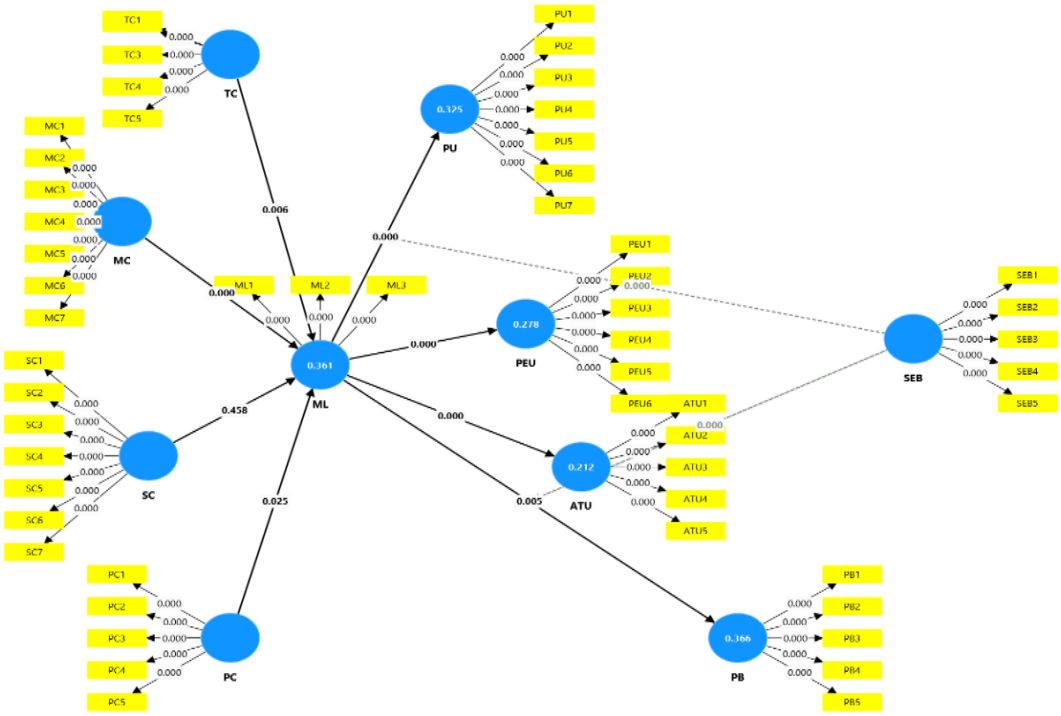

Figure 15: Smart PLS Model

Source: Author's Creation

The results imply that managerial leadership is the pivot in every unit of organizations and the key to human resource development. Managerial leadership is a blend of characteristics coupled with professional practices to achieve goals and objectives. The results establish managerial leadership as an integration of management theory and leadership behaviour with an emphasis on restructuring and alignment to stay focused and competitive. These findings are confirmed by TIAN-SYUNG et al. (2019) statement that managerial leadership creates change in strategies that affect the function and structure of a business and supports individual development and technology applications. The analysis demonstrates the importance of managerial leadership where management and leadership roles are joined to enhance performance and organizational effectiveness. Moreover, the results are an indication that managerial leadership encourages multicultural organizations to eliminate differences between socio-cultural backgrounds by giving subordinates equal opportunities, especially knowledge of the internet to develop their hidden talents. The results further suggest that the combined effect of leadership and management is positive and enormous as it leads to technological advancement, trustworthiness, trade liberalization and sustainable development.

The evaluation of managerial leadership's role in the relationship between TAM and competencies revealed that managerial leadership plays a significant role as its functions represent entrepreneurship. Entrepreneurial intelligence establishes a managerial ability to set attainable organizational objectives (SHET et al., 2021) to confirm these results. The results revealed that managerial leadership is considered entrepreneurial intelligence because such leaders understand and accept interpersonal and intrapersonal talents and acts that have the potential to support competence development and productivity. The results show that managerial leadership functions as a moderator and embodies entrepreneurial intelligence and linguistic intelligence to improve communication with stakeholders and the impact of knowledge on trainees and the newly employed for business continuity.

4.4 Fitness of the Model

Standardized Root Mean Square Residual (SRMR) refers to an absolute measure of fit that assesses the average discrepancy between observed and predicted correlations. SRMR values range from 0 to 1 with values closer to 0 indicating a better fit. An SRMR value less than 0.08 is accepted and

a value of 0.05 indicates a better fit. Also, the standardized difference of the unstandardized and latent covariances (d_ULs) is a diagnostic tool that measures the difference between unstandardized and latent covariances. The d_ULS lower values show a better fit while the large differences predict the model's inadequate capture of the relationship between latent variables. Besides, the standardized difference between observed and model-implied covariances (d_G) measures the difference between observed covariances and the covariances implied by the model. The lower values of d_G suggest a better fit model whereas larger values implied a misspecification of the model. The Chi-square (X^2) tests the discrepancy between the observed data and the expected data under the model. A non-significant Chi-square (X^2) statistical test $p>.05$ indicates a good model fit because observed data is aligned with the model's predictions. The Chi-square is, however, sensitive to sample size, hence, large samples often yield significant results even if the model fit is adequate.

Chi-square assesses whether there is a statistically significant difference between the observed and model-predicted covariances but should not be solely relied on for it is sensitive to sample size. The normed fit index (NFI) known as Bentler-Bonett Normed Fit Index, compares the chi-square values of the hypothesized model with a null model especially where all the variables are assumed to be unrelated. The NFI values range from 0 to 1, with values closer to I suggesting a better fit. Moreover, NFI with values greater than 0.70 are generally considered acceptable (Table 15).

Table 15: Model Fit Summary

	Saturated Model	Estimated Model
SRMR	0.042	0.109
d_ULS	2.655	18.139
d_G	1.397	1.539
Chi-square	2830.232	3016.543
NFI	0.848	0.838

Source: Author's Creation

The results in Table 15 show that the SRMR value for the saturated model is 0.042, whereas it is 0.109 for the estimated model. A decreasing SRMR value implies a better fit of the model, and the saturated model fits the data better than the estimated model. The second fit index is the ULS, which stands for the unweighted least squares discrepancy function. This index gives a number to

the difference between the covariance matrix and the covariance matrix that the model suggested. A smaller d_ULS value suggests an improved fit.

The saturated model has a d_ULS value of 2,655, whereas the estimated model has a value of 18,139. The saturated model has a lower d _ULS value than the estimated model, indicating a better fit. The third fit index is denoted by the letters d_G, which stands for the G-statistic. This index uses the likelihood ratio test to compare the observed and model-implied covariance matrices. A smaller d_G value suggests a better model fit. In the current setting, the saturated model has a value of d_G of 1.397, while the estimated model has a value of 1.539. Again, the saturated model has a lower d_G value than the estimated model, indicating a better fit. The Chi-square index measures the difference between the observed covariance matrix and the model-predicted covariance matrix. A lower Chi-square value suggests a greater degree of fit. In the present scenario, the Chi-square value for the saturated model is 2830.232, whereas the value for the estimated model is 3016.543. The saturated model has a lower Chi-square value than the estimated model showing a better fit. The normal fit index (NFI) represents the fifth fit index.

The index compares the Chi-square values of the estimated model and the null model. An NFI value close to 1 suggests a satisfactory model fit. In this study, 0.848 represents the NFI value in the saturated model whereas 0.838 corresponds to the estimated model. The saturated model has a higher NFI value than the estimated model, indicating a better match. The fit summary in Table 15 shows the values of several fit indices for both the saturated and estimated models. The saturated model has a better fit based on the values of the indices than the estimated model.

