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## REIMAGINING LOCAL ECONOMIC DEVELOPMENT IN HAMMARSDALE TOWNSHIP: A TIPS™-INFORMED APPROACH

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### ABSTRACT

This study applies the Management of Technology, Innovation, People, and Systems (TIPS™) framework to examine challenges to sustainable economic development in Hammarsdale, a peri-urban KwaZulu-Natal township in South Africa. Historically shaped by apartheid space planning and industrial shrinkage (Todes *et al.*, 2022; Godfrey & Maree, 2021), Hammarsdale's contemporary challenges include 38% unemployment (Statistics South Africa, 2023), infrastructure deficits (SALGA, 2022), and digital exclusion (FinMark Trust, 2023). But its strategic location on the N3 corridor and existing industrial infrastructure present untapped potential (KZN EDTEA, 2023; DTIC, 2023). Applying a TIPS™ lens (Sibieude *et al.*, 2014), author identifies interrelated challenges across four dimensions: (1) Technological (digital divides, obsolete manufacturing technology); (2) Innovation (weak R&D culture, policy misalignment); (3) Human capital (skills mismatch, youth disengagement); and (4) Systemic (fragmented governance, value chain exclusions). The study proposes integrated solutions, such as A digital transformation fund and Industry 4.0 adoption (Gillwald *et al.*, 2022; DTIC, 2023); An innovation hub with circular economy pilots (GreenCape, 2023); Demand-led skills programmes and women's entrepreneurship support (DHET, 2023) and a local economic observatory and industrial park revitalisation (GCRO, 2023). Policy recommendations emphasise place-based initiatives such as a special economic zone with innovation incentives and a township procurement portal (Rogerson & Rogerson, 2024). The TIPS™ approach demonstrates how concerted effort across all four dimensions has the potential to break cycles of underdevelopment in township economies, offering a replicable model for similar contexts.

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## INTRODUCTION

Hammarsdale, a peri-urban township midway between Durban and Pietermaritzburg in KwaZulu-Natal, mirrors both the stubborn difficulties and underlying potential characteristics of South Africa's post-apartheid township economies. Historically shaped by apartheid spatial planning, which continues to marginalise such areas and restrict economic integration (Todes *et al.*, 2022), Hammarsdale has suffered intense industrial shrinkage, particularly in its once-thriving textile industry. This contraction, driven by global competition and domestic policy shifts (Godfrey & Maree, 2021), has contributed to entrenched high unemployment, estimated at 38%, with youth unemployment exceeding 60% (Statistics South Africa, 2023). Compounding these economic difficulties are long-standing shortages in water, sanitation, and electricity infrastructure, as seen in recent municipal audits (SALGA, 2022), as well as a chronic mismatch between local skills development programs and labour market requirements (Phethi & Rogan, 2021). Furthermore, limited access to financial and digital resources strangles growth, with only 34% of township SMEs accessing formal credit and widespread digital

exclusion denying entry to the modern economy (FinMark Trust, 2023). Despite these structural constraints, Hammarsdale also retains significant untapped potential. Its situation on the N3 highway makes it a strategic logistics and manufacturing node (KwaZulu-Natal Economic Development Department, 2023), while idle industrial zones offer opportunities for revitalisation, particularly in agro-processing and light manufacturing, as highlighted in eThekweni Municipality's recent industrial strategy (2022). The township is also underpinned by robust social capital, with informal sector resilience and community-based savings societies (stokvels) underwriting a vibrant, if under-tapped, entrepreneurial culture (Charman & Petersen, 2023). Proximity to Durban's port and the broader economic hub of KwaZulu-Natal also positions it for new opportunities under the African Continental Free Trade Area (AfCFTA), with Hammarsdale potentially involved in regional value chains (DTIC, 2023). This intersection of historical disadvantage and new opportunity renders Hammarsdale an intriguing case study for imagining more inclusive, sustainable local economic development in South Africa's township economies.

