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Barriers and Enablers of Youth Technopreneurship in South Africa: An Empirical Analysis

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Abstract

Youth unemployment in South Africa remains persistently high, necessitating innovative approaches such as technopreneurship. This study evaluates the barriers and enablers shaping youth engagement in digital entrepreneurship using a barrier–enabler functional model. Quantitative survey data (N = 533) and qualitative interviews (N=90) reveal that enablers such as digital skills, finance, mentorship, and entrepreneurial ecosystems significantly enhance engagement, while barriers including skills mismatch, the digital divide, corruption, and weak institutional support constrain it. Regression results confirm that technopreneurship engagement is positively associated with digital skills ($\beta = 0.184$, $p < 0.001$), finance ($\beta = 0.237$, $p = 0.002$), mentorship ($\beta = 0.151$, $p = 0.014$), and ecosystems ($\beta = 0.221$, $p = 0.001$), while systemic barriers exert negative effects. Qualitative insights underscore youth resilience despite these constraints. The findings highlight the need for policies that simultaneously strengthen enablers and dismantle structural barriers to unlock technopreneurship's potential in reducing youth unemployment.

Keywords: Barriers and enablers; Digital skills; Entrepreneurial ecosystems; Sustainable Livelihoods Framework; Technopreneurship; Youth unemployment.

1. Introduction

Youth unemployment remains one of South Africa's most pressing socio-economic challenges, consistently ranking among the highest globally. Recent statistics indicate that over 60% of individuals aged 15–24 are unemployed, while many others are engaged in informal, insecure, or vulnerable work, offering minimal income stability or long-term prospects (Statistics South Africa, 2025). This issue extends beyond the labour market, reflecting broader structural constraints such as slow economic growth, limited industrial diversification, and persistent mismatches between the skills produced by the education system and those required by employers (ILO, 2023). There is an urgent need to explore innovative and inclusive job-creation strategies capable of

generating long-term economic stability and addressing systemic labour market vulnerabilities.

Despite multiple policy interventions aimed at alleviating youth unemployment, the crisis persists, highlighting the limitations of conventional employment pathways. While entrepreneurship is often promoted as a potential solution, young South Africans face substantial barriers, including limited access to finance, weak institutional support, insufficient infrastructure, and digital divides (ILO, 2023; World Bank, 2020). Consequently, the entrepreneurial potential of youth remains underutilized. Technopreneurship (entrepreneurship + digital technologies), has gained recognition as a pathway for job creation, yet literature remains fragmented. Much empirical research focuses on digital entrepreneurship in Asia and Europe (Singh et al., 2024). In South Africa, studies demonstrate that digital technologies influence entrepreneurial intention (Nkwei et al., 2023); however, few have systematically examined how enabling factors, such as digital skills, access to resources, and entrepreneurial ecosystems, interact with structural barriers to shape youth technopreneurship outcomes.

Addressing this gap, the study investigates the role of technopreneurship in mitigating youth unemployment by examining how digital skills, access to resources, and entrepreneurial ecosystems influence youth engagement in technology-driven ventures. Digital platforms, mobile applications, and innovation hubs are reshaping youth economic participation by lowering entry barriers and expanding access to local and global markets (Wanzala & Obokoh, 2025; World Bank, 2020). Sectors such as e-commerce, FinTech, AgriTech, and creative industries illustrate how technopreneurship fosters self-employment while generating broader job creation opportunities (African Development Bank [AfDB], 2020; Wanzala & Nanziri, 2026). By situating these factors within the SA's labour market, the study provides evidence-based insights for targeted policy interventions aligned with the National Development Plan, and global frameworks, such as the United Nations Sustainable Development Goals (SDGs 8 and 9) emphasizing decent work, innovation, and sustainable economic growth (United Nations, 2015).

2. Literature Review

2.1 Theoretical Framework

This study is anchored in four complementary theoretical perspectives that collectively provide a nuanced understanding of youth technopreneurship as a potential solution to unemployment in South Africa. The first, the Theory of Planned Behaviour (TPB), posits that entrepreneurial intentions are shaped by attitudes, subjective norms, and perceived behavioural control (Ajzen, 1991). In the context of technopreneurship, digital skills enhance self-efficacy and perceived control, while entrepreneurial ecosystems influence social norms that validate or discourage engagement. Empirical evidence supports this perspective: research in South Africa indicates that digital technology adoption and the perceived benefits of innovation strongly influence entrepreneurial orientation, with risk-taking acting as a mediator (Nkwei et al., 2023). This confirms the value of TPB in explaining why young people are more likely to engage in technopreneurship when they feel capable and socially supported.

Expanding on this behavioural lens, the Resource-Based View (RBV) emphasizes the centrality of access to valuable, and well-deployed resources in achieving sustainable entrepreneurial success (Barney, 1991). Empirical studies reinforce this perspective, demonstrating that community-based resources significantly enhance entrepreneurial capital in rural contexts, while limited access to finance and infrastructure remains a key barrier for young entrepreneurs (Lose, Nxopo, & Simatele, 2023). RBV thus provides a structural explanation for why even highly motivated youth may fail to translate entrepreneurial intention into employment outcomes. By highlighting disparities in resource access, RBV complements TPB, showing that motivation alone is insufficient without tangible inputs that facilitate business creation and sustainability.

While individual skills and resources are essential, they function within broader governance and ecosystem contexts. Institutional Theory highlights the influence of formal and informal rules, governance structures, and regulatory environments on entrepreneurial activity (North, 1990). In South Africa, weak institutions, corruption, and bureaucratic inefficiencies often impede youth entrepreneurship, creating unequal opportunities (Ofosu-Appiah, Mensah, & Boateng, 2025). Complementing this, Entrepreneurial Ecosystem Theory situates technopreneurship within networks of

actors, resources, and institutions, emphasizing that coherent ecosystems, comprising incubators, accelerators, universities, investors, and enabling policies, are vital for venture success (Isenberg, 2011). Integrating TPB, RBV, Institutional Theory, and EET, the study presents a multidimensional framework illustrating that technopreneurship depends on the interaction of individual capacity, resource availability, institutional quality, and ecosystem connectivity to effectively reduce youth unemployment.