To ascertain the statistical significance of the relationship between variables and the effect of managerial leadership as a moderator among variables that represent competence and technology-accepted model (TAM). Table 16 presented the results of the hypotheses (H3: managerial leadership moderating the impact of TAM on competencies development) where all the findings except one indicated insignificant p-values.

Table 16: Hypothesis

Constructs	Beta coefficient	Standard deviation	T statistics	P values	Remarks
ML moderates the relationship between PC and ATU	0.061	0.030	2.037	0.042	Accepted
ML moderates the relationship between MC and PEU	0.184	0.051	3.616	0.000	Accepted
ML moderates the relationship between PC and PEU	0.070	0.034	2.046	0.041	Accepted
ML moderates the relationship between TC and ATU	0.076	0.032	2.366	0.018	Accepted
ML moderates the relationship between SC and PEU	0.025	0.034	0.730	0.465	Rejected
ML moderates the relationship between TC and PEU	0.087	0.036	2.455	0.014	Accepted
ML moderates the relationship between TC and PU	0.036	0.017	2.154	0.031	Accepted
ML moderates the relationship between MC and ATU	0.161	0.046	3.512	0.000	Accepted
ML moderates the relationship between SEB and PB	0.261	0.030	8.707	0.000	Accepted
ML moderates the relationship between SEB and PU	0.163	0.035	4.698	0.000	Accepted

Source: Author's Creation

Managerial Leadership (ML) moderates the relationship between Personal Competencies (PC), Methodological Competencies (MC), Social Competencies (SC), Technological Competencies (TC) and TAM variables (perceived attitude – ATU, perceived eases of use - PEU, perceived usefulness -PU). Managerial leadership (ML) moderates the relationship between socioeconomic benefits (SEB) and Perceived Behavioural intentions (PB), and Socioeconomic benefits (SEB) and perceived Usefulness (PU). A detailed explanation of the managerial leadership moderating effects on the relationship between these variables is found in the text.

The analysis is crucial since it validates the relationships between TAM and competencies development. This includes the effect of managerial leadership on competencies (technological competence, methodological competence, social competence and personal competence) and technology acceptance model variables (perceived usefulness, perceived ease of use, perceived attitude towards technology usage, perceived behavioural intention and socioeconomic benefits).

The analysis was conducted to determine how significant the effect of managerial leadership (ML) as a moderator is on the relationships between technology technology-accepted model (TAM) and competencies development (CD).

The results revealed that managerial leadership significantly influenced the relationship between TAM and competencies, except SC -> ML -> PEU (Table 16). The relationship between social competence (SC) and perceived ease of use (PEU) SC -> ML -> PEU, has no bearing on and no significance to managerial leadership (ML) (ß = .025, t = 0.730 p < .0.465). This implies that social competence (SC) development, though is often associated with an interest in the relationship and readiness to accept a change of behaviour. Leadership may provide all the necessary logistics to enhance customer relationships, quality education and personal development but once the individual is content with the status and conviction may not feel the influence.

The results revealed that the relationship between personal competence (PC) and the perceived attitude (ATU) of the leaders towards technology (PC -> ML -> ATU) is statistically and significantly impacted by managerial leadership (ML) (ß = 0.061, t = 2.037, p < 0.042). This explains managerial leadership's significant influence on leadership competencies development and the attitude towards technology adoption. Hence, leaders' competencies development determines their interest and commitment to applying technology in daily business activities. The results further show that managerial leadership (ML) statistically and significantly influenced the relationship between methodological competence and perceived ease of use (MC -> ML -> PEU), that is (ß = 0.184, t = 3.616, p < 0.000). Besides, managerial leadership (ML) positively moderated between personal competence (PC) and perceived ease of use (PEU), this implies PC -> ML -> PEU is statistically and significantly influenced by managerial leadership (ML) (ß = 0.070, t = 2.046, p < 0.041), Additionally, managerial leadership (ML) has a positive influence on the relationship between technological competence (TC) and attitude towards use (ATU). This explains TC -> ML -> ATU has statistical and significant influence (ß = 0.076, t = 2.366, p < 0.018).

Managerial leadership (ML) positively moderates the relationship between technological competence (TC) and perceived ease of use (PEU), TC -> ML -> PEU is statistically and significantly influenced by managerial leadership (ML) (ß = 0.087, t = 2.455, p < 0.014).

Managerial leadership (ML) positively moderates the relationship between technological competence (TC) and perceived usefulness (PU) which means TC -> ML -> PU is statistically and significantly influenced by managerial leadership (ML) (ß = 0.036, t = 2.154, p < 0.031). Table 16, the results show that managerial leadership (ML) significantly influenced the relationship between methodological competence (MC) and attitude towards technology use (ATU), that is MC -> ML -> ATU which means (ß = 0.161, t = 3.512, p < 0.000). Similarly, H3a: managerial leadership (ML) significantly and positively influenced the relationship between socioeconomic benefits (SEB) and perceived behavioural intentions (PB), that is SEB -> ML -> PB (ß = 0.261, t = 8.707, p < 0.000), and H3b: managerial leadership (ML) significantly and positively influenced the relationship between and socioeconomic benefits (SEB) and perceived usefulness (PU), SEB -> ML -> PU (ß = 0.163, t = 4.698, p < 0.000).

4.5 Results of Recommended Model for SME Competence Development

Managerial leadership is core in workforce and infrastructure development and a key ingredient in technology and competence integration in any given organization. An application of technique and science has a positive and tremendous impact on individual and SME development as shown in Figure 16. Leadership stimulates the socio-economic benefits of the applications. This leads to the desire for further training and development which determines their attitude towards the perceived usefulness of the product and psychologically attempted with perceived ease of use.

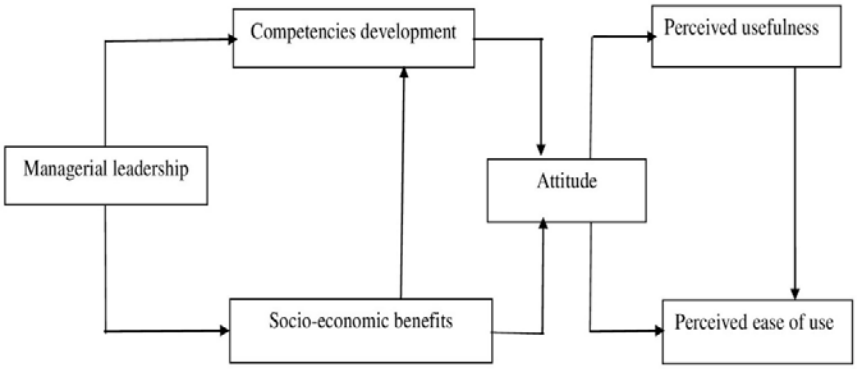

Figure 16: Technology Acceptance Competence Integrated Model (TACIM)

Source: Author's Creation

The mode provides insights into the relationships between technology and leadership competencies development with managerial leadership as a moderator between competencies and the TAM. The model highlights the importance of aligning management technology and competencies to survive potential challenges. Also, this model combines competency theory, from the perspective of managerial leadership, resource-based theory, from the viewpoint of competencies development, human capital theory from the standpoint of attitude, and social exchange theory, from the assessment of socioeconomic benefits. The results on technology-competence integration positively established in this study formed the modification of TAM to propose TACIM.

