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THE RELEVANCE OF INFRASTRUCTURE TO SMALL AND MEDIUM SCALE INDUSTRIAL CLUSTERSAND ITS RELATION TO LOCAL PRODUCTIVITY; ONITSHA MAIN MARKET AS A CASE STUDY.

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ABSTRACT

Small and medium scale enterprises (SMEs) are pertinent to economic growth, innovation, and job creation. The lifecycle of SME clusters depend on various factors; a critical one of them being the presence of adaptable infrastructure at the very least. The Nigerian Small and Medium Scale sector performance has remained far from impressive despite efforts to advance it. SME clusters have however survived in the face of economic underdevelopment in the country. This study probes the link between cluster based infrastructures, and how its influences industrial activities, adopting Onitsha Main Market Component Industrial Cluster as the case study. Through an exploration of theoretical frameworks, empirical evidence, and case studies, we examine the ways in which infrastructure influences the growth, competitiveness, and sustainability of SME clusters. The findings emphasize the significance of investing in adequate physical, social, and digital infrastructure to foster SME cluster development and foster long-term economic prosperity. This study also posits that the clustering is capable of transforming the fortunes of the SME sector if its infrastructure is adequately expressed to accommodate its needs.

Keywords: Onitsha, Cluster, SMEs, Infrastructure.

Introduction

The Small and Medium Scale Enterprise sector plays an extremely important part in modern economy, proving to be the most attractive and tremendous innovative system. The vital contribution to SMEs in economic development is a reality unanimously recognised. Showing their economically and socially beneficial effects led to the consideration of the SME sector as a field of strategic interest for any economy (Avasilicai, 2009). Druker (2009), said that Small and Medium Scale Enterprises represent the main catalyst of economic development and that these small businesses contribute intensely to achieving the fundamental goals to any national economy, becoming the backbone of socio-economic progress.

The agglomeration or concentration of such industries or enterprises with similar or interconnected products and services are called Industrial Clusters (Porter 1990). Industrial Clusters represent a new way of thinking about economic growth at all levels, but which requires new roles for companies, government agencies, universities and other organizations in enhancing competitiveness (Porter 2000). While the successes of SME clusters depend on a multitude of factors, the

presence of robust infrastructure emerges as a critical determinant. Constraints are completed, sadly, by a deplorable state of elements of physical infrastructure and by a poor supply of some basic services like transport, utilities, urban planning and so on (Nicolescu, 2001, 2007). Infrastructure encompasses the physical, social, and digital foundations that enable businesses to function efficiently and facilitate economic activities. It includes transportation networks, industrial parks, utility services, education and healthcare facilities, broadband connectivity, and more. The availability and quality of infrastructure can significantly impact the growth, competitiveness, and sustainability of SME clusters (Chen et al 2022).

These SMEs play essential roles in the economy of a country. They represent a source of entrepreneurship abilities, innovation and creation of new jobs. Their capacity to apply, adapt and disseminate new technology is unique. The release of the entire SMEs potential represents an essential part of the Federal Government's strategy in maintaining quality of employers. A survey carried out by the Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) in conjunction with the National Bureau of Statistics (NBS) revealed that the total number of MSMEs in Nigeria as at 2013 stood at 37,994,416 companies, employing 59,741,211 people which represented 84.02% of the total Nigeria Labour force and contributing 48.47% of the country's GDP in the year in question. SMEs generate the largest number of new jobs with a much lower cost capital, being an important alternative in fighting unemployment. They represent over 99% of the total number of enterprises in most economies (Neagu 2016), and as such make obvious the relevance of being sustained.

Similarly, the relevance of industrial activity is tremendous for developed and developing countries. It raises productivity, creates employment, reduces exposure to risk, enhances income generating assets of the poor and helps diversify exports. It provides a singular contribution towards the prosperity of a region and helps accumulate physical and human capital (Iwuagwu, 2011). It integrates the informal and formal economy and generates demand for agriculture, mining, and other raw materials, as well as for energy and information technologies, simultaneously increasing the supply of products for consumer markets, construction, and other sectors. (Prakash 2019).