2.2 Empirical Review

Empirical studies across Africa and other emerging economies increasingly underscore the critical role of digital skills and entrepreneurial ecosystems in shaping youth entrepreneurship. For example, (Okegbe, 2025) in Southeast Nigeria shows that digital entrepreneurship skills significantly correlate with economic sustainability and empowerment among young people, with government and private initiatives playing key facilitating roles. Similarly, a broader synthesis of digital entrepreneurship education by (Idowu, 2025) finds that digital platforms, policy frameworks, and experiential learning models can help scale youth engagement in the digital economy, by strengthening human capital and bridging the digital divide.

Closer to the South African context, research in rural Namibia illustrates the stark challenges in adopting digital entrepreneurship. (Kamutuezu et al., 2021) identify lack of awareness, unreliable electricity, limited device ownership, high connectivity costs, and cybersecurity risks as major barriers. Their work shows that rural entrepreneurs are highly constrained by infrastructural and cost barriers even when entrepreneurial intent exists. In South Africa, analyses of youth entrepreneurship point to similar constraints: proximity barriers (e.g., geographic isolation) and limited access to crucial information are cited as significant impediments (Kim et al., 2023), hampering the scaling of youth ventures. These empirical insights affirm that while digital skills matter, their effect is conditioned on resource access, infrastructure, and effective ecosystems.

Empirical interventions also point to promising models for bridging gaps. (Rutherford et al., 2025) evaluated a rural technology education program using Productivity Enhancing Technology Experience (PETE) Kits, finding that hands-on training in smart and connected technologies increased students' comfort with tools and aspirations toward technology-based entrepreneurial projects in underserved areas. Their findings

support the idea that ecosystem-level interventions, combining training with community engagement, can contribute to bridging the digital–entrepreneurial divide. Additionally, in sub-Saharan Africa more broadly, (Ofosu-Appiah, Mensah, & Boateng, 2025) conduct a socio-ecological review of youth entrepreneurship barriers and call attention to multi-layered constraints (individual, institutional, community) that must be addressed holistically. Their review underscores the empirical gap: much research isolates individual constraints (skills, attitudes) without fully integrating systemic and ecosystem variables.

Despite these important contributions, a clear empirical gap remains. Much of the existing literature isolates individual-level determinants such as skills or motivation, while paying limited attention to how these factors interact with ecosystem-level enablers like infrastructure, institutional quality, and access to finance. Studies that do incorporate contextual barriers (Kamutuezu et al., 2021; Ofosu-Appiah et al., 2025) often rely on descriptive or qualitative evidence, with fewer robust quantitative analyses that account for multiple dimensions of youth entrepreneurship simultaneously. By empirically testing how digital skills, resource access, mentorship, and ecosystems interact to influence entrepreneurial intent, this study directly addresses these gaps and contributes novel evidence to the discourse on youth technopreneurship.

3. Methodology

3.1 Research Design, Study Area, Sample Size and Data Collection

This study adopted a quantitative research design to examine how digital skills and access to entrepreneurial resources shape entrepreneurial intention among unemployed youth in South Africa. Grounded in the Theory of Planned Behaviour (Ajzen, 1991), the study conceptualised entrepreneurial intention as a function of individual capabilities and enabling contextual conditions. A structured questionnaire was used to collect data on self-assessed digital competencies, access to entrepreneurial resources, and entrepreneurial intentions, while controlling for age, gender, educational attainment, and prior entrepreneurial experience to minimise potential confounding effects.

The study surveyed 533 unemployed youths selected through purposive and proportionate sampling across six municipalities, ensuring adequate representation of the target population. Ethical approval was obtained from the Johannesburg Business

School Research Ethics Committee (JBSREC), University of Johannesburg (Ethical Clearance No. JBSREC202453; approved in June 2024; valid from 14 June 2024 to 14 June 2029). All research procedures complied with the University of Johannesburg Research Ethics Policy, the South African National Health Research Ethics Council (NHREC) guidelines, and the ethical principles of the Declaration of Helsinki (2013 revision). Written informed consent was obtained from all participants prior to data collection after they had been informed of the study objectives, the voluntary nature of participation, confidentiality safeguards, and their right to withdraw at any stage without penalty. As all respondents were adults, consent from legal guardians was not required.

The data were analysed using descriptive statistics, Pearson correlation analysis, and the barrier–enabler functional equation estimated with robust standard errors to account for potential heteroskedasticity and enhance the reliability of statistical inference (Field, 2017; Gujarati & Porter, 2009; Wooldridge, 2010). Restricting the analysis to unemployed youth is theoretically and policy justified because this demographic constitutes the primary target of South Africa's National Development Plan 2030, which identifies entrepreneurship as a strategic mechanism for employment creation and inclusive growth. This focus is further supported by Human Capital Theory (Becker, 1993), which posits that investments in skills and capabilities increase individuals' productive potential and entrepreneurial engagemen

Following the specification of the research design and ethical procedures, methodological rigour required the determination of a statistically adequate and representative sample. The subsequent subsection outlines the procedures used to estimate the required sample size and its proportional allocation across the six municipalities to enhance the precision, representativeness, and generalisability of the study findings.

(a) Youth Sample Size

As shown in Table 1, the six municipalities under study have a combined population of approximately 23 million, including an estimated 7.82 million youths aged 15–34 years. Johannesburg accounts for the largest youth share (2.07 million; 26.5%), followed by

Cape Town (1.60 million; 20.4%), eThekwini (1.33 million; 17.0%), Ekurhuleni (1.26 million; 16.1%), Tshwane (1.22 million; 15.7%), and Polokwane (340,000; 4.3%). This distribution indicates that the majority of urban youth reside in the three largest metros, while smaller municipalities contribute proportionally less. These variations guided the study's sampling framework to ensure representative coverage. Using (Krejcie & Morgan's, 1970)'s table, a minimum sample of 384 was required (Krejcie & Morgan, 1970); the study's 533 respondents with Johannesburg accounting for (145), Cape Town(110) and eThekwini(92) respectively, reflect their substantial youth populations. Ekurhuleni(85) and Tshwane(81) respectively, while Polokwane(20) respondents with the smallest youth population. This enhanced representativeness (Creswell & Creswell, 2018) and statistical reliability thus exceeding the threshold.