4.6 Results on Correlations of Strategy Development Indicators

The relationship between SME leadership behaviour and human capital showed a positive and significant relationship (rs = .467, p-value = .001), however, the relationship between the supportive factor and perceived risks of use presents the least figure, though positive and significant (rs = .439, p-value = .001) as demonstrated in Table 17.

Table 17: Competencies Integration

	CD	PU	HC	LB	SF
CD	1				
PU	.432**	1			
HC	.452**	.438**	1		
LB	.439**	.416**	.521**	1	
SF	.410**	.387**	.480**	.467**	1

**. Correlation is significant at the 0.01 level (2-tailed)

Source: Author's Creation

CD: competence development, PU: perceived usefulness, SF: supportive factors, HC: human capital and LB: leadership behaviour.

The p-value clarified that the correlation coefficient between two variables at 0.01 level described the relationship as statistically significant because a P- value of 0.01 indicates that there is less than 1% probability that the correlation occurred by chance. However, a p-value greater than or

equal to .5 that is ($p \geq 0.5$) shows a weaker or not statistically significant correlation between the two variables. This suggests that there is more than a .5% probability that the correlation between those variables occurred by chance. The results show that all the variables confirm positive correlations with p-values, explaining a statistically significant impact on SME leadership competence development.

The study further predicts a positive correlation between SME leadership competence development and supportive factors which shows a positive correlation between the supportive factors and leadership competence development within the SME in the Upper East Region of Ghana. The results show that the Internet of Things does not operate in a vacuum, it requires infrastructure and skills, both external and external factors to function.

The willingness of the state to adopt the internet by investing in IT facilities to enable vulnerable firms such as SMEs in deprived regions to incorporate IT in their business processes. Developing countries can only have a successful implementation of IT systems among SMEs if governments make Internet applications budgetary allocation compulsory for firms (AKPAMAH & MATKÓ, 2021). The testing of an organization's competent human capital correlations with competence development revealed that human capital significantly correlates with competence development in the SME. The results revealed that leadership behaviour has a considerable influence on IT application in business. Leadership decisions are paramount in the implementation and integration of IT systems in competence development. Finally, testing if there is a positive connection between leadership behaviour and competence development, the results indicate a positive impact and are statistically significant (Table 17).

Organizational leadership relied on skilled labour to formulate and implement strategies making the human capital a key to organizational development. Human capital is 'the human factor in the organization; the combined intelligence, skills and expertise that gives the organization its distinctive character. The human elements of the organization are those that are capable of learning, changing, innovating, and providing creative thrust which if properly motivated can ensure the long-term survival of the organization' (BONTIS et al., 1999, p.391). Human capital is the organization's ability to consistently support competence development for sustainability and high productivity (PASBAN & NOJEDEH, 2016).

4.7 Report of the Open Questions

A descriptive report of the themes and *verbatim quotations* from respondents is presented while Figure 17 demonstrates the main themes describing the responses of the respondents to specific questions about the potential prospects of technologically integrated competencies within the SME.

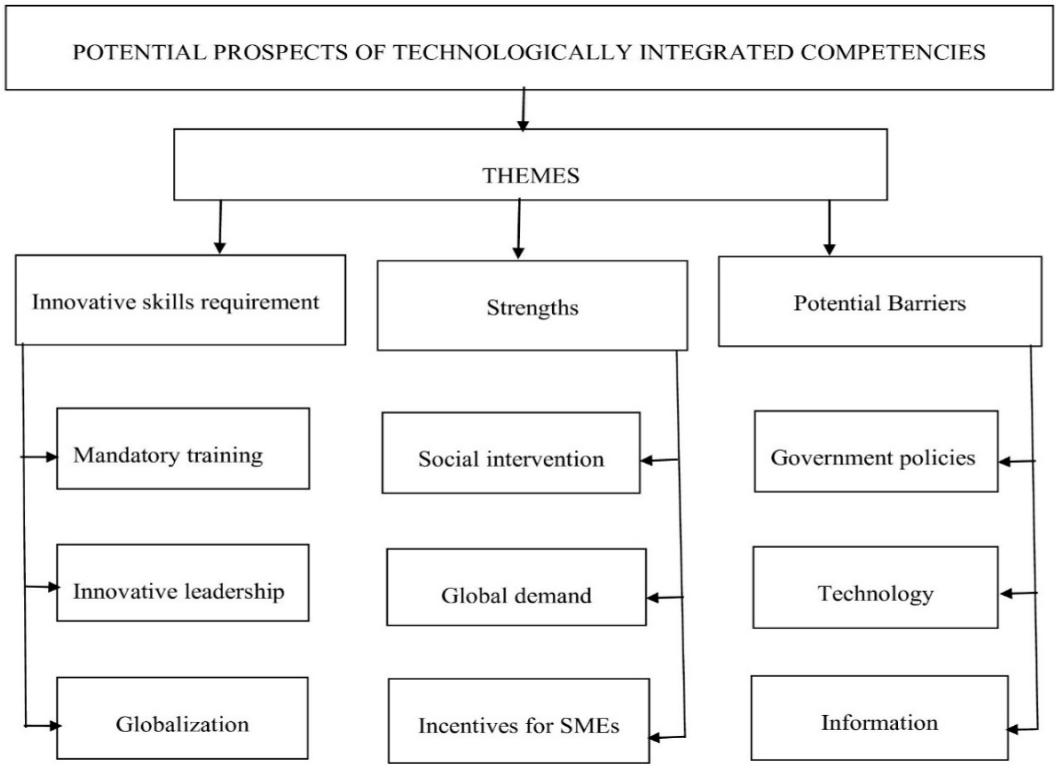

Figure 17: Main Themes

Source: Author's Creation

Figure 17 shows the competencies that an individual requires to work effectively and remain relevant in emerging technologies according to the participants. To maintain relevance, there must be mandatory training for leaders to acquire new knowledge at all times. The participants said SME leadership should be given training in relevant political decisions on sustainable SMEs. They advocated compulsory and continuous training programmes such as marketing, investment and customer relations for SMEs emphasizing entrepreneurial skills training.

A participant said:"*Management of SMEs requires knowledge of technology to understand data and trends to enable us to withstand any eventuality and properly plan for the future*".

The opinions of the participants confirmed HADJIMANOLIS (2000) findings which state that the absence of innovative-related institutions and the provision of continuous training is the result of SMEs' failure to accept technologically integrated management. The claim of the participants that leadership required innovative skills is supported by RUBMANN et al. (2015) argument that emerging technologies are changing the requirements in the labour market, particularly in the competencies and abilities. All the participants said that SMEs require managers with business skills and innovative leadership to survive the current business landscape.

A participant mentioned:*"Most of these SME leaders may have the necessary skills for effective management but these skills might be obsolete"*.

Besides, SME leadership's continuous use of traditional leadership styles often contributes little to sustaining their businesses and therefore requires innovative leadership to withstand the changing skill requirement influenced by innovative technologies. The participants' responses affirmed EISENBERG and WITTEN's (1987) statement that emerging technologies are requirements for leaders to equip themselves with unique knowledge and skills to function. Additionally, entrepreneurs should be trained to recognize opportunities and projects that solve societal problems, especially, technical skills as a niche market prospect for development. The current SME leadership require technical competencies which encompass job-related skills such as media skills, coding skills and integrated management (ZWOLIŃSKA, 2017).

The participants demanded huge investment in SMEs that can lead to massive innovations, commercialization, and national and international collaborations to enable the smooth transition of products and services within and beyond borders.

A participant disclosed:*"I think we those around the border will be happy trading with our colleagues on the other side of the border if there is a strong international corporation"*.