Onitsha is widely known as the "Home for all" cum "No man's land." Over the period of time of Onitsha's population explosion, the influx of people encouraged the sales of lands, shops and open spaces which accommodated emerging business ventures. This also led to the erection of illegal buildings and other structures. As Wang and Ren (2020) maintain, infrastructure plays an important role in widening the urban-rural wealth gap. To this end, those who cannot afford decent environments seek respite in illegally erected shacks. Onitsha is bedevilled with similar challenges common with urban centres in most developing countries. These include: environmental degradation, accelerated urbanization and insufficient urban structures (Muhammed, Sabiu, & Khalil, 2015; Sadashivam & Tabassum, 2016) not forgetting bad roads, blocked drainages, traffic jams, overflowing refuse incinerators, poor sanitary habits, foul odour and high incidence of crime (Okeke, 2003). The destruction of architecture, infrastructure and the environmental situation at the Onitsha

Main Market is reproachable. A field study revealed that the streets are blocked with ugly security gates, roads in and around the site in deplorable conditions, streets littered with garbage, tires, bottles, abandoned vehicles, city sanitary incinerators overflowing with waste, the absence of pedestrian walks, uncoordinated supply of water and electricity, and the absence of vital utilities and services that would have guaranteed optimum productivity of endemic businesses in the cluster. Through zoning, the application of urban development laws, one can afford the proper coordination of various public amenities, such as the industrial architectural units, micro transport facilities, water supply, drainage, electric power and the micro-climatic ordering of landscape components all to the end of reducing production costs and simultaneously increasing productivity and earnings.

Objective and Scope

Through the examination of existing evidence, postulated theories, and case studies, we aimto understand the ways in which infrastructure influences the development and success of SME clusters. The analysis will focus on 3 key dimensions of infrastructure: *physical, social, and digital*. With these, we can objectively provide a comparative analysis of the relevance of infrastructure to SME clusters. The scope of this article is focused on the Onitsha Main Market Industrial Cluster component, recognizing that SME clusters develop or grow diversely. By studying various examples, we aim to draw insights that can be applicable to the proposed parallel infrastructural development of the Onitsha Main Market. The findings will have implications for industry stakeholders seeking to understand and harness the power of infrastructure in supporting SME cluster development.

Methodology: Case Study

There is no particular moment when data gathering begins. It begins before there is commitment to do the study: back-grounding, acquaintance with other cases, first impressions. A considerable proportion of all data is impressionistic, picked up informally as the researcher first becomes acquainted with the case. Many of these early impressions will later be refined or replaced, but the pool of data includes the earliest of observations (Stake 1995)

The ethnographic research tradition in anthropology is a valuable starting point for a consideration of the philosophical basis of interpretive case studies, since it has been widely drawn on by organizational researchers concerned with interpreting the patterns of symbolic action that create and maintain a sense of organization (Walsham 1995).

By reviewing relevant theoretical frameworks on SME clusters and infrastructure, and identifying the conceptual linkages between them, we could achieve our aim, as sound theoretical foundations serve adequately as a framework for empirical analysis. More importantly, we use case studies to explore the impacts of physical, social and digital infrastructure on SME clusters, examining existing facilities that show how necessary these are to cluster development, emphasizing the outcomes and benefits that arise from the adequate infrastructural development of a cluster.