Table 1: Estimated Youth Population in Selected South African Municipalities and Sampling Framework for the Study

Municipality	Total Population (Census 2022)	Estimated Youth (15–34 years)	% Contribution to Total Youth Population	Proportional Allocation of Respondents	Actual Respondents Sampled
City of Johannesburg	6,100,000	2,074,000	26.50%	141	145
Tshwane (Pretoria)	3,600,000	1,224,000	15.70%	109	110
City of Ekurhuleni	3,700,000	1,258,000	16.10%	86	85
City of Cape Town	4,700,000	1,598,000	20.40%	91	92
eThekwini (Durban)	3,900,000	1,326,000	17.00%	84	81
Polokwane City	1,000,000	340,000	4.30%	22	20
Total	**23,000,000**	**7,820,000**	**100%**	**533**	**533**

Source: Authors Compilations

By employing proportional stratified sampling, the study minimized sampling error and ensured that no municipality was overrepresented or underrepresented relative to its youth population size. This framework thus enhanced the reliability and generalizability of the findings, making them more reflective of the broader youth demographic in urban South Africa.

(b) Policy Makers Sample Size

The estimated number of policy players across six South African municipalities was calculated using a proportional scaling approach that accounted for population size, administrative capacity, and the intensity of youth governance structures (Moyo & Mamobololo, 2023; Statistics South Africa, 2023). Larger metropolitan municipalities were assigned one policy player per 24,000 residents, whereas smaller municipalities like Polokwane received denser ratios of one per 11,000 residents, reflecting their closer proximity to communities and more direct governance interactions. Drawing on the National Youth Development Agency (NYDA, 2023) Annual Report and municipal youth frameworks, approximately 30% of policy actors in large metros and 25–28% in smaller municipalities were estimated to be directly engaged in youth-focused initiatives. Adjusted for projected administrative growth between 2022 and 2024, this resulted in a total of 1,030 policy players across the six municipalities, of whom roughly 295 were actively involved in youth initiatives as shown in Table 2.

Table 2: Estimated Number of Policy Players and Youth-Focused Policy Actors by Municipality (2022–2024) and Sample Size Obtained through Saturation (2022–2024)

Municipality	Estimated Total Number of Policy Players*	Estimated Number of Policy Players Dealing with Youth Initiatives*	Sampled through Saturation	% of Sampled Policy Makers from Estimated Number
City of Johannesburg	250	75	23	30.70%
Tshwane (Pretoria)	180	50	15	30.00%
City of Ekurhuleni	160	45	14	31.10%
City of Cape Town	200	60	18	30.00%
eThekwini (Durban)	150	40	12	30.00%
Polokwane City	90	25	8	32.00%
Total	**1,030**	**295**	**90**	**30.5% (Average)**

Authors Compilation

To determine an appropriate qualitative sample, a 30% saturation threshold was applied, consistent with established benchmarks in qualitative and mixed-methods research (Guest et al., 2020; Saunders et al., 2018; Creswell & Creswell, 2018). Saturation ensures that additional data collection yields minimal new insights while maintaining representativeness. Accordingly, 90 of the 295 youth-focused policymakers (30.5%)

were sampled, with larger municipalities such as Johannesburg (23) and Cape Town (18) contributing more participants due to their complex governance structures, while smaller municipalities like Polokwane contributed fewer (8) as shown in (Table 2). This proportional sampling approach captures both strategic perspectives of policymakers and operational insights from implementers, providing a robust foundation for qualitative analysis of youth policymaking, institutional capacity, and intergovernmental collaboration across diverse municipal contexts.

3.2 Analytical Approach

The analysis followed a structured sequence to ensure analytical rigor and validity. First, descriptive statistics were used to summarize respondent characteristics and key variables, followed by Pearson correlation analysis to examine bivariate relationships between enablers, barriers, and technopreneurship engagement. The barrier–enabler functional equation regression served as the main analytical technique, with separate models estimating the effects of digital skills, resource access, mentorship, ecosystem support, and systemic barriers. To enhance robustness, diagnostic tests were conducted, including the Shapiro–Wilk test for normality (Shapiro & Wilk, 1965), the Breusch–Pagan test for homoscedasticity (Breusch & Pagan, 1979), Variance Inflation Factors for multicollinearity, and the Durbin–Watson statistic for autocorrelation (Durbin & Watson, 1950). Complementing quantitative analysis, thematic analysis of qualitative data identified recurring patterns that enriched and contextualized the statistical findings (Braun & Clarke, 2006).

3.3 Model Specification

The barrier–enabler functional model was applied to assess the conditions that support or hinder youth technopreneurship in South Africa. This framework is appropriate because technopreneurship depends on the interaction between enabling factors and systemic barriers (Isenberg, 2011). Unlike linear models that focus only on positive predictors, it captures both enablers, such as digital skills and finance, and obstacles like institutional inefficiency and the digital divide. Prior studies reinforce its use: (Isenberg, 2011) Entrepreneurial Ecosystem Framework highlights how finance, policy, markets, and culture can simultaneously enable and constrain entrepreneurship, while (Autio & Rannikko, 2016) show that networks and funding promote start-up growth, but rigid institutions hinder activity. The model also aligns with the Theory of Planned

Behaviour (Ajzen, 1991), where enablers strengthen perceived behavioural control and barriers diminish it, making it suitable for mixed-methods analysis. The functional form of equation is specified as:

$$TE_i = f(Enablers) - f(Barriers) \quad (2)$$

Or expressed in an expanded regression-style form:

$$TE_i = \beta_o + \beta_1 DS_i + \beta_2 AF_i + \beta_3 MT_i + \beta_4 EE_i - \beta_5 SM_i - \beta_6 DD_i - \beta_7 CI_i - \beta_8 WI_i + \varepsilon_i \quad (3)$$

In this model, technopreneurship engagement (TE_i)represents the dependent variable and captures the extent to which young people participate in or express intent to pursue technology-based entrepreneurship. The model is structured around two opposing sets of factors: enablers, which positively influence technopreneurship engagement, and barriers, which constrain or diminish it. The enablers include digital skills (DS_i), reflecting the respondent's competence in using digital tools and platforms; access to finance (AF_i), which denotes the availability of financial resources such as credit, venture funding, or grants; mentorship (MT_i), representing guidance, role modelling, and training opportunities; and entrepreneurial ecosystems (EE_i), encompassing networks, incubation hubs, infrastructure, and supportive policy environments. Collectively, these enablers strengthen the capacity of youth to translate entrepreneurial aspirations into concrete ventures.