The participants' opinion confirms the statement that the general cost of production, accessibility, resource availability and innovativeness are positively influenced by internationalization (BROUTHERS et al., 2018). Participants' demand cross border engagement is in the right direction as the region is bordered by Togo and Burkina Faso, which makes it easier for SMEs in the region

to export their products to international markets and probably access products and services at a lower cost.

A participant replied: *"The strengthening of international relationships to enable the free flow of goods and services between Ghana and her border towns will help us."*

The participants' responses established CINNIOĞLU (2018) position that the components of globalization are key factors accountable for the swift transformation of the business environment as technologies cause sustained competition, compelling organizations to accept innovative management correlates with participants' assertion on globalization. According to the participants, strength in this regard refers to integrated skills development being a source of power for growth and sustainability, that entrepreneurs drive motivation and strength from sustainable business to keep them in business, hence the need for innovative skill development.

Participants recognize SMEs in the region as social intervention, and that technology integration will enhance the livelihood of those that are engaged in the business.

A participant answered:*"Businesses of this nature are found everywhere in the region, and most of these businesses do not require huge amounts of money or electricity to operate", and I say it is social intervention and our strength because the people get their daily bread from the small, small businesses that they do."*

These statements are a confirmation of POPESCU et al. (2010) findings that individual self-development and advanced knowledge in a given profession ensure continual improvement and sustainable livelihood.

People who desire innovation are mostly dependent on the intent and benefit (KYOBE, 2009). Participants mentioned that technological competence integration is desired globally and expected for every firm determined to survive the emerging technologies.

A participant said:*"If I have the skills and knowledge of technology, I will not have a limitation as technology is globally used"*.

The results agree with the previous studies that transnational has a worldwide growing impact on the local, national, and regional levels through financial, economic, political, social, environmental

and cultural (OCAMPO & MARTIN, 2003) where people of different origins, tribe, religion among others engagement are based on skills and competence.

SME leaders wanted state support for their businesses in the areas of funds, inputs, the market for their product and infrastructure development, secure market for those who are into agri-business especially, beverage and food production. This will serve as a motivation to acquire knowledge for continuous production.

The participant stated: *"Some of us have ideas that can improve productivity which in the long round can employ the unemployed to reduce the unemployment rate in the region, but limited by resources"*

Organizational leadership is motivated and inspired to accept training for a new future especially where leaders take absolute advantage of skills in pursuit of Industry 4.0 benefits (KWIOTKOWSKA et al., 2021), this supports the participants' opinions on incentives for the SME.

Also, free consultation and skill training will be an added advantage to SMEs, most especially, where the participants recommended that businesses should apply local resources to enhance the consumption of home-grown products and sustainable growth.

The participants mentioned some potential challenges that they face in accessing and adopting technology. These barriers include, but are not limited to state policies, technology and access to credible information. The research participants outline the challenges that confront them when incorporating technology with competencies in managing their organizations. This has a devasting effect on the productivity and sustainability of their businesses. The participants described the limitations of technology leadership competencies concerning state policy on technology.

A participant said:"*If the country formulates policies that make technology keeper to use and available, then, every firm will embrace technology competencies integration."*

The participants believe that the SME is reformed to enhance sustainability. A participant replied:"*There should be a system or a mechanism to ensure that the products produced meet both national and international standards."*

Also, financial support from government and charitable organizations will prevent SMEs from early shutdowns. The participants concern agree with BARTRAM et al. (2002) findings that SMEs need a competency development policy for a continuous update of knowledge. A comprehensive state policy framework on MSMEs' development is needed to improve the informal sector economy (MINISTRY OF TRADE AND INDUSTRY, 2019) confirmed the participants' claims. Most SMEs in deprived regions do not have the capital needed to acquire innovative skills and equipment to speed up growth in the sector. They lack the professional and entrepreneurial skills to increase productivity.

A participant declared:"*The application of technology will enhance the production of goods and services hence the absence of innovative ideas causes SMEs more harm than any other supportive factor"*.

Participants wanted strategies that would support the purchase of technological appliances for a radical transformation of SMEs to enhance productivity. The participants' responses are in line with the statement that organizations collapse after a few years of establishment can be attributed to not using technologies in management RAHMAN et al. (2018). According to the participants, SME leadership lacks knowledge of SME competencies development and entrepreneurs. They emphasized business owners must invest in training labour in technologies to enhance their competencies.

A participant revealed: "*I do not have an idea of the existence of equipment or facilities that can help me obtain new knowledge to increase productivity"*.

The participant views confirmed HULLA & RAMSAUER's (2020) statement that organizations could not achieve competence development is attributed to a lack of information and misconceptions of government regulations.

5. CONCLUSIONS AND RECOMMENDATIONS

The study examines small and medium-sized enterprise (SME) leadership competencies development and technology acceptance in the Upper East Region, Ghana. How these variables were interconnected and influenced by technology was assessed to enhance the understanding and appreciation of the current training and development needs of SMEs. The study integrates some selected theories to appreciate the relationship between technology and SME leadership competencies development. The authenticity of the results is measured by the reliability of the measuring instrument where the Cronbach alpha demonstrates high reliability values for all the variables. The results show a robust reliability coefficient for each variable with a maximum coefficient of 98.1% and a minimum coefficient of 84.3%, indicating that variables had excellent internal consistency. The variable obtains reliability test values > .7, that is an "α" is greater than 0.6 and considered reliable, substantial and acceptable.

These technologies have a tremendous effect on leadership decisions and general organizational behaviour. The leader's social and economic background has a significant influence on his/her approach to leadership and getting people to work for organizational achievement. The socio-economic factor is necessary in the assessment of the emerging technologies changing competencies requirement in recent times. Specialized training in leadership-related skills and the ability to leverage relationships for own ambition and organizational goal are entrenched in the socioeconomic characteristics of the leader. Leadership demonstrates a commitment to equality, diversity and inclusion as a principle, value and ethics stemming from quality and level of education and socio-cultural background. Leadership demonstrating truthfulness, honesty and motivation inspires and ensures the employees' good returns on their hard labour. SMEs require essential knowledge to enhance productivity and maximize socio-economic benefits. The testing of the impact of socioeconomic factors on competence development, leadership behaviour and attitude towards employee development contributes significantly to SME development. Leaders are mindful of current happens, they design vibrant strategies and continuously use data to stay informed and competitive. The results of hierarchical regression found strong evidence that leadership establishes a solid foundation for social exchange theory to thrive when there is a rapport between the management team and the workforce. Leaders' style of management and administration depicts the social exchange theory as it defines leadership intention regarding

workers' expected returns. This theory recognizes the material needs and psychological benefits of the worker. Social exchange theory contains employment contracts and responsibilities which include both tangible and intangible entitlements like wages and salary, trust, professional development, respect, motivation, promotion and collaboration.

Deliberate and properly planned actions, understandably organized to accomplish professionalism and organizational development are the basis of SME growth. Self-development and organizational management entails rationality and collaboration for successful SMEs in Ghana and beyond. The capacity-building framework that consists of knowledge, skills, and competencies often applied in managerial and interpersonal relationships coupled with technical aspects of work is deemed the most appropriate for SME sustainability. Though, the current business landscape has caused some changes to existing competencies and organizations ought to accept the integration of competencies and technology to solve the problem of unemployment in developing economies. Developing countries face diverse economic and social outcomes based on the integration level of the country into the global economy.