On the basis of one of its formal definitions, the case study method can be regarded as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly

evident" (Yin 2003, p.13). In endorsing this concept, Yin (2003) points out that the case study can be regarded as a method that is deliberately chosen to cover such contextual conditions, such as the entangled relations of the phenomenon with its context or the presence of many more variables of interest than data points. The case study method is mainly a method that allows investigators to retain the holistic and meaningful characteristics of real-life events while analyzing a specific phenomenon. The observation of the theoretical framework in the context of a design process requires such a holistic approach, so as to avoid the reduction of the possible correlations between the many variables involved in the scenarios analysed. According to Yin (2003), the peculiarity of analysing phenomena that have complex relations with their contexts further distinguishes the case study method from other types of inquiry like experiments, histories and surveys. For instance, an experiment focuses on only a few variables, deliberately divorcing the phenomenon from its context, using a laboratory environment to control the variables better. A history, meanwhile, takes contextual relations with the phenomenon into consideration, but usually deals with non-contemporary events by analysing documentary records from the past. Surveys, on the other hand, have an extremely limited ability to investigate contextual relations, once there is a concern for limiting the number of variables to be analysed in order to fall safely within the number of respondents that can be surveyed. Thus, the case study method was considered an appropriate tool to observe situations where the phenomenon and its context were hard to separate analytically (Yin 2003).

Lastly, we identify the challenges associated with developing infrastructure for SME clusters, which would in turn, help us to propose recommendations and contribute to the discourse on the role of infrastructure in the clustering of SMEs.

Essentially, this article seeks to deepen our understanding of the relevance of infrastructure to SME clusters. By examining the role of physical, social, and digital infrastructure, we aim to highlight the criticality of infrastructure investments in fostering the growth, competitiveness, and sustainability of SME clusters. The insights generated will inform concerned and involved stakeholders on ways to create an enabling environment that empowers SMEs and facilitates their integration into thriving clusters.

Case Study Findings

The Main Market Cluster is situated in Onitsha, Onitsha North Local Government Area, of Anambra State in south-eastern Nigeria. It sits on Longitude's and Latitude's 6.77254oE and 6.15128oN (Google 21/06/2023 7:11hrs). It is one of the largest markets in West Africa based on geographical size and volume of goods (Isaacs 2003). It is recorded that the market started in the 16th century having its most recent fire incidents in 1983, 1993 and 2019. Main market Onitsha grew so big that many others have been created to accommodate other sales;

1. Ogbo ogwu (pharmaceutical)
2. Ochanja Market (food stuff and articles)
3. Relief Market
4. Ogbo efere (ceramics, plates and cooking ware)
5. Ogbo abada (Textiles)
6. Electrical market
7. Ogbo okporoko (Stock fish)
8. Ogbo-Oshishi (timber market)

9. Motor spare parts
10. Building Material market
11. Glass market

Environment and Micro-Climate.
The Ose market – formerly served as the palace shrine where Onitsha people gathered for ancestral worship under traditional leader Obi Oraeze. The Otu Nkwo Eze, located at the present day Main Market had opened once in 4 days and grew to operate daily. It started with solely trade by barter transactions, then the simultaneous use of cowries as financial exchange.



Fig. 2 showing Onitsha weather by month
© WeatherSpark.com

Utility and Space Enhancement
Hazardous electrical connections overhead increases the risk of fire outbreaks or electrocution. There are no public provisions for telecommunication services and water supply services are individualized.

Form and Function
Historically, Onitsha has exercised a great deal of political, economic, and social influence over the surrounding area, including the neighbouring towns of Obosi, Nkpor, Oba, Ogidi, Nkwelle-Ezunaka, and Umunya, which existed before the founding of Onitsha. Onitsha expanded inland, which led to the development of new residential areas along major arterial roads including Awka Road, Oguta Road, New Market Road, Old Market Road, Iweka Road, Modebe Avenue, Venn Road, Court Road, Park Road, and Old and New Cemetery Roads. The central business district of Onitsha is around Main Market, which is one among many. The influx of traders from all parts of the country invariably contributed to the town's physical and population growth. The low price of commodities in Onitsha market, the wide range of goods, and the accessibility and low cost of transportation to and from the town continue to draw people. Onitsha's location on the Niger River is advantageous; in addition, the bridge over the Niger makes the town the only gateway between south-eastern and south-western Nigeria.