On the other hand, barriers serve as negative predictors that inhibit technopreneurship. These include skills mismatch (SM_i), which arises when educational qualifications do not align with industry requirements; the digital divide (DD_i), capturing inequalities in internet access, affordability, and digital infrastructure; corruption and institutional inefficiency (CI_i), which reflects bureaucratic obstacles, elite capture, and weak resource allocation; and weak institutional support (WI_i), denoting the absence of consistent government backing for youth entrepreneurship. These factors reduce opportunities and create systemic obstacles that limit youth participation in

technopreneurship. The model specifies that technopreneurship engagement is the result of a balance between enablers and barriers. The regression coefficients $(\beta_{1,\ldots,}\beta_8)$ estimate the magnitude and direction of each factor's influence, with positive values indicating stronger engagement and negative values highlighting constraints. The intercept (β_o) reflects baseline engagement in the absence of predictors, while the error term (ε_i) accounts for unobserved influences such as family support, peer networks, and personal motivation. By structuring technopreneurship engagement as a function of both enablers and barriers, this model highlights the dual nature of the ecosystem in South Africa. It emphasizes that successful engagement requires not only strengthening enabling factors but also systematically addressing barriers that inhibit youth entrepreneurship.

3.4 Robustness test

To verify the robustness of the baseline model, we introduced an interaction term to test whether access to resources AR_i strengthens or weakens the impact of digital skills DS_i on technopreneurship engagement (TE_i). The modified specification is expressed as:

$$TE_i = \beta_o + \beta_1 DS_i + \beta_2 AR_i + \beta_3 (DS_i \times AR_i) + \beta_4 MT_i + \beta_5 EE_i - \beta_6 SM_i - \beta_7 DD_i - \beta_8 CI_i - \beta_9 WI_i + \varepsilon_i \quad (3)$$

In this model, the interaction term $(DS_i \times AR_i)$ captures whether the relationship between digital skills and technopreneurship engagement depends on the level of resource availability. The coefficient β_3 represents the moderation effect of resources. A positive and significant β_3 would indicate that access to resources amplifies the benefits of digital skills, meaning that having digital capabilities is more valuable when youth also have financial, infrastructural, or network support. If β_3 is statistically insignificant, it suggests that digital skills and resources operate independently, with no moderating effect. Conversely, a negative and significant β_3 would imply that access to resources reduces the impact of digital skills, though such an outcome is considered unlikely in entrepreneurship contexts.

This robustness check strengthens the analysis by testing whether the effects of key predictors are purely additive or interact to create greater opportunities for entrepreneurship. This approach follows best practices in econometric modeling, where interaction terms are introduced to reveal deeper structural relationships between variables (Wooldridge, 2010).

4. Results

4.1 Descriptive Statistics

Descriptive statistics summarise the variables classified as enablers (digital skills, access to finance, mentorship, and entrepreneurial ecosystems) and barriers (skills mismatch, digital divide, corruption, and weak institutional support) in Table 3.

Table 3: Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
Technopreneurship Engagement (TE)	3.51	0.79	1	5
Digital Skills (DS)	3.72	0.77	1	5
Access to Finance (AF)/ AR	3.29	0.85	1	5
Mentorship (MT)	3.22	0.82	1	5
Entrepreneurial Ecosystem (EE)	3.47	0.8	1	5
Skills Mismatch (SM)	3.11	0.9	1	5
Digital Divide (DD)	3.26	0.88	1	5
Corruption/Institutional Ineff. (CI)	3.19	0.91	1	5
Weak Institutional Support (WI)	3.14	0.87	1	5

Note: N=533
Source: Authors' computation

The descriptive statistics for enablers in Table 3 revealed that digital skills, access to finance, mentorship, and entrepreneurial ecosystems scored moderately to strongly across the sample. This suggests that while many respondents have access to foundational supports, there are still notable disparities in how these resources are distributed. For example, access to finance received lower mean scores compared to digital skills, reflecting the well-documented financing gap faced by young entrepreneurs in emerging economies (Kim et al., 2023). Similarly, mentorship and ecosystem support scored positively, but their variability indicates uneven access to networks and incubators. These findings align with Entrepreneurial Ecosystem Theory,

which posits that institutional coherence and resource linkages are critical for sustaining entrepreneurship (Isenberg, 2011; Ogujiuba et al., 2025).

On the other hand, the barriers of skills mismatch, digital divide, corruption, and weak institutional support recorded moderate-to-high mean values, signaling their persistent influence in constraining youth technopreneurship. The relatively high averages for digital divide and institutional inefficiency suggest that systemic issues remain deeply entrenched, particularly in areas of governance and infrastructure. This observation resonates with Institutional Theory, which emphasizes that weak or fragmented institutions increase transaction costs and uncertainty, thereby discouraging entrepreneurial activity (North, 1990; Boateng, Wang, Ntim, & Elmagrhi, 2024). Interestingly, despite these barriers, the relatively strong mean for entrepreneurial intent observed earlier reflects resilience among youth, a finding consistent with recent evidence that young entrepreneurs often adapt innovatively to systemic constraints (Nkontwana et al., 2025).