This has a worldwide growing impact on the local, national, and regional levels through financial, economic, environmental, political, social and cultural. SME competence development speeds up the process of bringing about trade openness, technological development, access to international trade and the understanding of potential adverse effects. The global economic crisis in 2008 for instance was an indication that countries are interrelated in trade and technology as globalized integrated countries' capital flow was negatively affected by the crisis through the subversion of economies in these nations. The recent evidence of countries' interconnectedness was the outbreak of COVID-19 where countries that were originally not affected put measures including travelling restrictions to stay off the disease. SMEs in less privileged countries still face numerous challenges in employing people to alleviate their suffering. High unemployment rates, and inflation, among others, have been identified as key factors militating against the recovery of these countries. Even Ghana today still blames her financial difficulties on COVID-19 and the Ukraine-Russia war emphasizing the economic integration of the world. However, the high illiteracy rate and rampant collapse of SMEs are attributed to the non-acceptance of technology and its applications in the current business landscape. Their combined effects have made SMEs ineffective and susceptible to bankruptcy.

The absence of innovation and continuous training for SME leadership results in limited prospects and stagnation. Individual access to skill development determines viable opportunities and sustainability. The operation of business in external markets eliminates structural requirements and drastically reduces production costs as it may be remotely managed. SMEs in deprived regions like Ghana need access to information and e-marketing for their product expansion. The overall production cost, accessibility, resource availability, new knowledge, professionalism and innovation are influenced by integration. The positive connection between leadership behaviour and technological competence, leadership decision is paramount in the implementation and integration of emerging technologies in competence development for productivity and sustainable SMEs in the Upper East Region of Ghana.

5.1 Limitations and Future Research

The small sample of craftspeople and manufacturers may limit the generalizability of the results. Additional research should test the model in larger samples and different industries and countries. Longitudinal studies could provide insight into how competencies and technology integration co-evolve over time with the fear of technological disruption. More complex models could be developed to account for additional factors shaping required competencies for digital transformation. Besides, organizations produce various commodities to satisfy consumer demand. These firms employ labour with various skills to support production. These employees accept the organization's offer based on evaluation and comparison to their interests and expectations. This study has not been able to identify and investigate every variable that management deemed satisfactory for technology integration. The study is limited to only SMEs in the Upper East Region of Ghana creating a gap as large companies and Non-Governmental Organizations (NGOs) deployed technology in different units to enhance productivity in the region. Moreover, SMEs in the region are not in good standing, however, the literature reveals numerous research about the existing poor condition of SMEs, more attention is needed to resolve basic challenges such as infrastructure, start-up capital, appropriate business plan, customer-care, strategy design and implementation confronting the SMEs. It is, therefore, recommended that future research on SME competence development and technology integration delves beyond competencies to solicit responses on basic impediments.

The essence of this study cannot be overemphasized, since new knowledge in companies' limitations to acquiring competencies development needs is added to the database of management studies. Besides, organizations recognizing determinants for talent development may either adopt the results for implementation or improve upon their existing human resource development strategies to enable labour efficiency and high productivity. Individuals who identify their weaknesses by the results will make a fanciful effort to survive the 21st-century business environment.

5.2 Theoretical and Practical Applications

The study fuses on how SME leadership competence development is integrated into the technology accepted model (TAM) to understand and predict technology acceptance behaviour among leaders, managers, SME owners and decision-makers. The study individual's perception of technology applications is enshrined in his or her ability and the state policy on the Internet of Things. The findings advance theoretical understanding and provide practical guidance on developing skills and competencies for contemporary business operations in emerging markets. Technology and competencies integration as a requirement for organizational growth and sustainability, the primary objective of this study has both theoretical and practical applications.

Theoretical Implications

The study adds substantial knowledge to the social exchange theory by indicating the significance of social competencies in technology acceptance for organizational success. The results provide empirical evidence for resource-based theory, showing how leadership derives the development of management capabilities and functional competencies as a strategic organizational resource. The study advances human capital theory by elucidating the interconnected nature of technology and competencies that comprise individual and collective workforce capacity. The study found relationships among competencies aligned with emerging technologies emphasizing the role of leadership in identifying opportunities and reconfiguring organizational resources. The technology acceptance competence integration model (TACIM) was premeditated to evaluate competencies required for the adoption and utilization of technology applications within SMEs. This model combines aspects of TAM with the emerging competencies for effective implementation. The

model emphasizes the integration of technology acceptance with competence development for a sustainable SME.

Practical Implications

Organizations need knowledge to establish connections with their stakeholders, particularly the employees, the backbone of organizational development. These are internal stakeholders whose interest in a company comes through a direct relationship, such as employment and a continuous existence of the organization to prolong engagement. The study is very significant to policymakers, they could use the findings to make informed decisions on education and training programs to ensure that individuals have the necessary skills and competencies for success in a technology-driven economy. The results could be used as a guide to policies aimed at supporting businesses in adopting new strategies for future workforce needs. The study allows organizations to emphasize social competencies like communication, teamwork, and knowledge sharing to facilitate critical thinking and problem-solving.

The results will enable leadership development to focus on building critical analysis and skills evaluation to derive management and functional competencies. With these results, hiring and training will take a holistic view of competencies as interconnected, not independent skill sets. Firms could audit competencies regularly to identify gaps and proactively build the human capital needed for digital transformation and digitalization. The analysis provides insights into stakeholder dynamics and helps to identify those values that are crucial for the successful implementation of technology. Companies that continue to show improvement in the effectiveness of their quality management system (QMS) and have always aimed at satisfying employee by identifying processes in their system consider the study important, most appropriate and timely. Implementing a system that makes continual improvement easy for the team to carry out, means checking up on the quality management system where management as an internal stakeholder who has a direct relationship through ownership, and investment with the organization needs technology applications coupled with competence development to achieve the set objectives found in this study. The results assist managers who want to satisfy their employees' competence needs thereby recognizing and modifying existing factors to maintain a strong competent workforce through the establishment of programmes and strategies that focus on employee competencies development.

The analysis of emerging leadership competencies and technology acceptance centred on managerial leadership and SME competence development and technology acceptance model has an effect on leadership playing a positive and significant role in employee competence development to enhance technology applications. This study has a practical implication in general management and organizational development. The results explain why employees may possess talents and personal traits, but they still need leadership, especially intimate supervisor to shape their behaviours in the organization, only talents and traits cannot create and sustain outstanding performance to enable the organization to retain its culture and achieve the set objectives. An organization has a culture to protect, and the employee has values as competence requirements to achieve. These desires and values are systems based on interpretations of the organization and the individual involved, the study placing managerial leadership at the centre practically revealed that the workforce understands the uniqueness of their organization through a rapport with management which exposes them to innovation and self-development.

6. MAIN CONCLUSION AND NOVEL FINDINGS OF THE DISSERTATION

The study fuses on how SME leadership competence development is integrated into the technology accepted model (TAM) to understand and predict technology acceptance behaviour among leaders, managers, SME owners and decision-makers. Technology and competencies integration as a requirement for SME growth and sustainability, the primary objective of this study is unique. The study builds empirical research to align SME leadership competence development with the technology acceptance model (TAM) to form the technology acceptance competence integration model (TACIM) for sustainable SMEs. The study reveals that an individual's perception of technology applications is enshrined in his or her ability and the state policy on the Internet of Things.

The study advocates compulsory and continuous training programmes such as marketing, investment and customer relations for SMEs emphasizing entrepreneurial skills training. SME leadership requires innovative leadership to withstand the changing skill requirement influenced by innovative technologies, because organizational sustainability largely depends on organizational efficiency, strategy decisions and flexibility of leadership approach. Hence, leaders' competencies development determines their interest and commitment to applying technology in daily business activities. However, SME are confronted with barriers include but are not limited to state policies on technology and access to credible information.

