INNOVATE DURBAN

STATE OF INNOVATION

IN KWAZULU-NATAL 2025/26 TECHNICAL REPORT

TECHNICAL REPORT

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FOREWORD

The State of Innovation in KwaZulu-Natal exists because the province's innovation system is consequential enough to warrant measurement and unevenly enough developed to warrant scrutiny. This seventh edition is the first to commit to an explicit analytical position about that unevenness. The position, set out in full in Section 3, is that the province consistently assembles the structural preconditions for innovation – the largest NSC examination cohort in the country, a consistent third-place ranking on total R&D expenditure, a leading research university, and the second-largestformal employment base nationally – but does not consistently convert these preconditions into proportionate throughput, commercialisation or employment outcomes. R&D intensity ranks seventh of nine provinces. Real business R&D has lost approximately 42 per cent of its purchasing power over nine years. The TVET engineering pipeline ranks second on registrations and eighth on completions. The pattern repeats across the five categories the publication measures.

This edition differs from its predecessors in three respects. The indicator set has been reduced from 51 to 40, prioritising quality and defensibility over completeness; indicators that could not be sourced reliably or whose methodologies could not withstand external scrutiny have been removed or formally deferred with a documented reinstatement pathway. The number of dimensions reported per indicator has been expanded, from typically one to three data points in previous editions to between four and eight in the present one. And the publication is now presented across three documents – this Technical Report, a companion Snapshot, and a standalone Celebrating KwaZulu-Natal Innovators volume – calibrated to different audiences.

The data on which the report rests are produced and made publicly available by the Human Sciences Research Council, the Department of Higher Education and Training, the Department of Basic Education, Statistics South Africa, the Independent Communications Authority of South Africa, the National Treasury through the SEAD platform, and the Companies and Intellectual Property Commission. The custodians of these sources do the heavy work of measurement; this publication does the work of provincial analysis on top of it. The continued quality of these national systems is what makes a publication of this kind possible.

Tamisha Gengayah and I worked jointly across all aspects of this edition, from indicator design and data extraction through workbook construction, figure preparation and analytical framing. Sphesihle Thusini provided helpful guidance on sourcing patent and intellectual property data. Innovate Durban CEO Aurelia Albert reviewed the full draft.

The 2025/26 edition is offered to provincial and national policy formulation, to university and science council planning, to industry investment decisions, and to academic researchers and civil society organisations engaged with the provincial innovation system. The argument it makes is that the central challenge in KwaZulu-Natal is not scale but conversion. The evidence supporting that argument is set out in the chapters that follow.

Patrick Martel
Research and Impact Lead, Innovate Durban
May 2026

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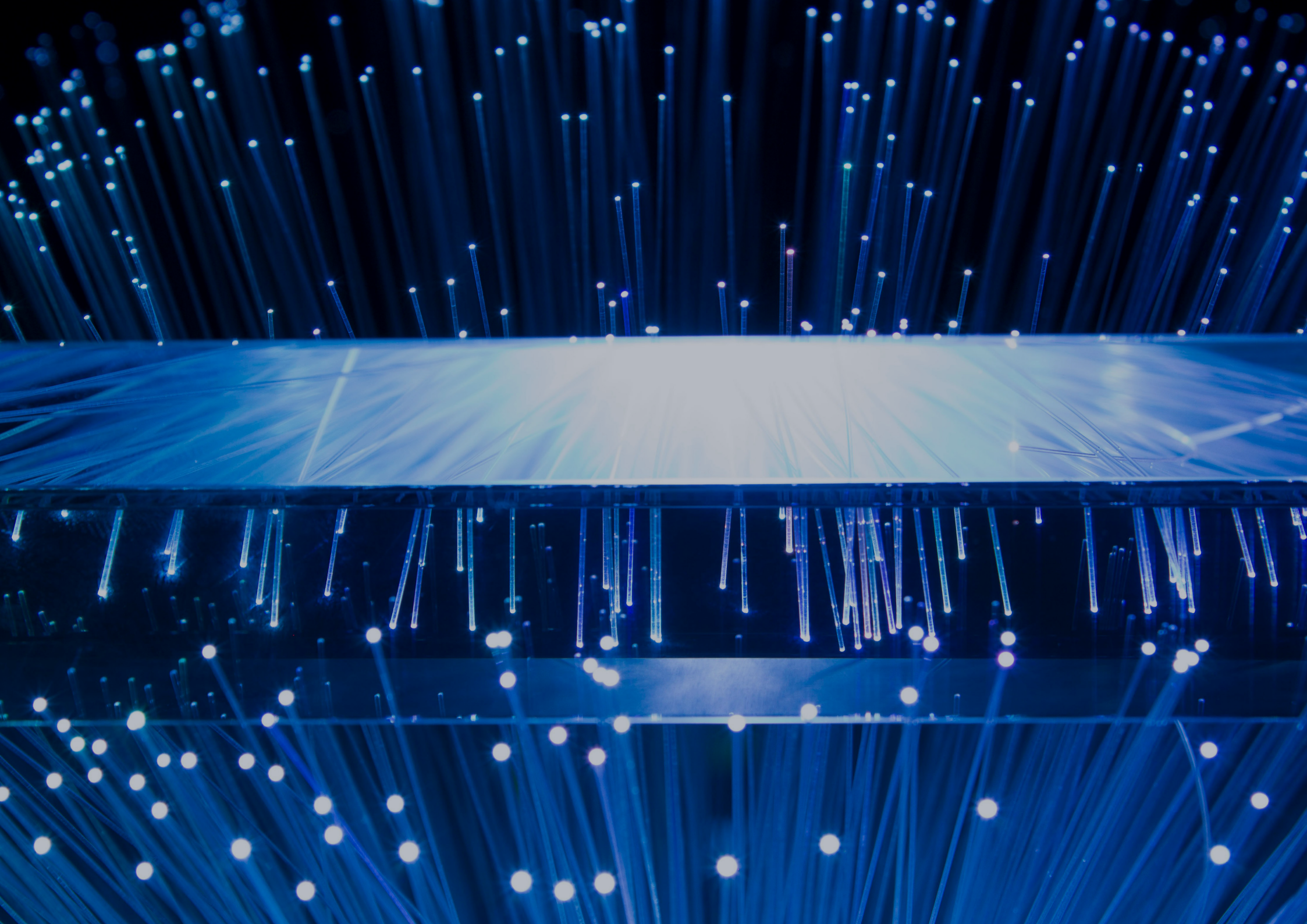
ABBREVIATIONS AND ACRONYMS

The following abbreviations are used throughout this Technical Report. The list is exhaustive for the 2025/26 edition and includes institutional names, measurement conventions and shorthand used in tables and figures.

ABBR.	EXPANSION	ABBR.	EXPANSION
3G	Third-Generation mobile network	**NWU**	North-West University
4G	Fourth-Generation mobile network	**OECD**	Organisation for Economic Co-operation and Development
5G	Fifth-Generation mobile network	**OLS**	Ordinary Least Squares
AI	Artificial Intelligence	**PCT**	Patent Cooperation Treaty
BERD	Business Expenditure on Research and Experimental Development	**PSDF**	Provincial Spatial Development Framework
CAGR	Compound Annual Growth Rate	**PSET**	Post-School Education and Training
CeSTII	Centre for Science, Technology and Innovation Indicators	**QES**	Quarterly Employment Statistics
CFERI	Centre for Entrepreneurship and Rapid Incubation	**QLFS**	Quarterly Labour Force Survey
CIPC	Companies and Intellectual Property Commission	**R&D**	Research and Experimental Development
COGTA	Department of Co-operative Governance and Traditional Affairs	**RCA**	Revealed Comparative Advantage
CPUT	Cape Peninsula University of Technology	**RI**	Research Infrastructure
CSI	Corporate Social Investment	**RIA**	Revealed Innovation Activity
CUT	Central University of Technology	**RSA**	Republic of South Africa
CV	Coefficient of Variation	**RU**	Rhodes University
DBE	Department of Basic Education	**SA-SAMS**	South African Schools Administration and Management System
DCDT	Department of Communications and Digital Technologies	**SARAO**	South African Radio Astronomy Observatory
DHET	Department of Higher Education and Training	**SEAD**	Spatial Economic Activity Data
DPRU	Development Policy Research Unit	**SEDA**	Small Enterprise Development Agency
DSAC	Department of Sport, Arts and Culture	**SEDFA**	Small Enterprise Development and Finance Agency
DSI	Department of Science and Innovation	**SET**	Science, Engineering and Technology