4.2 Correlation Analysis

Before estimating the regression models, a Pearson correlation analysis was conducted to explore the direction and strength of associations among the study variables. Correlation analysis provides preliminary insights into whether hypothesised relationships are present and whether multicollinearity is likely to pose challenges in regression modelling (Gujarati & Porter, 2009). The results, presented in Table 4, indicate meaningful associations between predictors and dependent variables across the three study objectives. These findings provide statistical justification for advancing to regression analysis, while also offering early evidence of the relationships predicted by theory.

The correlation analysis in Table 4 highlighted that technopreneurship engagement (TE) was positively and significantly correlated with digital skills (DS) ($r = 0.30$, $p < 0.01$), access to finance (AF) ($r = 0.34$, $p < 0.01$), mentorship (MT) ($r = 0.27$, $p < 0.01$), and entrepreneurial ecosystems (EE) ($r = 0.36$, $p < 0.01$). These results suggest that youth who report stronger digital capabilities, greater financial inclusion, mentorship opportunities, and supportive ecosystems are more likely to engage in technology-driven entrepreneurship. The relatively strong correlations for finance and ecosystem

variables underscore the importance of structural supports alongside individual capacity.

Table 4: Correlation Matrix

Variables	TE	DS	AF	MT	EE	SM	DD	CI	WI
TE	1								
DS	0.30***	1							
AF	0.33***	0.27**	1						
MT	0.29***	0.22**	0.31***	1					
EE	0.35***	0.26**	0.28***	0.32***	1				
SM	–0.27***	–0.19**	–0.21**	–0.16*	–0.24***	1			
DD	–0.31***	–0.23**	–0.26***	–0.19**	–0.28***	0.33***	1		
CI	–0.26***	–0.18*	–0.24**	–0.20**	–0.25**	0.29***	0.30***	1	
WI	–0.28***	–0.21**	–0.22**	–0.17*	–0.23**	0.27**	0.29***	0.32***	1

Notes:***p < 0.01; **p < 0.05; *p < 0.10; N=533
Source: authors' computation

Conversely, as shown in Table 4, TE was negatively correlated with skills mismatch (SM) ($r = –0.25$, $p < 0.01$), digital divide (DD) ($r = –0.29$, $p < 0.01$), corruption and institutional inefficiency (CI) ($r = –0.31$, $p < 0.01$), and weak institutional support (WI) ($r = –0.33$, $p < 0.01$). These negative relationships confirm that systemic barriers substantially undermine entrepreneurial participation. The findings are consistent with Institutional Theory, which posits that weak governance and corruption increase transaction costs and uncertainty, thereby discouraging entrepreneurial activity (North, 1990; Boateng et al., 2024). They also align with Entrepreneurial Ecosystem Theory, which emphasizes that strong networks, finance, and institutional coherence are vital for entrepreneurial success (Isenberg, 2011; Ogujiuba et al., 2025). Taken together, these results highlight that while enablers are important, addressing systemic barriers is equally critical to unlocking technopreneurship engagement.

4.3 Diagnostic Tests for Regression Models

To validate the regression results for the barrier–enabler model, a series of diagnostic tests were conducted to confirm that the assumptions of Ordinary Least Squares (OLS) regression were satisfied. These tests assessed whether the predictors, digital skills,

access to finance, mentorship, entrepreneurial ecosystems, skills mismatch, digital divide, corruption, and weak institutional support, exhibited acceptable statistical behaviour in relation to technopreneurship engagement. The diagnostics addressed linearity, independence of errors, homoscedasticity, normality of residuals, and multicollinearity. In addition, model fit was assessed to confirm that the predictors collectively explained a meaningful proportion of variance in technopreneurship engagement. Table 5 summarizes the results of these diagnostic tests.

Table 5: Summary of Regression Diagnostic Tests for the Barrier–Enabler Model

Diagnostic Test	Purpose	Statistic/Tool Used	Threshold/ Criteria	Result in Study	Conclusion
Linearity	To confirm predictors (barriers & enablers) have a linear relationship with technopreneurship engagement.	Scatterplots & Partial Regression Plots	Approximate straight-line pattern	Linear trends observed.	Linearity assumption satisfied.
Independence of Errors	To check that residuals are uncorrelated.	Durbin–Watson statistic	~2.0 (1.5–2.5 acceptable)	DW ≈ 2.0	Residuals are independent.
Homoscedasticity	To test if residuals have constant variance.	Breusch–Pagan / White Test	$p > 0.05$ = homoscedasticity	No significant heteroscedasticity.	Homoscedasticity assumption satisfied.
Normality of Errors	To confirm that residuals follow a normal distribution.	Histogram, Q–Q Plot, Shapiro–Wilk Test	$p > 0.05$ = normality	Residuals approximately normal.	Normality assumption satisfied.
Multicollinearity	To test if predictors are highly correlated.	Variance Inflation Factor (VIF)	VIF < 5 acceptable	All VIF values < 2	No multicollinearity detected.
Model Fit	To assess overall explanatory power.	F-test, Adjusted R^2	$p < 0.05$, higher R^2 preferred	Model significant, explains meaningful variance.	Model is statistically adequate.

Source: Authors' computers

The diagnostic checks in Table 5 indicate that the regression model for barriers and enablers met the key assumptions of OLS. The predictors demonstrated linear relationships with technopreneurship engagement, residuals were independent and approximately normally distributed, and the variance of errors was constant across

predicted values. Multicollinearity was not a concern, as all VIF values were well below acceptable thresholds. Furthermore, the model achieved statistical significance, with an adjusted R^2 suggesting that a meaningful portion of technopreneurship engagement could be explained by the combined effects of enablers and barriers. These results strengthen the validity of the model and provide confidence that the estimated coefficients reflect the true underlying relationships between ecosystem conditions and technopreneurship engagement.

4.4 Regression Model

Regression model was estimated with both enabling and constraining factors as predictors and the results are presented in Table 6. The enablers included digital skills, access to finance, mentorship, and entrepreneurial ecosystems, while the barriers comprised skills mismatch, the digital divide, corruption and institutional inefficiency, and weak institutional support. Technopreneurship engagement served as the dependent variable.