Fig 1.1: Satelite image showing Otu-Nkwo Eze part of main market OnitshaSource; retrieved from Google maps, 21 – 06 – 2023, 07:32 hrs

Circulation
Vertical and horizontal circulation mediums are characteristic of narrow balconies, pathways and corridors

comparative to the standard requirements of their use, for horizontal circulation between stores/offices on suspended floors, and pedestrian circulation on site. Staircases are the only medium of vertical circulation and no ramps were utilized. Vehicular provisions (car parks and driveways) are both inadequate and unseparated from pedestrian traffic routes.

Site Planning and Landscape Detailing

Designated market area has the form of a planned urban component, looking like it had an intentional pattern but the outgrowing market is devoid of a planned urban structure. Designated mustering points, green areas, and pedestrian sidewalk are non-existent.

Building Services

There are neither mechanical fire alarm systems, sprinkler system nor public water supply systems. Private boreholes serve as main source of water supply and natural ventilation systems prove insufficient as a passive architectural strategy as they resorted to electrically induced ventilation. Sewage and waste systems are privatized and hence are not holistic in their approach to solving the problem sustainably.

Design Detailing Considering Barrier-Free Environment

There are no designated accesses to facilities for persons that are physically challenged neither are there such parking details or standards for vehicular traffic



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Pic 1.1 showing vehicular and pedestrian traffic characteristically unseparatedsource;people's gazette nigeria

SME Cluster Definition and Characteristics

Michael Porter (2000), who has been credited with popularizing the term cluster, defines it as a geographic concentration of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate.

Doeringer and Terkla (1995) define clusters as a geographical concentration of industries thatgain performance advantages through co-location.

Similarly, clusters are characterized by a close proximity of interconnected firms, oftenengaged in complementary or interdependent activities. SME clusters foster collaboration, knowledge sharing, and specialization, creating a favourable

business environment for participating enterprises (Gudda 2017).

Corthright (2006) argues that clustering is about proximity, meaning that business that are closer to one another have advantages that are unavailable to businesses that are farther away.

The relevance of infrastructure to SME cluster development is underscored by various theoretical perspectives. Primarily, from an agglomeration theory perspective, infrastructure plays a crucial role in creating a favourable environment for clustering. According to this theory, the clustering of SMEs offers advantages such as economies of scale, reduced transaction costs, and knowledge spill overs. Infrastructure acts as an enabler by providing the physical and social foundations necessary for these advantages to materialize (Obokoh & Goldman 2016)

Also, the resource-based view, highlights the importance of infrastructure as a strategic resource for SME clusters. Infrastructure assets, including transportation networks, industrial parks, and utility services, contribute to the competitiveness and efficiency of cluster participants. By providing access to essential resources and amenities, infrastructure enhances the productivity and operational capabilities of SMEs within the cluster. (Journal de Organisation de Coopération et de Développement Economiques 2017)

Linkages Between Infrastructure, Development, And SME Clusters

Building upon the aforementioned theories, a conceptual framework can be developed to understand the linkages between infrastructure and SME clusters. This framework identifies three interrelated dimensions of infrastructure: physical, social, and digital.

Uzor (2004) examined the cluster concept and its impact on private sector development in Africa in general and on SME development in Nigeria in particular. The findings of the study indicate that there are no effective institutions supporting cluster development in Africa in general and in Nigeria in particular. Enterprises in a cluster do not merely cooperate, compete, and learn from each other, but also formulate strategies to cope with the external challenges, and expand their market through the development of a network to gain more benefit (Uzor, 2004).

Osinachi (2004) indicates that firms in Nigeria build a learning network mainly to improve their performance through sharing of tools, cost of transporting raw materials and information.This suggests that deliberate efforts should be made to facilitate information sharing among SMEs, which again can be achieved through careful infrastructure planning and development with the aim of bolstering this type of collective efforts and gains. In Nigeria, the Chamber of Consumers and Industry provide business information for the firms and work with local manufacturers association to organize local trade fairs whose effect (Osinachi, 2004). Bravtigarn (1997) notes that sharing of technical knowhow and skilled workers are benefits gained by small firms clustering in developing countries since individual firms cannot alone afford the cost of high technical skilled workers or invest in Capital goods.