DUT	Durban University of Technology	**SIC**	Standard Industrial Classification
EC	Eastern Cape (province abbreviation in tables)	**SIM**	Subscriber Identity Module
EDTEA	Economic Development, Tourism and Environmental Affairs (KwaZulu-Natal)	**SKA**	Square Kilometre Array
EFMS	Education Facility Management System	**SME**	Small and Medium Enterprise
FDI	Foreign Direct Investment	**SMU**	Sefako Makgatho Health Sciences University
FS	Free State (province abbreviation in tables)	**SOE**	State-Owned Enterprise
FTE	Full-Time Equivalent	**SOI**	State of Innovation
GDP	Gross Domestic Product	**SPU**	Sol Plaatje University
GERD	Gross Expenditure on Research and Experimental Development	**Stats SA**	Statistics South Africa
GHS	General Household Survey	**STEM**	Science, Technology, Engineering and Mathematics
GP	Gauteng (province abbreviation in tables)	**STI**	Science, Technology and Innovation
GVA	Gross Value Added	**STIP**	Science and Technology Innovation Park (UKZN)
HEMIS	Higher Education Management Information System	**SU**	Stellenbosch University
HERD	Higher Education Expenditure on Research and Experimental Development	**TI**	Technology Infrastructure
HHI	Herfindahl-Hirschman Index	**TIA**	Technology Innovation Agency
HSRC	Human Sciences Research Council	**TIMSS**	Trends in International Mathematics and Science Study
ICASA	Independent Communications Authority of South Africa	**TSC**	Technology Station in Chemicals
ICLS	International Conference of Labour Statisticians	**TT**	Technology Transfer
ICT	Information and Communications Technology	**TUT**	Tshwane University of Technology
IP	Intellectual Property	**TVET**	Technical and Vocational Education and Training
IPC	International Patent Classification	**UCT**	University of Cape Town
KIS	Knowledge-Intensive Services	**UFH**	University of Fort Hare
KZN	KwaZulu-Natal	**UFS**	University of the Free State
LP	Limpopo (province abbreviation in tables)	**UIF**	Unemployment Insurance Fund

LQ	Location Quotient	**UJ**	University of Johannesburg
LTE	Long-Term Evolution (mobile network standard)	**UKZN**	University of KwaZulu-Natal
MAE	Mandate Alignment Exemption	**UL**	University of Limpopo
MP	Mpumalanga (province abbreviation in tables)	**UMP**	University of Mpumalanga
MUT	Mangosuthu University of Technology	**UNISA**	University of South Africa
NACI	National Advisory Council on Innovation	**UNIVEN**	University of Venda
NC	Northern Cape (province abbreviation in tables)	**UNIZULU**	University of Zululand
NDP	National Development Plan	**UP**	University of Pretoria
NEET	Not in Employment, Education or Training	**UVU**	UVU Africa (Western Cape innovation publisher)
NEIMS	National Education Infrastructure Management System	**UWC**	University of the Western Cape
NFP	Not-for-Profit	**VUT**	Vaal University of Technology
NGO	Non-Governmental Organisation	**WC**	Western Cape (province abbreviation in tables)
NMU	Nelson Mandela University	**WIPO**	World Intellectual Property Organisation
NPC	National Planning Commission	**Wits**	University of the Witwatersrand
NSC	National Senior Certificate	**WSU**	Walter Sisulu University
NW	North West (province abbreviation in tables)	**ZAR**	South African Rand



EXECUTIVE SUMMARY

KwaZulu-Natal's innovation challenge is not principally a challenge of scale. On absolute participation measures, the province occupies the position its population and economic weight would predict: the country's largest National Senior Certificate examination cohort at 171,368 candidates in 2025, a third-place ranking on absolute Gross Expenditure on R&D held in every year of the twelve-year measurement series, mobile internet penetration leading the country at 80.0%, and a research university that sits second nationally on per-capita research output. On intensity, throughput and value-capture measures, the provincial position falls to mid-table or below. R&D intensity ranks seventh of nine provinces. Real Business R&D has contracted approximately 42% over nine years at a compound annual rate of -5.94%, approximately 1.6 times the national rate of contraction. Science, Engineering and Technology graduation per 100,000 of population sits below its 2015 starting point. N3 Engineering completion ranks eighth of nine provinces at 44.9% against a national average of 50.8%. High-technology manufacturing employment fell 23.0% over the eleven-year window to 2025. The 2025/26 edition of the State of Innovation in KwaZulu-Natal Technical Report introduces the gap between scale present and conversion absent as the lens through which the indicator data is read. The report assembles forty active indicators across five categories (**PEOPLE**, **INFRASTRUCTURE**, **INVESTMENT**, **ECOSYSTEM** and **IMPACT**); the conversion-failure pattern appears in structurally distinct forms in each.

The provincial baseline against which the diagnostic operates is set out in Section 2. KwaZulu-Natal's GDP share has held within a narrow band of 15.8% to 16.5% across the past decade, with the eThekwini metropole generating approximately 55 to 60% of provincial economic output. The official unemployment rate stood at 32.3% in Q4:2025, the absorption rate at 34.9%, and broad labour underutilisation at 49.1%. Approximately 742,000 young people aged 15 to 24 are in NEET status (Q1:2024), the largest absolute provincial NEET cohort nationally. The strengths the indicator data records (the largest NSC cohort, the third-place R&D rank, the leading per-capita research output) are real; the gap between those strengths and outcome-layer absorption is what determines whether they translate into the labour-market conditions described above.

Each category contributes a structurally distinct reading of the conversion-failure pattern. The **PEOPLE** category records scale and improvement at the participation layer alongside throughput losses at three downstream transitions. The standard deviation across KZN district pass rates fell from 7.31 percentage points in 2016 to 1.91 percentage points in 2025, a 74% reduction in dispersion that is the strongest within-category convergence finding the report records. Whilst Mathematics subject participation declined 36.7% over the same period, restricting the candidate volume entering Mathematics-conditional pathways, achievement at the higher thresholds rose materially within the smaller cohort. SET enrolment in KZN holds rank three nationally and has grown 5.0% per annum over the 2015 to 2023 academic-year window, albeit graduation per 100,000 of population sits below its 2015 starting point. The **INFRASTRUCTURE** category shows parity at basic electrification, with 100% formal electrification recorded across all 5,753 KZN public ordinary schools, alongside compositional gaps at school laboratories, computer centres and libraries. Mobile internet penetration leads the country, although the rural-urban 5G coverage gap and the household electrification gap to the Western Cape (a provincial gap that has widened, not narrowed, over the period) signal that the infrastructure platform is uneven. The **INVESTMENT** category shows scale and stability at the public R&D base held against private-sector contraction. KZN holds third-place absolute GERD throughout the twelve-year series, and Not-for-Profit R&D growth has been the strongest provincial performer over the period; the Business sector R&D contraction at a compound annual growth rate (CAGR) of -5.94% is the most pronounced finding the Investment chapter records. The **ECOSYSTEM** category shows institutional presence held against three structural gaps in the commercialisation pipeline. KZN ties first nationally on Living Labs at three entries; no Fabrication Lab is recorded in the December 2025 facility register; the two universities producing the bulk of provincial research output sit at ranks nineteen and sixteen of twenty-three on patent applications per 100 DHET output units; and the locally anchored funding directory at 95 mechanisms is advisory-weighted, with patient capital and technology-transfer-facing finance under-represented relative to navigational support. The **IMPACT** category shows positive sectoral employment growth in knowledge-intensive services at +19.3% over the period to 110,890 FTE in 2025, with 76.0% of that employment concentrated in eThekwini, alongside compression of the innovation wage premium across the three core innovation services sectors (Information & Communication, Finance & Insurance, and Professional, Scientific and Technical Activities) and real wage contraction recorded in three of the four KIS sectors examined.