Table 6: Regression Results for the Barrier–Enabler Model (Dependent Variable: Technopreneurship Engagement)

Predictor	Coefficient (β)	Standard Error	t-value
Digital Skills (DS)	0.184***	0.052	3.54
Access to Finance (AF)/Access to Resources (AR)	0.237**	0.078	3.04
Mentorship (MT)	0.151**	0.061	2.48
Entrepreneurial Ecosystem (EE)	0.221**	0.069	3.2
Skills Mismatch (SM)	–0.196**	0.067	–2.92
Digital Divide (DD)	–0.241**	0.074	–3.26
Corruption/Institutional Inefficiency (CI)	–0.173**	0.062	–2.79
Weak Institutional Support (WI)	–0.188**	0.07	–2.69
Constant	0.298**	0.092	3.24

Note: $p < 0.001$.*** $p < 0.01$; ** $p < 0.05$.
Source: Authors' Compilations

The regression results in Table 6 demonstrate that both enablers and barriers significantly influence technopreneurship engagement among South African youth. Among the enablers, digital skills (β=0.184, p<0.001), access to finance (β=0.237, p=0.002), mentorship (β=0.151, p=0.014), and entrepreneurial ecosystems (β=0.221,

p=0.001) all had positive and statistically significant effects. This indicates that higher levels of digital competence, financial access, supportive guidance, and institutional infrastructure increase the likelihood of youth engaging in technopreneurship. On the other hand, barriers were also found to be significant and negative. Skills mismatch (β=−0.196, p=0.004), digital divide (β=−0.241, p=0.001), corruption and institutional inefficiency (β=−0.173, p=0.006), and weak institutional support (β=−0.188, p=0.008) all reduced technopreneurship engagement. These results highlight that structural and systemic challenges play a substantial role in limiting opportunities for young entrepreneurs. The overall model explained 19.6% of the variance in technopreneurship engagement (R2=0.196), indicating that both barriers and enablers together have a meaningful impact on participation in technology-driven entrepreneurship.

4.5 Thematic Analysis

Table 7 presents a summary of the thematic analysis conducted through interviews and focus group discussions with policymakers to provide deeper insights into the barriers and enablers influencing youth participation in technopreneurship. The emerging themes are accompanied by illustrative quotes from policymakers, which help contextualize and enrich the quantitative findings. The analysis revealed recurring patterns across participants' narratives, highlighting both the structural obstacles faced by young entrepreneurs and the resilience they continue to demonstrate.

Table 7: Summary of Qualitative Themes on Barriers and Enablers of Technopreneurship

Theme	Description	Illustrative Quote (Youth Participant)
Skills Mismatch	Education not aligned with industry needs.	*R8: "We learn theory in class, but when it comes to applying digital tools for business, we are unprepared."*
Digital Divide	High data costs and limited internet access.	*R2: "The biggest challenge is internet costs. Sometimes I cannot even upload my business products online."*
Institutional Inefficiency	Corruption and bureaucratic hurdles.	*R11: "To get a permit or funding, you need connections. Without them, the process is too slow or unfair."*
Resilience of Youth	Motivation to innovate despite barriers.	*R6: "Even if the system doesn't support us, we are determined to find our own way through technology."*

Source: Authors' Compilations

Table 7 presents findings from the thematic analysis of interviews conducted with respondents (R2–R15), identifying four major themes, Skills Mismatch, Digital Divide, Institutional Inefficiency, and Resilience of Youth, that collectively capture both the barriers and enablers shaping youth technopreneurship in South Africa. These themes reveal how individual determination interacts with systemic challenges, illustrating the complexity of the entrepreneurial landscape for young digital innovators. To begin with, the Skills Mismatch theme highlights the persistent gap between academic training and industry needs. As expressed by R8, "We learn theory in class, but when it comes to applying digital tools for business, we are unprepared." This statement underscores how educational programs often emphasize theory over practical digital competencies. Consequently, many youths struggle to translate knowledge into entrepreneurial action, suggesting that curricula reform and digital upskilling are urgently needed to align education with the evolving digital economy.

In addition, the Digital Divide theme exposes structural inequalities in access to technology. Respondent R2 lamented that "The biggest challenge is internet costs. Sometimes I cannot even upload my business products online." This illustrates how high data prices and unreliable internet connectivity limit participation in e-commerce and digital marketing. Therefore, it becomes clear that without affordable and inclusive digital infrastructure, many aspiring technopreneurs remain excluded from the benefits of digital transformation. Furthermore, the theme of Institutional Inefficiency draws attention to systemic and governance-related barriers. R11's observation, "To get a permit or funding, you need connections. Without them, the process is too slow or unfair", points to corruption, red tape, and bureaucratic delays that discourage innovation. These inefficiencies not only erode trust in public institutions but also slow down the progress of youth-led ventures that could otherwise contribute to national development.

Despite these obstacles, the final theme, Resilience of Youth, reveals a contrasting yet powerful narrative of perseverance. As R6 noted, "Even if the system doesn't support us, we are determined to find our own way through technology." This sentiment demonstrates that young entrepreneurs continue to innovate and adapt despite facing multiple constraints. In other words, resilience serves as a critical enabler, reflecting

optimism, creativity, and agency among South Africa's digital youth. Therefore, the analysis suggests that while structural and institutional barriers, such as inadequate digital skills, high connectivity costs, and inefficient governance, limit technopreneurship, the intrinsic determination and adaptability of youth offer a strong foundation for future growth. Therefore, bridging these gaps through policy reforms, digital inclusion initiatives, and targeted mentorship programs could unlock the full potential of youth-driven digital entrepreneurship in South Africa.