**TIPS™ Framework Application:** The Technology, Innovation, People, and Systems (TIPS™) management framework was created in the early 2010s through cooperative research by Dr. Thierry Sibieude and his colleagues at École Polytechnique in Paris and ESSEC Business School (Sibieude *et al.*, 2014). Initially imagined tackling intricate development issues in emerging economies, the framework took shape as a direct reaction to the failure of conventional silo approaches to economic development (Mkhize, 2018). The model's innovative breakthrough is its combination of four interrelated dimensions: technological progress (adoption and diffusion), innovation ecosystems (problem-solving and commercialisation), human capital formation (skills, equity and leadership), and systemic reorganisation (governance, infrastructure and market linkages) (Sibieude & Lux, 2016). Later adaptations by development economists have tailored the framework for use in African urban settings, rendering it highly suitable for South African townships (Rogerson, 2020). At its simplest, the TIPS™ approach functions on three basic principles that set it apart from traditional development frameworks (Sibieude *et al.*, 2019). Firstly, it demands integrated interventions that tackle all four dimensions simultaneously, acknowledging their interdependence in achieving sustainable impact (World Bank, 2021). Secondly, it prioritises contextual relevance, demanding solutions be adapted to local circumstances - including the development of suitable technologies for informal economies instead of importing standardised solutions from developed contexts (Charman & Petersen, 2021). Thirdly, the approach enforces multi-stakeholder engagement, forging organised partnerships among government, private sector entities, civil society and local communities to guarantee both relevance and implementation capacity (Atkinson & Marais, 2022). These principles echo modern understanding of complex adaptive systems within development economics, where linear top-down approaches have universally failed within township contexts (Turok, 2022).

The TIPS™ application to Hammarsdale's development issues offers a powerful case study of the framework's applicability to South African townships (KZN EDTEA, 2023). The technology pillar responds to Hammarsdale's digital divides and industrial obsolescence with focused interventions such as community WiFi hotspots and Industry 4.0 adoption programs (DTIC, 2023). The innovation pillar addresses weak R&D culture and policy misalignment through the creation of local innovation hubs and circular economy pilots, building on existing industrial assets (GreenCape, 2022). Human capital issues in the form of skills gaps and youth disengagement are addressed through demand-led vocational training and women's economic empowerment programs (DHET, 2023). Lastly, systemic bottlenecks such as fragmented governance and infrastructure silos are reorganised through the creation of a local economic observatory and innovative public-private partnerships (SALGA, 2023). This integrated strategy is particularly valuable in the context of Hammarsdale, where decades of spatial apartheid and economic marginalisation have formed complex, mutually reinforcing obstacles resistant to sector-specific solutions (Todes *et al.*, 2022). The TIPS™ framework's insistence on simultaneous intervention across multiple dimensions holds out a promising avenue to interrupt these persistent cycles of underdevelopment (Sibieude & Lux, 2023).

**Technology Barriers:** Hammarsdale's economic growth is held back by several technology-related bottlenecks that limit productivity, innovation, and market reach. A chronic digital divide restricts connectivity, with cheap broadband and digital tools still out of reach for most residents and businesses (Gillwald *et al.*, 2022). Remaining industries, especially in manufacturing, are plagued by technological obsolescence, using outdated machinery that decreases efficiency and global competitiveness (Mkhize & Ndabeni, 2023). Local businesses also experience e-commerce exclusion, with minimal involvement in digital marketplaces due to low digital literacy and a lack of payment infrastructure (FinMark Trust, 2023). The lack of smart infrastructure, including IoT-enabled utilities management, also increases inefficiencies in water and electricity distribution, making it more costly for businesses and households (Amaye *et al.*, 2021). Removing

these bottlenecks is key to unleashing Hammarsdale's potential in a more digital and automated economy.

**Innovation Constraints:** Hammarsdale's prospects for economic reindustrialisation are also undermined by systemic innovation bottlenecks that suppress entrepreneurial development and industrial upgrading. There is a limited R&D culture with few local innovation ecosystems to incubate startups and the adoption of technologies (Mboweni & Pouris, 2023). This is exacerbated by policy misalignment, in which Local Economic Development (LED) plans do not draw on Hammarsdale's particular industrial and logistical advantages, instead implementing generic township economic templates (Rogerson & Rogerson, 2024). Early-stage innovators encounter acute financing deficiencies, as risk-averse funders and poorly designed public funding schemes leave high-potential projects without finance (Banking Association South Africa, 2023). Moreover, weak university-industry connections suppress knowledge spillovers, denying local businesses access to leading-edge research and technical knowledge from proximate institutions such as the University of KwaZulu-Natal (UKZN) and Durban University of Technology (DUT) (Kruss *et al.*, 2022). If unaddressed, these bottlenecks threaten to leave Hammarsdale behind as South Africa shifts towards a knowledge-based economy.