Section 9 reads the cross-category evidence under four structural features that recur across categories. Concentration appears at three structurally distinct levels: institutional (UKZN accounts for 71.5% of provincial research output in 2023 and 76.0% of provincial doctoral SET graduates), spatial (eThekwini holds 76.0% of provincial knowledge-intensive services employment and 82.1% of locally anchored funding mechanisms), and sectoral (a single large-employer decision in Motor Vehicles and Trailers carries the entire +6.4% medium-high-tech manufacturing growth over the period, with the remaining four sub-sectors collectively losing 5,222 jobs). Composition refers to the structural mix within each scale category, consistently weighted away from the throughput- and value-capture-end of each pipeline. The funding directory shows the pattern: advisory mechanisms account for 54.7% of the

95 entries against capital-deploying mechanisms at 33.7%. The school infrastructure platform shows it: electricity coverage at 100% sits alongside laboratory access at 24.4% and library access at 26.1%. The Ecosystem facility composition shows it: Living Labs at rank one nationally sits alongside zero Fabrication Labs and a patent-intensity rank in the lower half of the twenty-three-institution national set for the two universities producing the bulk of provincial research output. Throughput refers to the transition losses observed at the three downstream points in the human-capital pipeline (NSC enrolment to NSC achievement, NSC achievement to higher education registration, and higher education registration to graduation) and at the research-output to commercialisation transition. Value Capture refers to the wage and price terms on which KZN participates in the formal innovation labour market, with the innovation wage premium compressing more sharply at the early-career level than at the all-worker average. The four features describe one system observed at different analytical registers; they are mutually reinforcing.

Section 9.7 draws five priorities for action from these mechanisms. Spatial inclusion targets the eThekwini concentration pattern and the rural-urban infrastructure gap. Capital architecture targets the advisory-versus-capital composition gap in the locally anchored funding directory, and the private-sector R&D contraction. Commercialisation infrastructure targets the Fab Lab absence and the publication-to-patent conversion gap at UKZN and DUT. Digital connectivity targets the rural-urban 5G coverage gap and the persistent household electrification gap. Human-capital pipeline targets the three downstream throughput losses identified in the People category. The priorities are not independent of one another. Section 9 hypothesises that concentration, composition, throughput and value capture interact across the categories rather than within them, and that a coordinated strategic response is more likely to close the conversion gap than a response addressing each priority in isolation. The hypothesis warrants longitudinal confirmation in subsequent reporting cycles.

The diagnostic the report supports is structural. The primary location of the conversion failure does not sit at the entry stage of any sub-domain. It sits downstream of input scale, in the mechanisms by which large headcount bases are translated into high-intensity, high-value-capture outcomes. The province's strengths are genuine, and the conversion-failure framing is not a denial of them. The framing claims something different. KwaZulu-Natal does not lack the structural preconditions for innovation. It assembles them, and then fails to convert them at the layers the framework measures. That failure is itself structural rather than incidental. The report assembles the cross-category evidence the diagnosis rests on; the strategic response sits with the actors who hold the levers the diagnosis identifies.

A note on framework scope. The 2025/26 edition extended the measurement framework in three respects that made the conversion gap legible. The indicator set was reduced from fifty-one to forty to focus on indicator quality. The dimensions reported per indicator were expanded from one-to-three data points in previous editions to between four and eight in the present edition, covering absolute values, provincial shares, ranks, compound annual growth rates, indexed trends and distance-to-frontier comparisons. Three primary data sources entered the framework for the first time: the National Treasury Spatial Economic Activity Database (SEAD), the CIPC Patent Register, and the Innovate Durban Innovation Support Facility Register and Funding Map. What the framework cannot yet see is set out in Section 9.6: the informal economy innovation contribution sits below the resolution of administrative tax and UIF data; three formal-framework data gaps remain unresolved (R&D Personnel at full-time-equivalent provincial scale, LTE Device Adoption pending ICASA disclosure, and patent grants by KZN-anchored universities at the firm-applicant level); and five cross-category statistical relationships hypothesised in this edition warrant longitudinal confirmation in subsequent reporting cycles

1. INTRODUCTION

The 2025/26 State of Innovation in KwaZulu-Natal Publication, produced by Innovate Durban, presents the seventh edition of this annual assessment of the province's innovation landscape. This edition reports on five categories, 16 sub-categories and 40 indicators, drawn from primary national statistical sources including the Human Sciences Research Council (HSRC) Centre for Science, Technology and Innovation Indicators (CeSTII), the Department of Higher Education and Training (DHET), the Department of Basic Education (DBE), Statistics South Africa (Stats SA), and the Independent Communications Authority of South Africa (ICASA). The full inventory of data sources, including the National Treasury Socio-Economic Analysis Database (SEAD platform), the Companies and Intellectual Property Commission (CIPC) Patent Register, and Innovate Durban's own Facility Register and Funding Map, is set out in Section 3.

The analytical framework is structured around three functional groupings: innovation enablers (People and Infrastructure), innovation resources and support mechanisms (Investment and Ecosystem), and innovation outcomes (Impact). This grouping recognises that successful innovation requires foundational capacity in people and infrastructure, adequate resourcing through investment and support systems, and ultimately translates into measurable outcomes in employment, value capture and knowledge production. A fuller explanation of this framework, including its grounding in innovation systems theory, is provided in Section 3.

Whilst the five-category structure has been retained from previous editions, the 2025/26 publication differs from its predecessors in three substantive ways. First, an explicit conceptual framework is now presented, identifying the organising analytical lens under which this edition reads the indicator data: the pattern in which KwaZulu-Natal demonstrates competitive scale on participation indicators but underperforms on intensity, throughput and value-capture indicators at successive stages of the innovation pipeline. Second, the indicator set has been reduced from 51 to 40, reflecting a deliberate focus on indicator quality, rather than a narrowing of analytical scope; indicators that could not be sourced with sufficient data quality, or whose methodologies could not be defended against external scrutiny, have been removed or formally deferred with a documented reinstatement pathway. Third, where indicators have been retained, the number of dimensions reported per indicator has been expanded substantially, typically from one to three data points in previous editions to between four and eight in the present edition, covering absolute values, provincial shares, ranks, compound annual growth rates, indexed trends and distance-to-frontier comparisons.

The conversion-failure framing posits that KwaZulu-Natal's innovation challenge is not principally a challenge of scale. On absolute participation measures, the province consistently occupies the position its population and economic weight would predict: the largest National Senior Certificate (NSC) examination cohort in the country, a consistent third-place ranking on total R&D expenditure, a leading research university, and the second-largest formal employment base nationally. On intensity, throughput and value-capture measures, the provincial position falls to mid-table or below. R&D intensity ranks seventh of nine provinces. Science, Engineering and Technology (SET) graduation per capita sits below its own 2015 starting level. Business sector R&D has contracted in real terms at approximately 1.6 times the national rate over nine years. This pattern, in which scale is present but conversion is absent, is the lens under which the indicator analysis is read in Sections 4 to 8 and is argued in Section 9 with reference to the cross-category evidence the report assembles.

A further structural change concerns the format in which the publication is presented. Previous editions combined the technical analysis and the innovator case studies within a single volume. The 2025/26 edition is presented across three separate documents. This Technical Report contains the full quantitative analysis. A companion Snapshot document condenses the headline findings for non-specialist readers. The third document, Celebrating KwaZulu-Natal Innovators, profiles ten innovators alongside three emerging innovators, with five of the thirteen profiles accompanied by short video features. This separation allows each document to be calibrated to its intended audience without compromising the analytical depth of the underlying technical work.

The Technical Report is intended to serve provincial and national policy formulation, university and science council planning, industry investment decisions, and the work of academic researchers and civil society organisations engaged with the provincial innovation system; the companion Snapshot and Celebrating KwaZulu-Natal Innovators publications are calibrated for broader stakeholder engagement and public dissemination. The remainder of this report is structured as follows. Section 2 provides a situational assessment of KwaZulu-Natal in terms of demographic, economic and labour market structure. Section 3 details the methodology, including the conceptual framework, the three-layer analytical approach, and the treatment of data sources and limitations. Sections 4 to 8 present the indicator analysis for each of the five categories in turn: People, Infrastructure, Investment, Ecosystem and Impact. Section 9 reads the cross-category findings under four structural features (Concentration, Composition, Throughput and Value Capture) and sets out implications for policy, practice and future research. Section 10 concludes this technical report.

2. SITUATIONAL ASSESSMENT

The state of innovation in KwaZulu-Natal is shaped by conditions that extend well beyond the boundaries of the innovation system itself. The following subsections contextualise the province's structural position in terms of macroeconomic scale and trajectory, sectoral composition, labour market conditions, socioeconomic baseline, and innovation policy framework, to support a more accurate interpretation of the indicator findings reported in the sections that follow.