4.6 Triangulation of Quantitative and Qualitative Findings

The triangulation of quantitative and qualitative findings strengthens the validity and depth of this study's conclusions by demonstrating convergence between statistical results and participants lived experiences. The regression results in Table 6 reveal that enablers such as digital skills ($\beta = 0.184$, $p < 0.001$), access to finance ($\beta = 0.237$, $p < 0.05$), mentorship ($\beta = 0.151$, $p < 0.05$), and entrepreneurial ecosystems ($\beta = 0.221$, $p < 0.05$) significantly promote youth technopreneurship. Conversely, barriers such as skills mismatch ($\beta = -0.196$, $p < 0.05$), digital divide ($\beta = -0.241$, $p < 0.01$), corruption and institutional inefficiency ($\beta = -0.173$, $p < 0.05$), and weak institutional support ($\beta = -0.188$, $p < 0.05$) constrain engagement. These relationships were further validated by thematic evidence from interviews and focus group discussions, which provided contextual insights into how these enabling and constraining factors manifest in practice.

Qualitative findings from Table 7 resonate strongly with the quantitative outcomes, reinforcing the explanatory power of the regression model. For instance, the Skills Mismatch theme aligns with the negative regression coefficient for skills mismatch, revealing that inadequate practical training and theoretical curricula hinder entrepreneurial capability. As R8 observed, "We learn theory in class, but when it comes to applying digital tools for business, we are unprepared," confirming the statistical finding that limited digital competence constrains technopreneurial engagement. Similarly, the Digital Divide theme substantiates the negative association found in the regression model ($\beta = -0.241$), as participants emphasized high data costs and poor connectivity as key obstacles. Respondent R2's account that "The biggest challenge is internet costs… I cannot even upload my business products online"

illustrates the lived consequences of digital exclusion, complementing the quantitative evidence that infrastructural inequities impede digital entrepreneurship.

The qualitative insights also contextualize the statistically significant effects of institutional inefficiency and weak institutional support. The regression model identified both as negative predictors of youth technopreneurship, and interview narratives such as R11's, "To get a permit or funding, you need connections… the process is too slow or unfair", give voice to these structural barriers. At the same time, the Resilience of Youth theme complements the positive enabler effects captured in the model, particularly digital skills, mentorship, and supportive ecosystems. Despite structural limitations, participants emphasized determination and adaptability, as R6 remarked, "Even if the system doesn't support us, we are determined to find our own way through technology." This resilience reflects the moderating effect of personal agency observed in similar studies of youth innovation in Africa (Mothibi & Okeke, 2023; WEF, 2022).

Taken together, the triangulation reveals strong convergence between the quantitative and qualitative strands of analysis. Both highlight that youth technopreneurship in South Africa is shaped by a dual dynamic, where institutional barriers restrict opportunities, yet intrinsic motivation and targeted enablers can counteract these constraints. The quantitative model quantified these relationships, while the thematic evidence humanized them, providing depth to statistical associations. Therefore, the integrated findings underscore the need for a comprehensive policy response that not only expands access to digital and financial resources but also enhances institutional transparency, reformulates education curricula, and leverages youth resilience as a catalyst for inclusive digital transformation.

4.7 Robustness Check

Table 8 presents the results of the robustness check conducted to test the consistency and reliability of the main regression model. In this analysis, an interaction term between Digital Skills and Access to Resources was introduced to examine whether resource availability moderates the effect of digital skills on entrepreneurial intent among South African youth. This approach ensures that the observed relationships are not merely statistical artifacts but remain stable when additional interaction effects are

considered. The robustness test thereby strengthens the validity of the model by verifying that the individual and combined effects of digital skills and resources maintain their significance across alternative specifications.

Table 8: Robustness Checks

Variable	Coefficient (β)	Std. Error	t-Statistic
Digital Skills (DS_i)	0.152***	0.051	2.98
Access to Resources (AR_i)	0.201***	0.058	3.47
Interaction ($DS_i \times AR_i$)	0.089**	0.043	2.07

Note: $p < 0.001$.*** $p < 0.01$; ** $p < 0.05$.
Source: Authors' Compilations

As shown in Table 8, the results reaffirm that both digital skills and access to resources have a statistically significant and positive influence on entrepreneurial intent, even after accounting for their interaction. To begin with, the coefficient for digital skills ($\beta = 0.152$, $p < 0.01$) indicates that improvements in youths' digital competencies significantly enhance their likelihood of pursuing entrepreneurship. This suggests that when young people acquire digital literacy and problem-solving abilities, they become more confident and capable of identifying and exploiting business opportunities. Moreover, access to resources ($\beta = 0.201$, $p < 0.01$) exerts an even stronger positive effect, underscoring the critical role of financial capital, infrastructure, and mentorship in enabling entrepreneurial ventures. This finding implies that while skills provide the necessary know-how, resources supply the means to transform ideas into tangible enterprises.

Interestingly, the interaction term ($\beta = 0.089$, $p < 0.05$) also emerged as statistically significant, indicating that access to resources strengthens the positive effect of digital skills on entrepreneurial intent. Conversely, in contexts where such resources are scarce, digital skills alone may not yield substantial entrepreneurial outcomes. Taken together, these results demonstrate a complementary relationship between digital capabilities and resource access. Therefore, enhancing entrepreneurship among South African youth requires not only improving digital literacy but also ensuring equitable access to enabling resources. In summary, the robustness check confirms that the model is both

stable and theoretically sound, reinforcing the need for integrated policy interventions that simultaneously build digital capacity and expand resource accessibility to sustain inclusive technopreneurship.

5. Discussions

The findings of this study confirm that technopreneurship engagement among South African youth is influenced by both individual capabilities and systemic conditions, reflecting a complex interplay between personal agency and structural context. On the enabling side, digital skills, access to finance, mentorship, and entrepreneurial ecosystems emerged as significant predictors of youth participation in digital ventures. This aligns with Human Capital Theory (Becker, 1993), which emphasizes that knowledge and skills are central to innovation and productivity, and TPB (Ajzen, 1991), which posits that individuals' entrepreneurial intentions are shaped by their attitudes, perceived behavioural control, and subjective norms. In this study, youths with higher digital competence and self-efficacy demonstrated stronger entrepreneurial intent, consistent with TPB's behavioural logic. Furthermore, the findings reinforce the Resource-Based View (RBV) (Barney, 1991), which underscores that access to valuable, rare, and inimitable resources, such as financial capital, technology, and networks, forms the foundation of competitive advantage in entrepreneurial ecosystems.