The physical dimension of infrastructure refers to the tangible assets and facilities that support SME cluster activities. This includes transportation networks that facilitate the movement of goods and people, industrial parks and special economic zones that provide dedicated

spaces for business operations, and utility services such as energy, water, and telecommunications infrastructure.

The social dimension of infrastructure encompasses the intangible elements that contribute to the social and human capital within the cluster. It includes education and skill development initiatives that nurture a skilled workforce, healthcare facilities that ensure worker well-being and productivity, and entrepreneurial support systems that provide training, mentoring, and access to financing.

The digital dimension of infrastructure focuses on the technological foundations that enable connectivity, innovation, and market reach within SME clusters. It includes broadband connectivity and digital access that facilitate information exchange and e-commerce platforms that expand market opportunities for cluster participants. Additionally, digital infrastructure promotes innovation through the adoption of emerging technologies and digital transformation strategies.

By understanding the interplay between these three dimensions of infrastructure, policymakers and stakeholders can develop a comprehensive approach to supporting SME clusters. The theoretical frameworks and conceptual framework presented in this section provide a foundation for analysing the relevance of infrastructure in fostering the growth, competitiveness, and sustainability of SME clusters.

Lastly, in order for a nation to achieve sustainable development, the small and medium-sized enterprise (SME) sector is essential (Jiménez et al, 2021;Aryeetey &Ohene, 2004; Oludele& Emilie, 2012). Thus, encouraging small and medium-sized enterprises (SMEs) in emerging countries like Nigeria would lead to widespread wealth creation, financial independence, and entrepreneurship, thus slowing the flow of people from rural to urban regions (Arinzeh, 2022;Uzor, 2004). They are simple to launch and bring in significant revenue for the economy, as well as export revenues, requiring just a little amount of initial investment and specialized knowledge (Okechukwu et al, 2020; Udechukwu, 2003).

Physical Infrastructure and SME Clusters

Physical infrastructure plays a crucial role in the development and success of SME clusters. Adequate transportation networks and accessibility are essential for efficient movement of goods, services, and labour within and beyond the cluster. Well-connected roads, highways, ports, and airports reduce transportation costs, enhance supply chain efficiency, and promote inter-firm collaboration. SMEs can benefit from improved accessibility to input suppliers, markets, and distribution channels, enabling them to compete more effectively.

Reliable utility services, including energy, water, and telecommunications infrastructure, are critical for SME cluster development. Stable and uninterrupted access to affordable energy supports continuous operations and enables SMEs to meet production demands. Moreover, robust telecommunications infrastructure, including broadband connectivity, facilitates

information exchange, e-commerce activities, and participation in global value chains. Access to reliable utility services ensures the competitiveness and resilience of SMEs within the cluster (Obokoh & Goldman 2016).

Case studies have demonstrated the significant impact of physical infrastructure on SME clusters. For example, the Shenzhen Special Economic Zone in China transformed from a small fishing village into a global manufacturing hub through strategic investments in physical infrastructure. The construction of efficient transportation networks, the establishment of dedicated industrial parks, and the provision of reliable utility services played a pivotal role in attracting SMEs and nurturing their growth within the cluster.