2.1 KwaZulu-Natal in relation to the National Economy

South Africa's population reached 63.1 million in 2025, up from 46.6 million in 2002 (Stats SA, 2025a). KwaZulu-Natal, with an estimated 12.23 million mid-2025 residents, is the second most populous province nationally behind Gauteng's 16.10 million. More specifically, KZN had an average annual population growth of 1.7% between 2011 and 2022 (Stats SA, 2023). The Census 2022 figure of 12.42 million is referenced where comparison against other Census-vintage data is required.

KwaZulu-Natal is consistently South Africa's second-largest provincial economy, with a GDP share that has held within a narrow band of 15.8% to 16.5% between 2014 and 2024, recording a share of 16.3% in 2014 and 16.1% in 2024 (Stats SA, 2025b). Gauteng, the Western Cape and KZN collectively generated 63.4% of national GDP in 2023 whilst accounting for 57.8% of the population (NACI, 2025), an above-proportional economic concentration that has remained stable across the period. Nationally, nominal GDP reached R7.6 trillion in 2025, with real growth of 1.1% for the year; finance, real estate and business services provided the primary growth impulse at 0.5 percentage points, whilst manufacturing, utilities and construction all recorded negative contributions (Stats SA, 2026a). The OECD (2025) projects national real GDP growth of 1.3% and 1.4% in 2025 and 2026 respectively, contingent on continued reform progress in electricity supply and freight logistics, although the national unemployment rate is expected to remain at approximately 32% through 2026.

eThekwini accounts for a disproportionate share of provincial economic output. City and provincial economic data indicate that the metro generated approximately 59.9% of KZN's GDP in 2018, equivalent to R468 billion at current prices (COGTA, 2020).

EDTEA's GVA-based district profile estimates the contribution at 54.7% of provincial GVA in 2019 (EDTEA, 2021); the difference between the two figures reflects the GDP/GVA methodological distinction rather than a substantive economic shift. Given that Stats SA does not publish an official metro-level GDP series, a 55–60% indicative range is the most defensible current estimate.

In terms of population, the metro's 4.24 million residents (Census 2022) represent approximately 34% of the provincial total of 12.42 million, whilst formal employment in the metro grew by 12.3% between 2014 and 2024, reaching approximately 877,000 full-time equivalent jobs (SEAD-SA, 2026).KZN recorded real GDP growth of 0.4% in 2024, fractionally below the national average of 0.5% (Stats SA, 2025b); the province's growth trajectory was further affected by the April 2022 floods, which caused infrastructure damage and business losses estimated at 0.5% of national GDP (OECD, 2025). Msunduzi and uMhlathuze perform secondary industrial and administrative functions but operate at a considerably smaller scale in both population and employment terms (SEAD-SA, 2026).

Bearing this macroeconomic context in mind, KZN's economy is large in absolute terms but has grown at a compound annual real rate of only 0.7% between 2014 and 2024 (Stats SA, 2025b). At this pace, lifting R&D intensity as a share of provincial product requires deliberate increases in expenditure rather than passive reliance on economic expansion to lower the ratio; the Investment indicators in this report should be interpreted with this constraint in mind.

2.2 Sectoral Structure and Comparative Advantage

KZN's sectoral position within the national economy is characterised through Revealed Comparative Advantage (RCA) analysis. Table 2.1 presents RCA values across ten sectors for all nine provinces, calculated from gross value added data covering the period 2011 to 2021 (NACI, 2023). The values above 1.0 indicate a disproportionate provincial share of national output in that sector relative to overall economic weight.

Table 2.1: Revealed Comparative Advantage of provinces based on gross value added (2011–2021)

SECTORS	EC	FS	GP	KZN	LP	MP	NW	NC	WC
Construction	1.02	0.66	0.95	1.13	0.90	0.86	0.71	0.73	1.37
Electricity & Water	0.59	1.18	0.86	1.03	1.27	2.21	0.94	1.17	0.73
Manufacturing	0.89	0.83	1.13	1.32	0.26	1.08	0.44	0.26	1.10
General government service	1.20	1.38	0.85	1.03	0.82	0.73	1.41	0.96	1.13
Finance, real estate & business services	0.95	0.81	1.22	0.84	0.75	0.62	0.69	0.72	1.23
Community, social & other personal services	1.30	0.99	1.16	0.93	1.22	0.74	0.81	1.02	0.63
Wholesale & retail trade; hotels & restaurants	1.33	0.97	0.89	1.00	1.11	1.04	0.86	0.87	1.11
Transport & communication	0.89	1.05	1.02	1.34	0.55	0.70	0.67	1.32	1.07
Mining & quarrying	0.03	1.26	0.29	0.19	3.70	3.23	4.37	2.83	0.03
Agriculture, forestry & fishing	0.70	2.13	0.18	1.65	1.14	1.26	1.13	3.29	1.45

Source: Adapted from NACI (2023), covering 2011–2021 GVA data. Note: RCA values above 1 indicate relative specialisation. Neither NACI (2024) nor NACI (2025) publishes an updated RCA table; the 2023 edition therefore remains the most current available.

KZN's strongest comparative advantages lie in agriculture, forestry and fishing (RCA = 1.65), transport and communication (1.34), and manufacturing (1.32), whilst finance, real estate and business services (0.84) and mining and quarrying (0.19) represent areas of relative underperformance at the provincial level. These results are corroborated by more recent sectoral data from NACI (2025), which reports that KZN generated 19.4% of national manufacturing GVA in 2023, ranking second nationally behind Gauteng (40.2%), and 20.0% of national transport and communication GVA. This pattern suggests that port-linked industry and logistics remain the primary source of KZN's traded-sector weight, with agriculture playing a materially important supporting role.

At the metropolitan level, Spatial Tax Panel data from SEAD's eThekwini chapter provide a granular breakdown of formal employment for the 2023/24 tax year. Trade and Support Services account for 28% of full-time equivalent employment, followed by Public and Social Services at 25% and Manufacturing and Logistics at 22%; Finance and Business Services contribute a further 11%, bringing these four sectors collectively to approximately 86% of the metro's formal employment base (SEAD-SA, 2026). It is noteworthy that SEAD flags a head-office reporting bias affecting approximately 13.5% of FTE employment in the Spatial Tax Panel, particularly in retail and utilities; consequently, figures in Table 2.2 should be treated as indicative estimates rather than precise counts.

Table 2.2: Sectoral composition of formal employment in eThekwini, 2023/24

SECTORS	FTE EMPLOYMENT	SHARE OF TOTAL (%)
Trade and Support Services	248,465	28.0
Public and Social Services	219,748	25.0
Manufacturing and Logistics	197,342	22.0
Finance and Business Services	95,928	11.0
Construction and Utilities	45,381	5.0
Private Households / Other	30,891	4.0
Accommodation and Food Services	29,696	3.0
Agriculture and Resource Activities	12,409	1.0
Total	**879,860**	**100.0**

Source: Nell, A. and Visagie, J. (2025). Spatial Tax Panel 2014–2024, version 5.1, in SEAD Cities Economic Outlook 2026. Note: Approximately 13.5% of FTE employment may be subject to head-office reporting bias; figures are indicative.

The RCA analysis and SEAD employment data collectively inform this report's Layer 2 focus areas: logistics and port-linked services, agri-food and agro-processing, and creative industries. These sectors are not arbitrarily selected; they correspond to areas in which KZN demonstrates comparative advantage in terms of both GVA share and concentrated formal employment. The evidence points towards an incremental, path-dependent upgrading strategy: enhancing technology adoption, process innovation and skills development within existing manufacturing and logistics value chains, rather than pursuing structural diversification into sectors for which the current provincial base offers limited absorptive capacity.

2.3 Labour Market Structure

An eleven-year quarterly series compiled from Stats SA's Quarterly Labour Force Survey reveals persistent deterioration in KZN's labour market conditions rather than any decisive structural improvement (Stats SA, QLFS Series, 2014–2025). In Q1 2014, the official unemployment rate stood at 20.7%, the absorption rate at 38.4% and the labour-force participation rate at 48.5%, against a working-age population of approximately 6.57 million. By Q4:2025, the working-age population had expanded to approximately 7.78 million, yet the unemployment rate had risen to 32.3%, the absorption rate had declined to 34.9%, and broad labour underutilisation stood at 49.1%. The absorption rate in Q4:2025 was lower than at any pre-pandemic point in the comparable series. Discouraged work-seekers grew from approximately 620,000 in Q1:2014 to 962,000 in Q4:2024. This indicator is unavailable from 2025Q3 onward, with headline rates for Q3 and Q4:2025 drawn from the QLFS Trends workbook.