The findings advance theoretical understanding and provide practical guidance on developing skills and competencies for contemporary business operations in emerging markets. The study specifically discovered the following:

1. The study uncovers the precise magnitude and direction of the relationship between specific competency dimensions like interpersonal and key motivators such as perceived usefulness, and leadership support offering robust, across-contextual insights into their interactionist effects.

2. Findings reveal a balanced interactionist perspective that highlights the contextual and interdependent nature of leadership and technology in fostering sustainable organizational competencies.

3. The study reveals that insolvency is not merely the result of managerial ignorance, but more critically stems from the absence of scientific reasoning, structured decision-making processes, and the practical application of evidence-based management in business practices.

4. Additionally, it highlights the detrimental effects of neglecting organizational socialization mechanisms and ethical consciousness which together undermine sustainable business operations and long-term viability.

5. The research underscores that competencies and personal development serve as foundational elements for effective technology integration and the overall operational success of an organization, rather than being seen as costly luxuries or niche specializations.

SUMMARY

Some leaders are still not sure of the positive impact of the Internet of Things on their business development and sustainability. They use the internet and data for personal dealings. The development of human capital regarding innovation and positive attitude towards the use of technology remains unsatisfactory among the SMEs in deprived regions of Ghana. Most craftsmen and women still relied on traditional tools and methods to produce their artefacts. They do not incorporate IT as their businesses generate insubstantial income for economic development and unsatisfactory customer demand. An understanding of the concept and a perfect application of technology at work is a signal of sustainability. The “Internet of Things” has a tremendous effect on leadership and thoughts. Emerging technologies affect leadership by redirecting the way they orientate customers about the company’s products and the openness of corporate culture to digitization. The study found leaders’ consistent interest in the application of data in decision-making, which is obvious for them to stay with current information to establish business sustainability. Besides, the existing organizational processes are changing to match technology requirements. The provision of technologically collaborated structures that position businesses for technology applications is a requirement regardless of the products or services produced. SME leaders have a duty of doing extensive consultation including data and trend analysis. They ought to put cogent strategies in response to globalization. Leaders must react timely to the Industrial Revolution with a flexible strategy to stay focused and competitive. However, the SMEs' failure to recognize the importance of technology and competence integration is attributable to the government not investing in SMEs to create an avenue for technology applications. Individuals’ attitudes towards skill training and development, the zeal and ability of people to learn and appreciate new concepts have serious negative implications in incorporating emerging leadership competencies and technology in SME management.

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Registry number: DEENK/591/2024.PL
Subject: PhD Publication List

Candidate: Peter Akpamah
Doctoral School: Doctoral School of Management and Business
MTMT ID: 10080912

List of publications related to the dissertation

Articles, studies (5)

1. **Akpamah, P.**, Matkó, A.: Assessing SMEs leadership styles impact on business development and job creation: Evidence from Ghana.
Problems and Perspectives in Management. 21 (1), 448-458, 2023. ISSN: 1727-7051.
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International Journal of Engineering and Management Sciences. 4 (4), 408-419, 2019.
EISSN: 2498-700X.
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6. **Akpamah, P.**, Ivan, S. E., Matkó, A.: Organizational Culture as a Strategy. *Cross Cultural Management Journal. 23* (1), 15-26, 2021. ISSN: 2286-0452.

The Candidate's publication data submitted to the iDEa Tudóstér have been validated by DEENK on the basis of the Journal Citation Report (Impact Factor) database.

13 December, 2024

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Appendix

Appendix A: Technological Competencies Profile (TCP)

Table 1A: Technological Competencies Profile (TCP)

Technology Knowledge		
Theoretical framework based on the European e-Competence Framework (e-CF), the Skills Framework for the Information Age (SFIA), the Information Technology Infrastructure Library (ITIL) and emerging markets.		
Knowledge	**Abilities**	**Attitudes**
Software and Hardware	Software and Hardware	Communicative Purposeful Integrative Leadership Proactive Promotive Reflexive
	To encourage the usage of Web 2.0 tools	
	To identify necessary components, subsystems, and technologies	
	To participate in processes of creation, development, transfer, and usage of technology	
	To manage digital information in an accessible, sustainable and inter-operational way	
	To develop technological prospection based on the research of upcoming tendencies, technological and technical advances, social and political changes, and scientific research	
	To identify human talent with expertise in technological systems and device management	
Mobile applications	To use mobile equipment masterfully	Participatory Empathetic Proactive Communicative
	To use mobile apps for communication, collaboration, cooperation, and the efficient management of information.	
	To use tools for technological surveillance of technological innovation and associated with a systematic work of planning, production, and dissemination of information.	
	To plan the usage of mobile technological resources, promoting a competitive advantage	
	To select qualified and competent personnel for the management of components, subsystems, and necessary technologies	
	To master and adapt process reengineering and concurrent engineering	
	To manage activities in accelerated cycle processes for the development of new products and/or services and for their launch in the market, and to control time spans that get progressively shortened.	

Innovation management	To integrate a multidisciplinary team of employees within the company.	Committed Confidant Cordial
	To monitor through technological tools, considering security issues in software, hardware, infrastructure, and information.	
	To master and adapt process reengineering and concurrent engineering	
	To manage activities in accelerated cycle processes for the development of new products and/or services and for their launch in the market, and to control time spans that get progressively shortened.	
	To integrate a multidisciplinary team of employees within the company	
	To monitor through technological tools, considering security issues in software, hardware, infrastructure, and information.	
Technological change management	To manage systems, subsystems, devices and technology standards and certifications that regulate the use of the service.	Visionary Responsible Ethical leadership
	To practice self-learning.	
	To have a systematic and systemic vision	
	To manage the technical, administrative, legal, social, and environmental effects of a complex system.	
	To generate a productive environment from the constant redesign of services and technology changes.	
	To execute transitions efficiently and affordably.	
	To handle incidents.	
	To respond to requests for the resolution of problems, based on the perception of users, clients, and employees	
	To guide and manage the value offered to customers	

Source: Fundación Tecnologías de la Información (FTI) 2012

Table 1B: Technological Competencies Profile (TCP)

Knowledge of the SME Economy		
Analysis of government policies and their dispositions regarding SMEs in an international, national and regional framework; and perception of local higher education and research institutions by a pre-selected group of experts.		
Knowledge	Abilities	Attitudes
	To manage the development and innovation of products and services.	
	To reduce production and service costs without affecting quality.	
	To increment the quality of products and services of SMEs	
	To participate in pieces of training and certifications of SMEs by government institutions.	