Items under consideration	No. of firms	Percentage
What is the state of infrastructure		
Good	8	2.2
Adequate	33	8.9
Poor	111	30.1
Very poor	217	58.8
Total	**369**	**100**
Effect on operating cost		
Increase	292	79.1
Decrease	45	12.2
No effects	32	8.7
Total	**369**	**100**
Effect on profits		
Increase	31	8.4
Decrease	290	78.6
No effects	48	13.0
Total	**369**	**100**
SMEs that generate own power		
Yes	345	93.5
No	23	6.2
Others	1	0.3

Table 1.1 showing the effects of individual power generation and infrastructure on operating costs and profit margins of a sample of SMEs.
Source; Obokoh & Goldman 2016 (Infrastructure Deficiency and the Performance of Small and Medium Sized Enterprises in Nigeria's Liberalised Economy)

Social Infrastructure and SME Clusters

Social infrastructure, encompassing education, healthcare, and entrepreneurial support systems, is vital for the development of robust SME clusters. Education and skill development initiatives contribute to a skilled and adaptable workforce, enhancing the productivity and competitiveness of SMEs. Collaboration between educational institutions and SMEs fosters knowledge exchange, facilitates innovation, and ensures a pipeline of skilled workers with industry-relevant skills (Ans De Vos 2013).

Access to quality healthcare facilities is crucial for the well-being and productivity of workers within SME clusters. Adequate healthcare infrastructure ensures timely medical services, promotes a healthy workforce, and reduces absenteeism. By providing accessible and affordable healthcare, SME clusters create an environment that supports worker satisfaction, retention, and overall productivity.

Entrepreneurial support systems play a critical role in SME cluster development. These systems include business incubators, mentorship programs, access to financing, and networking opportunities (Pompa 2013). By providing guidance, resources, and a supportive ecosystem, these support systems nurture the growth and success of SMEs within the cluster. Entrepreneurs can benefit from shared knowledge, expertise, and access to networks, accelerating their learning curve and increasing their chances of success.

Case studies have highlighted the positive outcomes of social infrastructure investments in SME clusters. For instance, the Cambridge Cluster in the United Kingdom thrives due to the presence of prestigious educational institutions, such as the University of Cambridge. The collaboration between academia and industry has led to knowledge spill overs, technology transfer, and the creation of successful spin-off companies. Moreover, the provision of healthcare facilities and entrepreneurial support programs has further enhanced the cluster's competitiveness and sustainability.

Digital Infrastructure and SME Clusters

In the digital age, robust digital infrastructure is essential for SME cluster development. Broadband connectivity and digital access are fundamental enablers, allowing SMEs to harness the power of technology, access information, and engage in e-commerce activities. High-speed internet connectivity enables real-time communication, data exchange, and collaboration, bridging geographical barriers and expanding market reach for SMEs within the cluster.

E-commerce platforms have become integral to SME clusters, providing opportunities for SMEs to showcase their products and services to a global customer base. By leveraging digital platforms, SMEs can overcome traditional market access barriers, reach new customers, and participate in international trade. E-commerce platforms also facilitate supply chain integration, enabling SMEs to collaborate with other cluster participants and create seamless business linkages (SME Ministerial Conference Journal 2018)

Digital infrastructure promotes innovation within SME clusters. The adoption of emerging technologies, such as artificial intelligence, cloud computing, and the Internet of Things, enables SMEs to enhance their products, processes, and services. Digitalization and automation increase productivity, reduce costs, and drive competitiveness

for SMEs, positioning them at the forefront of technological advancements within the cluster.

One case study that showcases the transformative power of digital infrastructure in SME clusters is the Silicon Valley cluster in California. It owes its success to the presence of advanced digital infrastructure and a culture of innovation. The availability of high-speed internet, research institutions, and venture capital funding has facilitated the rapid growth of technology start-ups, fostering a dynamic ecosystem of entrepreneurship and technological advancement.

Through the analysis of physical, social, and digital infrastructure, it becomes evident that infrastructure plays a crucial role in the growth, competitiveness, and sustainability of SME clusters. The presence of robust physical infrastructure, including transportation networks, industrial parks, and utility services, enhances accessibility, collaboration, and operational efficiency within the cluster. Social infrastructure, comprising education, healthcare, and entrepreneurial support systems, nurtures a skilled workforce, ensures worker well-being, andfosters entrepreneurship. Furthermore, digital infrastructure, such as broadband connectivity and e-commerce platforms, expands market reach, drives innovation, and promotes digital transformation within SME clusters.