**People Challenges:** Hammarsdale's economic potential is heavily constrained by human capital constraints that undermine workforce productivity and entrepreneurial growth. A long-standing skills mismatch besets the local labour market, where vocational training programs remain disconnected from the evolving needs of priority sectors such as advanced manufacturing and green technologies (Cloete & Maassen, 2023). This is particularly acute among the youth, with alarming NEET (Not in Education, Employment or Training) rates more than 40% - a crisis that drives economic marginalisation and social instability (Statistics South Africa, 2023). At an institutional level, leadership deficits in local economic planning persist, as municipal officials often lack technical capacity in developing and implementing evidence-based development plans (SALGA, 2022). Furthermore, gender imbalances present additional barriers, with women entrepreneurs facing disproportionate challenges in accessing finance, markets, and business networks - despite recording superior repayment rates and community impact (Charman & Petersen, 2023). These interlinked human capital constraints require targeted interventions to unlock Hammarsdale's full socioeconomic potential.

**Systems Failures:** Hammarsdale's economic progress is constrained by deep-seated systemic weaknesses that replicate underdevelopment despite focused interventions. A fragmented system of governance produces bottlenecks for implementation, with poor coordination between local, provincial and national departments, leading to duplicated effort and competing priorities (Atkinson & Marais, 2023). Silos of key infrastructure persist, where water, energy and transport systems operate in isolation, undermining efficiency and imposing costs on business (SACN, 2022). The township's manufacturers and agricultural producers face value chain disconnections, with these firms systematically excluded from regional supply chains dominated by established urban businesses (Ponte & Odijie, 2024). Most fundamentally, perhaps, Hammarsdale's economy is trapped in an informalisation trap, with the majority of enterprises stuck in the informal sector and with few transition paths to formalisation and growth (Charman & Petersen, 2023). These systemic weaknesses cumulatively reinforce patterns of economic marginalisation that demand integrated, multi-level solutions.

#### **TIPS™-Informed Solutions for Hammarsdale**

**Technology Interventions:** To fight Hammarsdale's persistent digital divide and technological backlogs, we propose a comprehensive three-pronged technology intervention strategy. The first component entails the creation of Digital Township Infrastructure, establishing subsidised community WiFi hotspots alongside mobile digital literacy units. The project draws lessons from Johannesburg's effective

Township Digital Hubs program (Gigaba & Abrahams, 2023), adapting the model to Hammarsdale's specific conditions by incorporating mobile training centres capable of reaching underserved areas. The second intervention, Industrial Modernisation, creates a targeted Industry 4.0 uptake fund specifically designed for Hammarsdale's metalworks and agro-processing SMEs. The fund will provide matching grants for automation equipment, connect businesses with technical experts from Durban University of Technology, and enable energy-efficient building retrofitting (DTIC, 2023). The third innovative component introduces Blockchain Applications unique to Hammarsdale's informal economy, such as supply chain verification solutions for informal traders, secure stokvel savings club management, and transparent municipal service payment systems (Blockchain Research Institute Africa, 2023). Together, the interventions concurrently address short-term connectivity needs and longer-term technological transformation, laying a foundation for digital inclusion and industrial competitiveness. The rollout of these technology interventions will prioritise local capacity building and community engagement. Digital literacy training will be co-designed with residents for cultural relevance, and industrial modernisation will emphasise the creation of local tech-support employment. Blockchain solutions will be created through participatory design processes with informal traders and stokvel members. In this way, technological solutions are not only rolled out in Hammarsdale, but are actually of and for the community, with higher adoption rates and long-term sustainability. The phased rollout will commence with immediate digital infrastructure upgrades while concurrently developing the ecosystem for more advanced technological uptake, carving a path from foundational digital inclusion to advanced Industry 4.0 applications.

**Innovation Strategies:** To stimulate economic revitalisation in Hammarsdale, we propose three key innovation-driven interventions:

Creating a co-working facility with embedded maker laboratories and a business incubator to support entrepreneurship and experimentation with technology. The hub will offer access to 3D printing, computer numerical controlled (CNC) machining, and digital fabrication equipment, and provide formal incubation programs for high-potential startups (KZN EDTEA, 2023).

Implementing waste-to-business initiatives that convert industrial by-products (i.e., textile waste, food processing waste, and construction waste) into marketable products. The initiatives will partner with existing manufacturers to develop sustainable business models while reducing environmental waste (GreenCape, 2023).

Developing formalised systems to safeguard and commercialise traditional Zulu handicrafts, agricultural practices, and medicinal practices. This involves putting in place intellectual property systems, standards, and online marketplaces to link artisans with international purchasers (DAC, 2023).