The official unemployment rate reached a series high of 33.4% in Q2:2025 before easing to 32.3% by Q4:2025. Broad labour underutilisation has sat above 49% across both Q3 and Q4:2025 and reached a series peak of 50.4% in Q1:2022, indicating that approximately half of the province's broad labour force is affected by unemployment or a related form of labour market exclusion. The differential between the official and expanded unemployment rates has ranged between 14 and 17 percentage points throughout the series, a persistently wide gap that likely reflects the scale of discouraged worker absorption in KZN relative to Gauteng and the Western Cape, where the official-expanded differential is consistently narrower.

Informality is a structural rather than transitional feature of KZN's employment landscape. Across the comparable pre-ICLS-break series (Q1:2014 to Q2:2025)[1], informal-sector employment accounted for between 16% and 22% of the total employment in any given quarter. However, including agriculture and private household employment brings the informal employment share to approximately one-third of all employed persons throughout the period. Formal-establishment employment grew from approximately 1.74 million in Q1:2014 to 1.90 million in Q4:2024 – a net gain of around 160,000 jobs over a decade in which the working-age population expanded by more than 1.1 million (Stats SA, QLFS Series, 2014–2025), at a rate insufficient to absorb demographic expansion. The OECD (2025) makes a structurally important observation in this regard: unlike most emerging economies where excluded workers transition into informal employment, South African workers shut out of formal jobs are more likely to remain unemployed, a pattern the OECD characterises as labour market exclusion rather than informal absorption. KZN's data are consistent with this characterisation.

Enterprise-level data from Stats SA's Quarterly Employment Statistics complement the household-based picture. National formal non-agricultural employment stood at 10,551,000 in December 2025, representing a modest quarter-on-quarter increase of 18,000 (0.2%) but a year-on-year decline of 1.0% relative to December 2024 (Stats SA, 2026d). The hardest-hit industries on an annual basis were manufacturing (−25,000, or −1.9%) and construction (−20,000, or −3.3%); mining was the only sector to record positive annual employment growth (+3,000, or +0.6%). Whilst these figures are national rather than KZN-specific, they are consistent with the structural pressures reflected in the KZN QLFS series and provide the broader formal-sector context within which the provincial labour market is operating.

At the national level, 7,836,000 South Africans were unemployed in Q4:2025, yielding an official unemployment rate of 31.4%, whilst a further 17,134,000 people were outside the labour force entirely (Stats SA, 2026b). At the provincial level, KwaZulu-Natal ranked second behind Gauteng in terms of absolute unemployment count. Nationally, 3,714,000 people were classified as discouraged work-seekers. In relation to educational profile, 90% of the unemployed had either completed matric (3.1 million) or had not finished secondary schooling (4.0 million), with only 9.4% holding a tertiary qualification (Stats SA, 2023), a distribution that likely reflects the structural mismatch between the education system's output and the economy's labour demand, as well as to the limited absorptive capacity of knowledge-intensive sectors at the current stage of provincial development.

The Impact indicators reported in this publication, covering high-technology employment, knowledge-intensive services wages and related measures, require interpretation against this labour market context. Marginal gains in innovation-relevant employment are analytically significant, but they are occurring within a market in which approximately one-third of workers are unemployed, and a further substantial proportion are either informally employed or outside the labour force. Consequently, the scale of the structural baseline means that innovation-sector growth alone will not resolve provincial unemployment.

2.4 Inequality and Socioeconomic Baseline

South Africa records the highest income inequality of any country for which comparable data are available, with a Gini coefficient of 0.671 (World Bank, 2022). Objective poverty has nonetheless followed a declining trend: the proportion of individuals below the Lower-Bound Poverty Line fell from 46.7% in 2015 to 37.9% in 2023, and the Food Poverty headcount from 22.4% to 17.6% over the same period (Stats SA, 2026c). However, subjective poverty remains significant, with 25.7% of individuals self-identifying as poor in 2023 compared with 34.4% in 2015 (Stats SA, 2026c), suggesting that measured reductions in poverty incidence have not yet translated fully into improvements in lived experience.

Formal housing coverage stood at 83.5% of the population in 2022/23, with 12.2% of households residing in informal settlements (Stats SA, 2023). Social grants function as a primary or secondary income source for a substantial share of households, particularly across the more disadvantaged provinces, providing a critical but consumption-oriented safety net (Stats SA, 2023).

KZN's demographic profile places particular pressure on the People indicators in this report. Children aged 0–14 account for approximately 28.7% of the provincial population, youth aged 15–34 for a further 34.3%, and persons aged 60 and above for approximately 9.2% (Stats SA, 2025a); collectively, children and youth represent just over 63% of KZN's residents, a dependency structure weighted heavily towards younger cohorts. In Q1:2024, approximately 742,000 young people aged 15–24 in KZN were not in employment, education or training (NEET), accounting for just over 20% of South Africa's 3.64 million NEET youth and representing the largest absolute provincial NEET cohort nationally (DHET/DPRU, 2024). QLFS-based analysis by Mudiriza and De Lannoy (2023) corroborates this, placing KZN's NEET rate at approximately 36% for 15–24-year-olds, above the national average of around one-third.

[1]The International Conference of Labour Statisticians (ICLS) standardises labour-statistics classifications internationally. Statistics South Africa implemented the revised ICLS-19 framework in the Quarterly Labour Force Survey during 2025, changing the operational definitions of employment, unemployment and informality. Pre- and post-implementation series are therefore not directly comparable on these dimensions. The QLFS-based estimates in this section use the longest available comparable pre-implementation window, and headline figures for the late-2025 quarters are drawn from the QLFS Trends workbook where Stats SA has published bridged values.

This scale can potentially be attributed to the combined effect of a large youth cohort, structurally limited formal employment absorption, and a post-school education and training system whose throughput has not kept pace with demographic demand. Consequently, the implications for the indicators in the People category in the section that follows are significant.

2.5 Innovation Policy Framework

KwaZulu-Natal's innovation landscape is shaped by an interconnected set of policy instruments at the national and provincial levels. At the national level, the 2019 White Paper on Science, Technology and Innovation (DSI, 2019) remains the primary framework document, positioning the National System of Innovation to address South Africa's structural development challenges through STI. The National Development Plan (NPC, 2012) provides the longer strategic horizon, emphasising increased R&D investment, stronger public-private sector collaboration, and institutions capable of supporting commercially relevant innovation. The STI Decadal Plan (DSI, 2022) operationalises these priorities across five thematic areas: modernising agriculture, manufacturing and mining; unlocking the digital economy; advancing mission-oriented R&D in health and energy; building state capacity through innovation; and addressing climate change as a grand societal challenge.

At the provincial level, a final draft of the KwaZulu-Natal Innovation Strategy 2017–2027 was prepared, framing industrialisation and inclusive economic development as co-equal objectives (EDTEA, 2017); however, the document was not formally adopted. The Provincial Growth and Development Strategy situates innovation within the broader imperative of economic growth and employment creation (KwaZulu-Natal Provincial Planning Commission, 2012), and the Provincial Spatial Development Framework adds a territorial dimension, linking skills development and innovation support to expanding economic sectors with particular emphasis on youth employment and spatial equity (COGTA, 2021). More recently, the Moses Kotane Research Institute was established as a provincial public entity under the KwaZulu-Natal Moses Kotane Research Institute Act of 2024 (Province of KwaZulu-Natal, 2024), representing the most recent institutional development in the provincial innovation architecture.

Three national digital policy instruments finalised in 2024 represent a material addition to this framework since the previous edition of the State of Innovation. The National AI Policy Framework (Department of Sport, Arts and Culture (DSAC) and Department of Communications and Digital Technologies (DCDT), 2024), the National Data and Cloud Policy (DCDT, 2024), and the ICT and Digital Economy Masterplan (DCDT, 2024) collectively establish governance principles for AI deployment and data sovereignty, and provide a sector-wide roadmap for digital economy development.

These instruments are directly relevant to the Infrastructure and Ecosystem indicators measured in this report; the extent to which the provincial and municipal landscape is positioned to translate these national commitments into practice is a question the indicator data in the following sections address.