Recommendations

Recognizing the significance of infrastructure for SME clusters, policymakers and stakeholders can leverage the theoretical frameworks and conceptual understanding presented to formulate effective policies and strategies. The following policy implications can be derived from the discussion.

Policymakers should adopt an integrated approach to infrastructure planning in SME clusters. This involves considering the interdependencies and synergies among different infrastructure dimensions, including physical, social, and digital. Integrated planning ensures that infrastructure investments are coordinated and aligned with the specific needs and priorities of the cluster. It also promotes a holistic and sustainable development of infrastructure that supports the long-term growth and competitiveness of SMEs.

Collaborative efforts between the public and private sectors are essential for infrastructure development in SME clusters. Public-private partnerships (PPPs) can leverage the expertise, resources, and innovation capabilities of both sectors. Governments can provide enabling policies, regulatory frameworks, and financial support, while private entities bring in technical expertise, investment capital, and operational efficiency. PPPs can help address the funding gap, expedite infrastructure projects, and ensure their effective management and maintenance.

Also, adequate access to finance is crucial for SMEs to invest in infrastructure and leverage its benefits. Policymakers should focus on creating a conducive financial ecosystem that supports SMEs in accessing affordable financing options. This can be achieved by establishing specialized funding schemes, providing guarantees or subsidies, and promoting financial literacy and awareness among SMEs.

Similarly, investing in human capital and entrepreneurial support systems is vital for infrastructure-driven SME cluster development. Policymakers should prioritize initiatives that enhance education and skill development

programs, particularly those aligned with the specific needs of the cluster. Collaboration between educational institutions, industry associations, and SMEs can foster knowledge exchange, practical training, and the development of relevant skills.

Policymakers should prioritize investments in digital infrastructure to enhance connectivity and digital capabilities within SME clusters. This includes expanding broadband access, improving network quality, and promoting digital literacy among SMEs. Additionally, policies should encourage the adoption of digital technologies and the development of e- commerce platforms tailored to SME needs. By fostering a digitally connected ecosystem, policymakers can facilitate information exchange, market access, and innovation, unlocking new growth opportunities for SMEs within the cluster.

Conclusion

This article has explored the relevance of infrastructure to SME clusters and highlighted its critical role in fostering their development, growth, and competitiveness. Drawing on theoretical frameworks, case studies, and policy implications, several key findings have emerged. Policymakers play a critical role in recognizing and addressing the infrastructure needs of SME clusters. By adopting an integrated and strategic approach, policymakers can create an enabling environment that enhances the growth, competitiveness, and sustainability of SME clusters.

First, infrastructure, encompassing physical, social, and digital dimensions, creates a favourable environment for clustering by enabling economies of scale, reducing transaction costs, and facilitating knowledge spill overs. Physical infrastructure, including transportation networks, industrial parks, and utility services, enhances accessibility, collaboration, and operational efficiency. Social infrastructure, such as education, healthcare, and entrepreneurial support systems, nurtures a skilled workforce, promotes well-being, and fosters entrepreneurship while digital infrastructure, including broadband connectivity and e- commerce platforms, expands market reach, drives innovation, and supports digital transformation within SME clusters.

Policy implications have been outlined to guide policymakers and stakeholders in infrastructure development for SME clusters. Integrated infrastructure planning, public- private partnerships, access to finance, skills development, and digital connectivity are key policy considerations.

The significance of infrastructure to SME cluster development is evident. The interplay between physical, social, and digital infrastructure creates a conducive environment for SMEs to collaborate, innovate, and compete. By recognizing the importance of infrastructure and implementing targeted policies and strategies, policymakers can catalyse the growth, competitiveness, and sustainability of SME clusters, driving economic development and fostering entrepreneurial success. Emphasizing infrastructure development is a crucial step toward building resilient and thriving SME clusters in the dynamic and interconnected global economy.

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