These initiatives have been formulated to take advantage of Hammarsdale's current assets while promoting a culture of innovation and sustainability.

**People Development:** In order to address the human capital requirements of Hammarsdale, we suggest an integrated people's development strategy targeting skills development, youth empowerment, and gender equity:

A demand-led vocational training program that provides citizens with green technology skills (solar installation, sustainable agriculture) and digital skills (coding, e-commerce, data analytics). The program will work with local industry to guarantee relevance to labour market demands (DHET, 2023). Annual problem-solving competitions calling on young innovators to create solutions for local problems (e.g., energy access, waste management). Winning solutions will be awarded seed funding, mentorship, and implementation support from the Hammarsdale Innovation Hub (NYDA, 2023).

A specialised program providing women entrepreneurs with access to low-interest loans, business expansion training, and childcare support. The project will also establish a women-led business network to enable peer learning and collective bargaining (IDC, 2023). These interventions are designed to decrease unemployment, close the skills gap, and enhance inclusive economic participation, key pillars for sustainable township development.

**Restructuring Systems:** To address Hammarsdale's deep-seated obstacles, we propose four paired interventions that reshape governance, infrastructure, and economic ecosystems:

A real-time data analytics system that tracks employment, enterprise development, and service delivery with a view to informing evidence-based LED planning. The system will be underpinned by predictive modelling and community feedback mechanisms (GCRO, 2023). A formal platform bringing together business, government, and civil society to harmonise policies, remove bottlenecks, and co-design solutions. Results-oriented agenda with public accountability mechanisms will characterise the meetings (SALGA, 2023). Public-private partnerships to finance mixed-use developments that incorporate affordable housing, retail space, and micro-industrial units. Projects will prioritise renewable energy integration and transit-oriented development (IDC, 2023). Refurbishing Hammarsdale's industrial zones with green technology (solar microgrids, water recycling) and shared manufacturing infrastructure to reduce SME business costs (DTIC, 2023). These interventions address fragmented governance, infrastructure silos, and exclusionary value chains by means of systemic coordination and intelligent investment.

## CONCLUSION

The TIPSTM model provides a comprehensive way of dealing with Hammarsdale's intricate economic issues. By tackling technological innovation, human capital and systemic blockages simultaneously, it takes LED models to the next level to develop a more sustainable and inclusive local economy. Leadership by local stakeholders, backed up by provincial and national partners, will be necessary to make it successful.

### Policy Recommendations

To operationalise the TIPSTM-informed interventions for Hammarsdale, the following evidence-based policy interventions are suggested:

A dedicated financing vehicle to support SME technology adoption, digital skills training, and smart infrastructure, drawing on the lessons of the successful digitalisation of Gauteng townships (Gillwald *et al.*, 2022). The facility should prioritise blended finance models that include public grants and private sector counterpart funding.

Taking advantage of Hammarsdale's location on the N3 corridor, SEZ status with tax benefits for Industry 4.0 investment and R&D partnership could attract advanced manufacturing and agro-processing firms (DTIC, 2023). The zone should incorporate binding local procurement targets and skills transfer requirements. An e-trading platform that links Hammarsdale's formal and informal businesses to supply chain opportunities with anchor institutions like schools, hospitals, and large retailers (Rogerson & Rogerson, 2024). The system must include capacity-building support for tender compliance and quality certification. A binding agreement between local industries, TVET colleges, and training providers to align curricula with emerging labour market needs in green technologies, digital services, and advanced manufacturing (DHET, 2023). The compact should include apprenticeship quotas and wage subsidy mechanisms. Curated exhibitions of township entrepreneurship paired with investor pitch sessions, modelled on Soweto's successful Innovation Week (DBSA, 2023). The expos should prioritise women- and youth-owned enterprises and facilitate B2B linkages.

### These suggestions are intended to:

- Leverage existing policy (e.g., SEZ Program, National Digital & Future Skills Strategy)
- Establish institutional responsibility through quantifiable goals
- Catalyse private sector involvement with intelligent incentives
- Redress spatial inequities with place-based interventions.

Rollout should be phased, starting with the skills compact and procurement portal (quick wins), then the SEZ designation and digital fund (medium-term), with innovation expos as sustained engagement platforms. This TIPS™-inspired response offers a replicable model for other South African townships wishing to transform to more sustainable and innovation-driven local economies.

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