In addition, the OECD's policy guidance on transformative research and technology infrastructures (OECD, 2026), declassified by the OECD Committee for Scientific and Technological Policy in February 2026 as a publication accompanying the OECD Agenda for Transformative Science, Technology and Innovation Policies, provides the most recent international reference point for how research infrastructures (RI) and technology infrastructures (TI) ecosystems should be structured, governed and funded to support transformative change. Its four policy actions, on strategic funding, collaborative development, data and knowledge stewardship, and skills, intersect directly with the structural findings reported in the Ecosystem and Investment chapters of this publication and inform the cross-category implications discussed in Section 9.

The 2025/26 Technical Report is the seventh edition in a continuous series produced by Innovate Durban, and is published alongside comparable indicator-based provincial innovation work elsewhere in the country. In the Western Cape, the 2025 Cape Technology and Innovation Ecosystem Report was released by UVU Africa in partnership with the Western Cape Government, Wesgro and the City of Cape Town (UVU Africa, 2025). In Gauteng, the Gauteng Innovation Observatory produces comparable analysis through a partnership between the North West University and the Gauteng Department of Economic Development. Across these three provinces, indicator-based innovation measurement has developed through partnerships between non-profit or academic organisations and provincial government, in each case outside any formal compliance requirement under national policy frameworks. The STI Decadal Plan positions NACI as the monitoring custodian for the national system of innovation (DSI, 2022). Provincial indicator work therefore contributes upward into that national architecture rather than deriving from it.

The policy framework outlined above sits within an outcomes context in which research and development intensity has remained largely stable over the past decade. National GERD as a share of GDP peaked at 0.76% in 2017/18 and has since plateaued at approximately 0.61%, remaining broadly unchanged across four consecutive HSRC survey periods (NACI, 2025). At the provincial level, KZN's R&D intensity stood at 0.43% of provincial GVA in 2022, declining from 0.48% in 2013 (NACI, 2025). EDTEA's 2025–2030 strategic plan articulates commitments to digital transformation and to revitalising township and rural economies (EDTEA, 2025); the five indicator categories in this publication constitute the evidence base against which the translation of those commitments into measurable outcomes can be assessed.

3. METHODOLOGY

This chapter sets out the conceptual framework within which the 2025/26 Technical Report is constructed, the indicator architecture and analytical layers applied across the five categories, the principal data sources and their limitations, and the conventions that govern how the indicator findings are read.

3.1 Conceptual Framework

The report adopts an innovation systems perspective. Innovation in this perspective is not a discrete event located in a single firm or laboratory but the outcome of interaction between institutions, people, infrastructure, capital and policy across a connected system. Lundvall's (1992) formulation of national innovation systems, Nelson's (1993) comparative work on national systems, and Edquist's (1997) treatment of systems of innovation as institutional and organisational arrangements all underpin this commitment. The provincial-level implication is that no single indicator describes the state of innovation in KwaZulu-Natal: the categories presented in this report are five complementary views of one underlying system rather than five independent measurements.

The operational measurement baseline is the OECD Oslo Manual (4th edition, 2018), as operationalised at the provincial level by the South African National Advisory Council on Innovation (NACI). The OECD framework defines innovation as the implementation of a new or significantly improved product, process, marketing method, or organisational model, and provides the international convention against which provincial measurement choices are calibrated. The NACI provincial measurement framework, adopted in successive editions of the National Survey of Research and Experimental Development and the State of Science, Technology and Innovation reporting cycle, supplies the indicator categories and the inter-provincial comparator logic this report applies.

Within that framework, the 2025/26 edition organises the 40 active indicators into three functional groupings. Innovation enablers (the People and Infrastructure categories) measure the foundational human capital and physical infrastructure capacity that any innovation system requires. Innovation resources and support mechanisms (the Investment and Ecosystem categories) measure the financial commitment to research and development and the institutional supports that translate that commitment into activity. Innovation outcomes (the Impact category) measure the employment, value-capture and knowledge-production results produced by the system. The five-category structure is retained from previous editions; the three-grouping framing makes explicit how the categories relate to one another and supports the cross-category synthesis presented in Section 9.

The 2025/26 edition adopts an explicit organising analytical lens. Innovation outcomes at the provincial level depend not only on the level of inputs assembled but on the rate at which those inputs convert into next-stage outcomes at successive transition points: from school enrolment to NSC achievement, from NSC achievement to higher education registration, from registration to graduation, from graduation to employment, from R&D expenditure to commercialisation, and from research output to applied use. The conversion-failure framing posits that KwaZulu-Natal's innovation challenge sits more sharply at these transition points than at the level of input scale itself. The framing is introduced here as the lens under which the indicator analysis in Sections 4 to 8 is read, and is argued in Section 9 with reference to the cross-category evidence the report assembles.

3.2 Indicator Architecture

The Technical Report contains 40 active indicators organised into the five categories and 16 active sub-categories summarised in Figure 3.1 and Table 3.1. The indicator count reflects a deliberate reduction from the 51 indicators reported in the 2024/25 edition, in line with the indicator-quality rationale set out in the Introduction. Indicators that could not be sourced with sufficient data quality, and indicators whose data series had been discontinued, were either removed or absorbed as dimensions within retained indicators. The full disposition map is held in the accompanying Indicator Register and is not reproduced in this chapter.

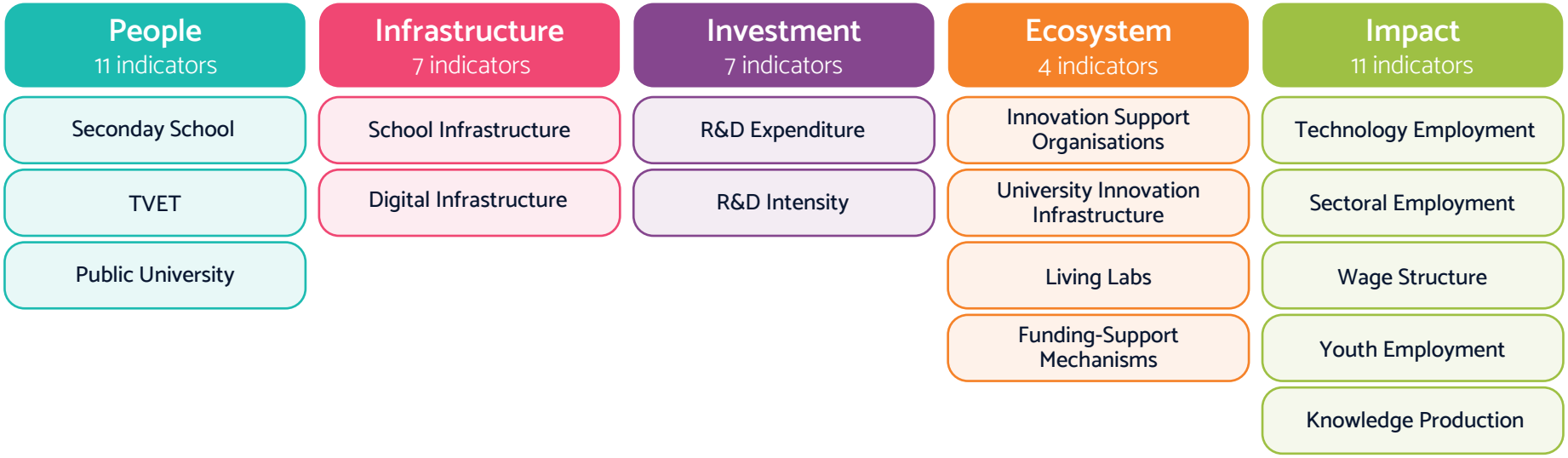


Figure 3.1: The five categories and sub-categories used in the 2025/26 State of Innovation in KwaZulu-Natal Technical Report

Table 3.1: Indicator Architecture summary

CATEGORY	SUB-CATEGORIES (ACTIVE)	INDICATORS	RANGE
People	Secondary School (6); TVET (1); Public University (4)	11	Ind01–Ind11
Infrastructure	School Infrastructure (4); Digital Infrastructure (3)	7	Ind12–Ind18
Investment	R&D Expenditure (6); R&D Intensity (1)	7	Ind19–Ind25
Ecosystem	Innovation Support Organisations (1); University Innovation Infrastructure (1); Living Labs (1); Fund-ing-Support Mechanisms (1)	4	Ind26–Ind29
Impact	Technology Employment (4); Sectoral Employment (2); Wage Structure (3); Youth Employment (1); Knowledge Production (1)	11	Ind30–Ind40
Total	16 active sub-categories	40	

Source: KZN SOI Indicator Architecture v7.0, May 2026. R&D Personnel Intensity is deferred from the 2025/26 edition because the HSRC/ CeSTII 2023/24 R&D Survey Statistical Report does not publish provincial full-time-equivalent personnel breakdowns.