At the same time, systemic barriers, including skills mismatches, the digital divide, corruption, and weak institutional support, were found to hinder youth engagement in technopreneurship. This is consistent with Institutional Theory (North, 1990), which asserts that governance structures, formal rules, and informal norms shape entrepreneurial activity by either enabling or constraining innovation. When institutional environments are fragmented or corrupt, transaction costs increase, and trust within the entrepreneurial ecosystem declines, discouraging participation and innovation (Akinboade & Lalthapersad-Pillay, 2022). A particularly notable finding is that access to resources ($\beta = 0.237$) exerted a stronger effect on technopreneurship engagement than digital skills ($\beta = 0.184$). This suggests that while human capital is vital, it must be complemented by structural enablers such as finance, infrastructure, and mentorship, findings consistent with (Lose et al., 2023; Ofosu-Appiah et al., 2025), who observed that resource availability determines whether young people transition from aspiring to active entrepreneurs.

The positive role of entrepreneurial ecosystems further supports Entrepreneurial Ecosystem Theory (EET) (Isenberg, 2011), which emphasizes the interconnectedness of finance, policy, markets, and support systems in shaping entrepreneurial success. When these elements operate cohesively, they reinforce innovation and scalability; however, weak or fragmented ecosystems restrict collaboration, reduce investor confidence, and limit market expansion. This study's qualitative findings reveal that while youth often resort to informal mentorship, mobile platforms, and peer networks to navigate these structural gaps, such adaptive strategies remain unsustainable without systemic reinforcement. The evidence suggests that institutional inefficiencies, corruption, and high operational costs collectively undermine the functionality of entrepreneurial ecosystems in South Africa (Akinboade & Lalthapersad-Pillay, 2022).

Comparative findings across Africa validate these results. For instance, (Okegbe, 2025) in Nigeria found that digital entrepreneurship skills improved youth empowerment only when supported by robust institutional and private-sector engagement. Similarly, (Kamutuezu et al., 2021) in Namibia reported that infrastructural deficits, particularly unreliable electricity and high data costs, constrained the potential benefits of digital skills. (Idowu, 2025; Ofosu-Appiah et al., 2025) further highlight that youth entrepreneurship across sub-Saharan Africa is shaped by a layered interaction between human capital and institutional ecosystems, reaffirming that entrepreneurial outcomes are determined by the alignment of skills, resources, and governance systems.

Taken together, these results illustrate that technopreneurship among South African youth cannot be explained by individual-level factors alone. Instead, it requires a holistic perspective that integrates the principles of the TPB, RBV, Institutional Theory, and EET. While digital literacy and entrepreneurial ambition provide the necessary foundation, they are most effective when reinforced by resource accessibility, institutional coherence, and supportive ecosystems. Therefore, policy interventions must transcend traditional skills development frameworks to simultaneously enhance resource access, ecosystem integration, and institutional quality. Only through such a multi-theoretical and multi-dimensional approach can technopreneurship meaningfully contribute to addressing South Africa's persistent youth unemployment and advancing inclusive digital development.

6. Policy Implications

Youth technopreneurship in South Africa is shaped by a delicate balance between enablers and barriers. On the enabling side, digital skills, access to finance, mentorship, and supportive entrepreneurial ecosystems empower young people to create technology-driven ventures that generate employment (Becker, 1993; Barney, 1991; Isenberg, 2011). However, systemic obstacles such as skills mismatch, the digital divide, corruption, and weak institutional support continue to undermine entrepreneurial potential (North, 1990; Akinboade & Lalthapersad-Pillay, 2022). These findings suggest that while improving individual competencies is essential, it will not translate into meaningful outcomes if the wider institutional and financial environment remains weak. Consequently, policy efforts must simultaneously address both personal capacity development and the systemic barriers that inhibit entrepreneurial activity.

Building on this, the next priority is to strengthen youth digital literacy and technical competence through targeted training, reskilling, and curriculum reform aligned with market demands boosting both employability and entrepreneurial capacity (World Bank, 2024; Becker, 1993). Jointly, expanding youth access to finance through seed grants, microcredit schemes, and innovative digital lending platforms can reduce entry barriers and provide the capital needed to scale new ventures (Lose et al., 2023; Ofosu-Appiah et al., 2025). These interventions bridge the gap between entrepreneurial intent and successful venture creation, ensuring that skills development leads to tangible economic participation.

Finally, translating entrepreneurial potential into sustainable growth requires stronger ecosystems and better governance. Governments and industry must nurture vibrant entrepreneurial ecosystems by supporting incubators, technology hubs, mentorship networks, and university–industry partnerships (Isenberg, 2011; Mazzucato, 2013). Complementing these efforts, institutional reforms aimed at improving transparency, reducing bureaucratic inefficiencies, and combating corruption will lower transaction costs and build trust in public systems (North, 1990; Akinboade & Lalthapersad-Pillay, 2022). When human capital development is combined with resource access, supportive ecosystems, and institutional strengthening, technopreneurship can become a powerful driver of youth employment and inclusive digital economic transformation.

7. Conclusion

This study finds that youth technopreneurship in South Africa is shaped by the interplay of enabling and constraining factors. Key drivers include digital skills, access to finance, mentorship, and supportive entrepreneurial ecosystems, which collectively empower young people to launch technology-based ventures capable of generating employment. However, systemic barriers such as skills mismatches, the digital divide, corruption, and weak institutional support limit entrepreneurial potential. The findings highlight that developing individual capabilities alone is insufficient; structural and institutional conditions must also be addressed. Effective youth technopreneurship policies should combine skills development with improved access to resources, enhanced institutional efficiency, and stronger entrepreneurial ecosystems. Limitations of the study include its cross-sectional design, self-reported measures, and purposive sampling, which restrict causal inference and broader generalizability. Future research should employ longitudinal, comparative, and sector-specific approaches to assess how changes in skills, resources, and policies influence technopreneurship outcomes and to identify context-specific strategies for fostering youth-led digital entrepreneurship.

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