Quality of service	To promote the SME market regulation schemes.	Committed Ethical Planning Visionary
	To promote and manage evaluation and certification models regarding SME techniques.	
	To socialize processes, procedures, and benefits concerning the incorporation of systems for SME sustainability.	
	To invest in cutting-edge technology for the sustainability of SMEs.	
	To modernize the production plant for SMEs in the remotest regions.	
	To consider the state's natural resources in the development of SME projects.	
Industry and government	To understand and take advantage of public policies that support the SME's leadership development.	Cooperative Participatory Leadership Communicative
	To obtain economical funding through the state and donor countries for sustainable SMEs.	
	To cooperate with the public sector to identify niche markets for SMEs.	
	To establish a relationship and cooperate with government institutions that support competencies training of SME leadership.	
	To analyze and understand the SME economic development from the strategic national planning perspective and consider the National Development Plan, a strategy and legislatures to reform SMEs.	
	To identify the objectives of every government institution that was created for the development of SMEs in Ghana such as the Ghana Enterprises Agency (GEA) and the Ministry of Trade and Industries (MOTI).	
	To be constantly informed about the state's programs that support SME development in Ghana.	
	To promote and participate in the competencies' standards for product efficiency and SME development.	
	To participate and maintain active communication with the Special State's SME agencies.	
	To understand and address the disadvantage of SMEs in northern Ghana regarding the allocation of national resources.	
	To integrate and/or participate in collaborative groups where the informal sector, higher education institutions, and government are involved.	
	To promote projects for SME development that are socially responsible and growth-oriented.	
	To promote a sustainable culture in the industry and society	

Industry and I + D	To identify innovative professions and incorporate professionals in the processes for sustainable SMEs.	Cooperative Integrative Participatory Reflexive
	To promote the usage of geographic information systems for the timely detection of needs and the feasibility analysis of products and services that will enable SME growth and development.	
	To link with the SME Innovation following the activities of their businesses or products.	
	To participate in forums and academic conferences for the promotion of services or the presentation of SMEs in the North.	
	To structure and promote internship programs for students so they can later be involved in business projects	
	To support the structure of a development and innovation department for the creation of new products and services	
	To sensitize businesses from different sectors on the need to create a department for sustainability management to develop projects based on productivity that allow the efficient usage and saving of resources.	
Exportation industry	To value compliance with international standards for SMEs efficiency.	Confidant Cordial Leadership Promotive Respectful Tolerant
	To analyze climate change and the need to reduce seasonal jobs	
	To disclose and transfer knowledge about climate change and the need to reduce post-harvest losses.	
	To link with the international industries in the developed countries for the acquisition of equipment at a low cost and within schedule.	
	To link with the international industries for the promotion of SMEs.	
	To seek foreign investment for the development of SMEs in deprived regions of Ghana.	
	To develop strategies for planning and exporting products and services of SMEs.	

Source: Fundación Tecnologías de la Información (FTI) 2012

Table 1C: Technological Competencies Profile (TCP)

Business Innovation Knowledge		
Based on a theoretical analysis of administrative trends of innovation and trends of SME's development.		
Knowledge	**Abilities**	**Attitudes**
	To encourage the development and labour insertion of human capital related to ICTs.	
	To promote remote work based on the technological capabilities of human capital.	

Boost to human capital.	To motivate and finance constant training and updating of human capital.	Communicative Confidant Cordial Leadership Planning Solidary.
	To promote internal training and updating programs for human capital.	
	To propose short-term, medium-term, and long-term goals for the adoption of ICTs within the firm or informal economy.	
	To promote entrepreneurship as part of the firm's growth	
	To promote the creation of a portfolio that presents the ICT capabilities of the firm's human capital.	
Digital Marketing	To know the marketing and digital marketing models.	Participative Proactive Communicative
	To raise awareness about the importance of incorporating and adopting technology in the industry.	
	To possess an innovative mindset	
	To direct efforts for the incorporation of technology after strategic market planning	
	To enable conditions for the usage of technology	
	To consider ICTs as a source of improvement within the firm, maintaining a positive vision of its implementation.	
	To constantly monitor the ideal connectivity and functioning of the internet systems.	
	To reveal services and processes through social networks regularly.	
	To diversify the dissemination of information through websites, contact emails, and browsers, among others.	
	To constantly evaluate the impact of digital promotion strategies.	
Collaboration and cooperation	To participate in work networks with the public and private sectors.	Proactive Purposeful Reflexive Ethical Leadership
	To promote and participate actively in the state's organized IT activities.	
	To join national and international collaboration networks.	
	To cooperate and collaborate with other sectors of the region that are involved in the production value chain.	
Effective communication	To integrate an efficient communication plan between employees and clients.	Respectful, Tolerant, Patient and Ethical Leadership
	To integrate an internal communication plan which clearly defines the means, frequency and forms of communication between human capital or company departments.	

	To define effective communication strategies with suppliers, minimizing delivery times, and speeding up operations and the acquisition of supplies.	
	To integrate and socialize the client portfolio within the firm, preferably with the use of digital media to ask for feedback from clients.	

Source: Fundación Tecnologías de la Información (FTI) 2012

Table 1D: Technological Competencies Profile (TCP)

Border and Transnational Context Knowledge		
Based on human, social, cultural, and geographic considerations		
Knowledge	**Abilities**	**Attitudes**
Educational	To be a multilingual leader	Persevering Critical Proactive
	To disclose and encourage the best organizational practices	
	To know the educational offers related to SMEs available in the state, from the technical to postgraduate level, to have a full understanding of the potential for human capital in the region.	
	To know the geography of the state and its potentialities in SME development.	
	To analyze the state's nature of consumption and the degree to which the demand for products and services is being addressed.	
	To know which indicators are cause of alarm in the state's natural resources, population growth, demand and supply, inflation rate, political and economic stability, technological development, international competition, and prices of goods and services.	
Social	To address needs in vulnerable communities that are without a business support system.	Proactive Participative Reflexive Purposeful Ethical Empathetic
	To identify the human development index, living conditions, poverty, and social and economic inequalities in the region	
	To identify migrant, Indigenous and disabled groups, and propose business support development	
	To identify the demographic population to establish projects in strategic areas to enhance growth and development.	
Economic	To know the economic activities in the state, mainly those where investment in SMEs is needed, such as agricultural and commerce in Northern Ghana.	Purposeful Leadership Planning Ethical Empathetic
	To know and analyze the development areas of the informal sector the state potential contributor to employment.	

Source: (Fundación Tecnologías de la Información FTI 2012)

Appendix B: Research Questionnaire

UNIVERSITY OF DEBRECEN, DEBRECEN- HUNGARY.
DOCTORAL SCHOOL OF MANAGEMENT AND BUSINESS.

QUESTIONNAIRE FOR THE SMEs IN THE UPPER EAST REGION, GHANA.

This survey is conducted by Peter Akpamah, a Ph.D. Candidate at the Doctoral School of Management and Business, University of Debrecen, Hungary, to better understand the thoughts and beliefs of SMEs on leadership and competence integration "Examine Emerging Leadership Competencies and Technology Acceptance: A Study of Small and Medium Enterprise (SME) in the Upper East Region, Ghana. This questionnaire consists of three sections, and it takes about 35 minutes to complete. The research is purely for academic purposes. Your responses and opinions on this topic would be beneficial in drawing a successful conclusion. This survey is anonymous and no individual information will be disclosed when the data is published.

Thank you very much for your help!