3.3 Analytical Layers

The Technical Report applies three analytical layers within each category section. Layer 1 follows the international measurement conventions established in the OECD Oslo Manual and operationalised at the provincial level through NACI. All 40 indicators are benchmarked against the eight other South African provinces and the national aggregate, with provincial rankings, shares of the national total, compound annual growth rates and distance-to-frontier metrics as the primary outputs. Layer 1 is the analytical instrument through which KwaZulu-Natal's position relative to the national distribution and the leading province is established.

Layer 2 applies a KZN-specific sectoral lens to a subset of indicators where the province has structural sectoral characteristics that are analytically material but not visible in national headline comparisons. Three KZN sectors are admitted to Layer 2 analysis: logistics and port-linked services, agri-food and agro-processing, and creative industries. Admissibility for each sector is evaluated against the three tests set out in Table 3.2; where Layer 2 analysis is applied within a chapter, the basis for sector inclusion is referenced at point of use.

Table 3.2: Layer 2 sector admissibility tests

TEST	NAME	DEFINITION
L2-A	Revealed Comparative Advantage	Location quotient at or above 1.0 in KZN relative to the national employment share for the sector concerned.
L2-B	Revealed Innovation Activity	Documented evidence of R&D-type activity, new product or process development, or institutional innovation infrastructure within the sector at provincial scale.
L2-C	Mandate Alignment Exemption	Applied only where formal employment data demonstrably undercount innovation activity in a sector central to Innovate Durban's mandate. Disclosed in-text wherever invoked.

Source: KZN SOI Indicator Architecture v7.0, May 2026. Logistics and port-linked services and agri-food and agro-processing pass tests L2-A and L2-B. The creative economy is admitted on the basis of L2-A on a trajectory basis, L2-B through documented design incubator, digital content, fashion, textile and craft innovation activity, and L2-C in recognition that formal employment data structurally undercount creative economy innovation.

Layer 3 encompasses the descriptive statistical techniques applied selectively within categories. Compound annual growth rates are reported over the full series and over defined sub-periods where the data support meaningful phase analysis. Standard deviations of provincial distributions are used to assess whether KwaZulu-Natal's position reflects a broadly spread national distribution or a genuinely differentiated one. Linear trend fits and R-squared values are used to test whether year-on-year movement reflects an underlying trajectory or volatility. Real-terms deflation is applied to all R&D expenditure series in the Investment chapter, with nominal HSRC/CeSTII values converted to constant 2015 rand using the GDP deflator series in the HSRC/CeSTII Statistical Report 2023/24.

Indexed growth series anchored to a common base year are used in the Investment, Impact and digital Infrastructure analyses, supporting comparison of relative trajectories where absolute scales differ across the indicators concerned. The Herfindahl-Hirschman Index is applied to mobile network market concentration in Infrastructure and to R&D sector shares in Investment. Distance-to-frontier metrics are used to express KwaZulu-Natal's position relative to the leading province on a comparable scale, allowing the gap to the national leader to be reported alongside the rank itself.

3.4 Data Sources and Limitations

Each indicator is anchored to a single primary data source. Cross-source checks were applied where multiple sources cover the same phenomenon, but only one source was treated as canonical for each dimension. Table 3.3 summarises primary data sources by category, the series window covered, and the principal limitations that bear on interpretation.

Table 3.3: Primary data sources by category

CATEGORY	PRIMARY SOURCES	SERIES WINDOW	PRINCIPAL LIMITATIONS
People	DBE NSC Examination Reports; DHET PSET Annual Reports; DHET HEMIS	2014–2025 (NSC); 2014–2022 (TVET); 2015–2023 (HEMIS)	TVET registration methodology change between 2019 and 2021 affects Indicator 07. UNISA included in national share calculations and excluded from inter-provincial rank comparisons (Indicators 08–11).
Infrastructure	DBE EFMS / NEIMS; Stats SA General Household Survey; ICASA State of ICT Sector Reports	2019–2025 (EFMS); 2002–2024 (GHS); 2017–2025 (ICASA)	EFMS 2025 introduces a definitional change for school libraries and computer centres; 2024 figures retained as the headline reporting year. ICASA coverage values are licensee self-reported.
Investment	HSRC/CeSTII National Survey of R&D 2023/24; Quantec EasyData (GVA denominator)	2012/13–2023/24 (HSRC); 2013–2022 (Quantec)	Provincial full-time-equivalent personnel breakdown not published in the 2023/24 release. R&D Personnel Intensity is formally deferred from the 2025/26 edition.
Ecosystem	Innovate Durban Facility Register v16.3; CIPC Patent Register; Innovate Durban Funding Map v3	December 2025 cross-section (Register); 2014–2024 (CIPC)	Provincial-level technology transfer ratios, licences signed and spin-outs registered are not consistently published; these dimensions are out of scope for the 2025/26 edition.
Impact	National Treasury Socio-Economic Analysis Database (SEAD platform, drawing on Stats SA economic and labour statistics); DHET Research Output Reports; Stats SA Quarterly Labour Force Survey (QLFS)	2014–2025 (SEAD); 2014–2024 (DHET); 2014–2025 (QLFS)	QLFS Q3 2025 series-break following the adoption of the 21st International Conference of Labour Statisticians (ICLS) informal-sector definition. Standard Industrial Classification (SIC7) division and section codes used throughout, in line with NACI reporting convention.

Source: KZN SOI Indicator Architecture v7.0, May 2026. Logistics and port-linked services and agri-food and agro-processing pass tests L2-A and L2-B. The creative economy is admitted on the basis of L2-A on a trajectory basis, L2-B through documented design incubator, digital content, fashion, textile and craft innovation activity, and L2-C in recognition that formal employment data structurally undercount creative economy innovation.

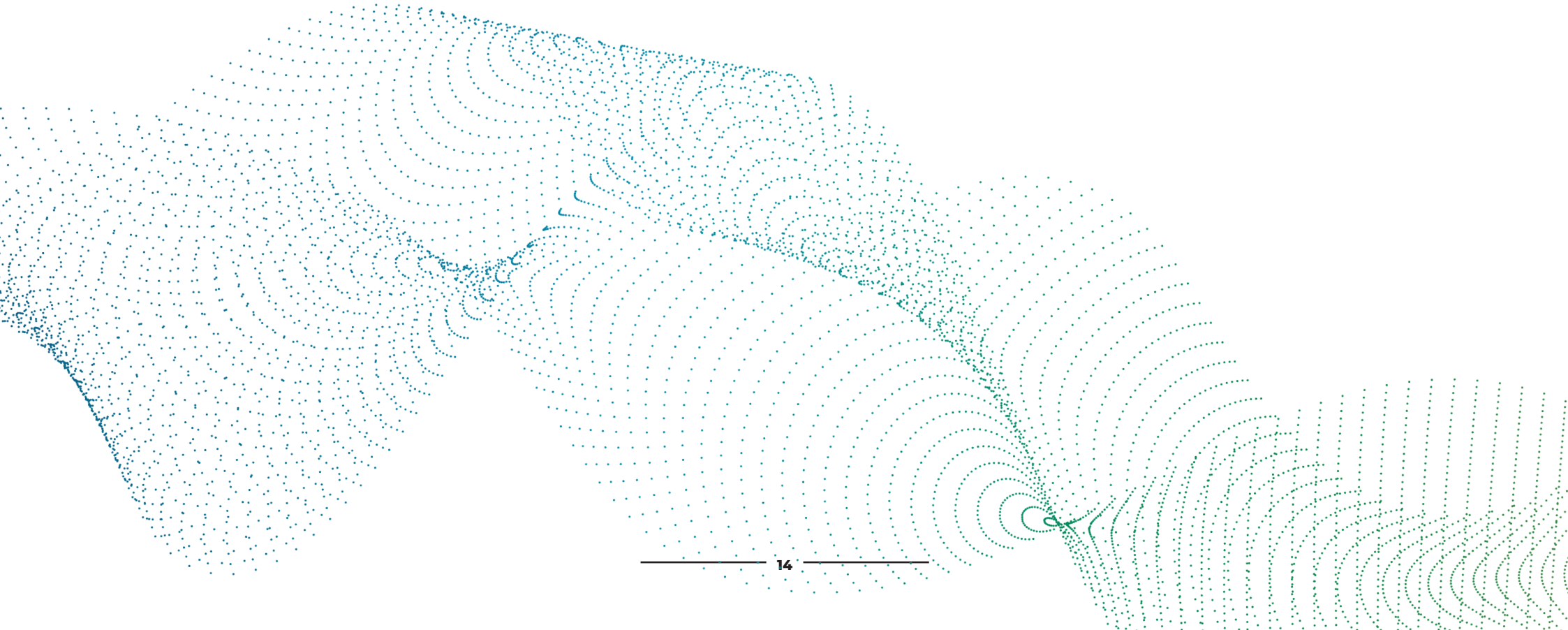
A small number of series-break caveats are flagged as interpretive considerations rather than data exclusions. The TVET registration methodology change between 2019 and 2021 affects the comparability of the engineering completion indicator across that window, and is documented in the People chapter at point of use. The COVID-affected 2020 and 2021 doctoral conferral data show an elevated peak followed by a contraction; the post-2021 movement is treated as a return to trend rather than a COVID artefact. The post-2018 introduction of a 50% subject-pass threshold in Mathematics and Physical Sciences reporting affects the Mathematics and Physical Sciences indicators and is treated as a comparability note.