Contacts: Email: akpamah.peter@eng.unideb.hu
Phone: **0247036656 / 0207756066**

Required Competencies and Challenges

Please tick correctly in the boxes using a tick (√) or cross mark (x) the statement that describes your opinion on the competencies ranging from **5 = very important to 1 = less important.**

		Responses				
	Statement	1	2	3	4	5
No	**Technical competencies**					
1	State-of-the-Art knowledge	☐	☐	☐	☐	☐
2	Process understanding	☐	☐	☐	☐	☐
3	Media skills	☐	☐	☐	☐	☐
4	Coding skills	☐	☐	☐	☐	☐
5	Understanding IT security	☐	☐	☐	☐	☐
	Methodological competencies Dep					

6	Creativity	☐	☐	☐	☐	☐
7	Problem-solving	☐	☐	☐	☐	☐
8	Conflict solving	☐	☐	☐	☐	☐
9	Decision making	☐	☐	☐	☐	☐
10	Analytical skills	☐	☐	☐	☐	☐
11	Research skills	☐	☐	☐	☐	☐
12	Efficiency orientation	☐	☐	☐	☐	☐
	Social competencies Dep					
13	Intercultural skills	☐	☐	☐	☐	☐
14	Communication skills	☐	☐	☐	☐	☐
15	Networking skills	☐	☐	☐	☐	☐
16	Ability to work in a team	☐	☐	☐	☐	☐
17	Ability to compromise and cooperate	☐	☐	☐	☐	☐
18	Ability to transfer knowledge	☐	☐	☐	☐	☐
19	Leadership skills	☐	☐	☐	☐	☐
	Personal competencies					
20	Flexibility	☐	☐	☐	☐	☐
21	Motivation to learn	☐	☐	☐	☐	☐
22	Ability to work under pressure	☐	☐	☐	☐	☐
23	Sustainability Mindset	☐	☐	☐	☐	☐
24	Compliance	☐	☐	☐	☐	☐
	Supportive Factors					
25	Available and accessible credit facilities	☐	☐	☐	☐	☐
26	State Policies on IT development or usage	☐	☐	☐	☐	☐
27	State budgetary allocation for IT Training	☐	☐	☐	☐	☐
	Managerial Leadership					
28	Organization and state Policies on IT	☐	☐	☐	☐	☐
29	Management/Leadership Styles	☐	☐	☐	☐	☐
30	Strategies to enhance computer literacy	☐	☐	☐	☐	☐

5 – Very Significant, 4 – Significant, 3– Neutral, 2 – Somehow Significant, 1– Not Significant

TECHNOLOGY ACCEPTED MODEL (TAM)

Please tick correctly in the boxes using a tick (√) or cross mark (x) the statement which best describes **your perceptions** of Technology Acceptance **1 = least to 5 = High.**

No	Statement	Responses 1	2	3	4	5
	Perceived usefulness					
1	Internet usage increases my knowledge of the international market.	☐	☐	☐	☐	☐
2	Internet usage increases my knowledge of networks/networking.	☐	☐	☐	☐	☐
3	Internet usage reduces the shortage of skilled labour.	☐	☐	☐	☐	☐
4	Internet usage increases my skills and general business knowledge.	☐	☐	☐	☐	☐
5	Internet usage increases my knowledge of international standards.	☐	☐	☐	☐	☐
6	Internet usage increases my spirit of innovation and managerial skills.	☐	☐	☐	☐	☐
7	Internet usage equips me with multi-skills	☐	☐	☐	☐	☐
	Perceived Ease of Use					
8	Learning to use the internet and its facilities is easy.	☐	☐	☐	☐	☐
9	Interacting with the internet is easily accessible and understandable.	☐	☐	☐	☐	☐
10	Internet application in my business is easy and flexible.	☐	☐	☐	☐	☐
11	It is easy to acquire skills for the use of the Internet and its facilities.	☐	☐	☐	☐	☐
12	It is easy to use the Internet across business units and departments.	☐	☐	☐	☐	☐
13	It is easy to use the Internet for internal and external transactions.	☐	☐	☐	☐	☐
	Leadership Behaviour					
14	Leaders style of management and decision-making affects IT acceptance	☐	☐	☐	☐	☐
15	Leader's behaviour can increase industrial harmony.	☐	☐	☐	☐	☐
16	A leader's behaviour positively affects relationships in an organization.	☐	☐	☐	☐	☐
17	A leader's behaviour affects a firm's Corporate Social Responsibility.	☐	☐	☐	☐	☐
18	Leaders are mindful of the culture, beliefs, and norms of the organization.	☐	☐	☐	☐	☐
19	A leader's attitude often changes the employee's behaviour.	☐	☐	☐	☐	☐
	Competent Human Capital					
20	I have experts available to assist during system failure and difficulties.	☐	☐	☐	☐	☐

21	I have health personnel use the internet and its facilities.	☐	☐	☐	☐	☐
22	I have personnel with a high level of skills to manage the internet.	☐	☐	☐	☐	☐
23	I have the skills to assess the progress of internet usage.	☐	☐	☐	☐	☐
24	I have loyal and committed personnel to use the Internet at work.	☐	☐	☐	☐	☐
	Attitude Towards Internet Usage					
25	Constant use of the internet enhances skills development.	☐	☐	☐	☐	☐
26	Internet usage increases my comfort.	☐	☐	☐	☐	☐
27	Frequent use of the internet leads to waste of precious time.	☐	☐	☐	☐	☐
28	Internet usage activates my desire towards innovation.	☐	☐	☐	☐	☐
29	Internet usage during decision-making is enjoyable.	☐	☐	☐	☐	☐
	Perceived Risk					
30	The Internet is a potential threat to monetary transactions.	☐	☐	☐	☐	☐
31	Internet usage lacks the protection of property rights.	☐	☐	☐	☐	☐
32	Differences of individual interest in talent development	☐	☐	☐	☐	☐
33	High cost and decline in labour output during the talent development	☐	☐	☐	☐	☐
34	Talent development creates double loss and bearing on the employer.	☐	☐	☐	☐	☐
35	The Internet puts the privacy of the company at risk.	☐	☐	☐	☐	☐
	Behavioural Intention					
36	Intend to use the internet in the company regularly.	☐	☐	☐	☐	☐
37	Plan to continue to use the internet in the future.	☐	☐	☐	☐	☐
38	Intend to recommend others to use the internet in their firms.	☐	☐	☐	☐	☐
39	Intend to frequently use the internet for networks and networking.	☐	☐	☐	☐	☐
40	Intend to use the internet to solve multi-skilled related job issues.	☐	☐	☐	☐	☐
	Competencies Development					
41	Strategic thinking and decision-making.	☐	☐	☐	☐	☐
42	Financial and business acumen.	☐	☐	☐	☐	☐
43	Leadership and people management.	☐	☐	☐	☐	☐
44	Innovation and change management	☐	☐	☐	☐	☐
45	Customer and stakeholder focus.	☐	☐	☐	☐	☐
	Socio-economic Benefits					
46	Effective partnerships and easy transfer of information	☐	☐	☐	☐	☐

47	Knowledge across the global markets	☐	☐	☐	☐	☐
48	Create and sustain market relationships.	☐	☐	☐	☐	☐
49	Customers are constantly in touch with the firm.	☐	☐	☐	☐	☐
50	Enhanced business advertisement across borders	☐	☐	☐	☐	☐

OPEN QUESTIONS

1. To what extent do you think innovative skills are potential motivators for the SMEs?
2. Do you think establishing business contacts beyond the local markets is worth doing?
3. Do you anticipate challenges in accepting technology integration?

BASIC DATA AND SOCIO-DEMOGRAPHIC CHARACTERISTICS

Please, tick the option that matches your response.

1. Sex,
1 ☐Male 2 ☐ Female

2. Age group
1. ☐ (18 – 30) 2. ☐ (31 – 45) 3. ☐ (46 – 55) 4. ☐ (56 and above)

3. What is your higher education attained?
1. ☐ No Formal Education 2. ☐ BECE 3. ☐ WASSCE 4. ☐ HND
5. ☐ BSc/ B.Ed. 6. ☐ BMA/MSc/M.Phil. 7. ☐ PhD

4. How long have you been in the business?
1. ☐ 5 – 10 years 2. ☐ 11 – 15 years 3. ☐ 16 – 20 years 4. ☐ 21 years and above

5. Your organization employed how many employees?
1. ☐ 5 – 7 2. ☐ 8 – 10 3. ☐ 11 – 13 4. ☐ 14 and above