3.5 No Composite Scoring

The Technical Report does not produce a composite innovation index, an overall provincial innovation score, or any weighted aggregation of indicators within or across categories. This is a deliberate analytical choice. Composite indices require methodological decisions on indicator weighting, normalisation method and treatment of missing values that are difficult to defend at the provincial level, where sample sizes are small, series lengths are short, and indicators from different sources sit on incommensurable scales. A composite score would also obscure the structural patterns that the indicator-level analysis is designed to surface, particularly the distinction between scale measures and conversion measures that runs across the five categories. Indicators within each category are therefore treated as complementary dimensions of a system, and reported positions, trajectories and gaps are presented for individual indicators rather than for aggregated category performance.

3.6 Analytical Posture in Section 9

The cross-category synthesis presented in Section 9 operates within an inherited analytical frame rather than building one from observation. Three commitments preceded the diagnostic process: the conversion-failure thesis introduced in 3.1, the framework's selection of 40 active indicators, and the structural-features architecture under which the chapter is organised. What was constructed during the writing of the chapter was the four-mechanism reading of the indicator data, with Concentration, Composition, Throughput and Value Capture identified as the structural features that organise the empirical findings most economically. The methodological note at the head of Section 9 distinguishes inherited from constructed elements, identifies the three kinds of claims the chapter advances (empirical, architectural and explanatory) with their respective hedging conventions, and sets out four construction disciplines applied during writing.




4.
PEOPLE

The People category measures the human capital pipeline feeding KwaZulu-Natal's innovation system, running from NSC preparation through TVET vocational training to public-university enrolment and graduation in Science, Engineering and Technology (SET) fields, including at doctoral level. Eleven indicators are active for 2025/26, organised across three sub-categories: Secondary School (Ind01 to Ind06), TVET (Ind07), and Public University (Ind08 to Ind11).

The eleven indicators are treated as complementary dimensions of the human capital layer rather than as components of a composite 'people score'. Differences in source, unit, educational level and reporting cycle make aggregation across them misleading. Collectively, however, they describe both the breadth of the talent pipeline, in terms of how many young people enter each stage, and the depth of conversion through it. It is the conversion rates, rather than the absolute participation counts, that determine how much innovation-relevant skill the province actually produces.

Sources and QC pointer: Indicators 1, 2 and 3 are drawn from the DBE NSC Manual Rework workbook (April 2026). Indicators 4 to 6 are drawn from DBE NSC Examination Reports 2014 to 2025. Indicator 7 is drawn from DHET Statistics on Post-School Education and Training (PSET) annual reports for the years in which data are published. Indicators 8 to 11 are drawn from DHET HEMIS data 2015 to 2023, with Stats SA P0302 mid-year population estimates used as the per-capita denominator on Indicator 9. Indicator-level data limitations and reconciliation issues are documented in the QC_Audit sheet within the People workbook. Where any conflict exists between a data note in this section and the QC_Audit entry, the QC_Audit entry takes precedence.

4.1 National Senior Certificate Scale and Performance (Indicator 01)

The Technical Report does not produce a composite innovation index, an overall provincial innovation score, or any weighted aggregation of indicators within or across categories. This is a deliberate analytical choice. Composite indices require methodological decisions on indicator weighting, normalisation method and treatment of missing values that are difficult to defend at the provincial level, where sample sizes are small, series lengths are short, and indicators from different sources sit on incommensurable scales. A composite score would also obscure the structural patterns that the indicator-level analysis is designed to surface, particularly the distinction between scale measures and conversion measures that runs across the five categories. Indicators within each category are therefore treated as complementary dimensions of a system, and reported positions, trajectories and gaps are presented for individual indicators rather than for aggregated category performance.

INDICATOR 01

National Senior Certificate Scale and Performance

Three analytical dimensions presented in this section.

DIMENSION A

Provincial comparator

All nine provinces benchmarked on candidates wrote, achieved and pass rate, latest year.

A

SHOWN AS
Table 4.1

DIMENSION B

KwaZulu-Natal longitudinal

KZN candidate counts and pass rates traced across the 2014 to 2015 series.

B

SHOWN AS
Figure 4.1

DIMENSION C

Year-on-year change

KZN annual deltas in cohort size, achievement and pass rate, 2024 to 2025

C

SHOWN AS
Inline narrative

KwaZulu-Natal has the largest single provincial National Senior Certificate (NSC) examination cohort in South Africa. In 2025, 171,368 KZN candidates wrote the NSC, accounting for 23.0% of the national cohort of 746,110. The province's share of the national cohort declined from 26.2% in 2014 and has held between 22.6% and 23.7% from 2017 onwards. The province therefore enters the secondary-pipeline analysis from a position of substantial scale, and any conclusion about provincial performance carries direct national consequences because of the absolute number of candidates involved.

The KZN NSC pass rate has improved substantially over the 12-year period. The 2014 rate of 69.7% rose to 90.6% in 2025, a gain of 20.9 percentage points. The national pass rate rose over the same period from 75.8% to 88.0%, a smaller gain of 12.2 percentage points. KZN has therefore improved by more than the national average. The province sat below the national rate from 2014 to 2018, drew level in 2019, held a small positive margin of +1.4 and +0.5 percentage points across the COVID-affected 2020 and 2021 examinations respectively, and has held a margin of 2.3 to 3.5 percentage points above the national rate from 2022 onwards. The 2025 KZN pass rate of 90.6% is 2.6 percentage points above the national average of 88.0%. Table 4.1 sets out the full provincial comparator for 2025, with KZN ranked first nationally on pass rate.

Table 4.1: Provincial National Senior Certificate pass rate comparator, 2025 (sorted by rank)

PROVINCE	WROTE	ACHIEVED	PASS RATE (%)	RANK
KwaZulu-Natal	**171,368**	**155,258**	**90.6**	**1**
Free State	38,205	34,129	89.3	2
Gauteng	140,927	125,513	89.1	3
North West	40,913	36,205	88.5	4
Western Cape	65,965	58,181	88.2	5
Northern Cape	14,084	12,365	87.8	6
Mpumalanga	67,114	58,084	86.5	7
Limpopo	100,973	86,986	86.1	8
Eastern Cape	106,561	89,694	84.2	9
South Africa (national)	**746,110**	**656,415**	**88.0**	**n/a**

Source: DBE NSC Examination Report 2025; KZN SOI People workbook FINAL, Indicator 01 Dimension A.
Pass rate calculated as Total Achieved ÷ Total Wrote. Rank computed across the nine provinces; the national row is excluded from the rank column.

Figure 4.1 traces the longitudinal pass-rate series for KZN and the national average over the 2014 to 2025 window. The KZN trajectory shows a strong long-run upward movement with two interruptions. The first was a single-year drop to 60.7% in 2015 reflecting a more demanding national standard-setting that year, after which the rate recovered monotonically to 76.2% by 2018 and peaked at 81.3% in 2019. The second was a COVID-era easing to 77.6% in 2020 and 76.8% in 2021. From 2022 onwards the rate climbed monotonically from 83.0% to the 2025 series high of 90.6%, a four-year gain of 7.6 percentage points. The 2025 figure represents 155,258 KZN NSC passes, 58,114 more successful candidates than in 2014, whilst the cohort itself grew by 32,001 over the same period.

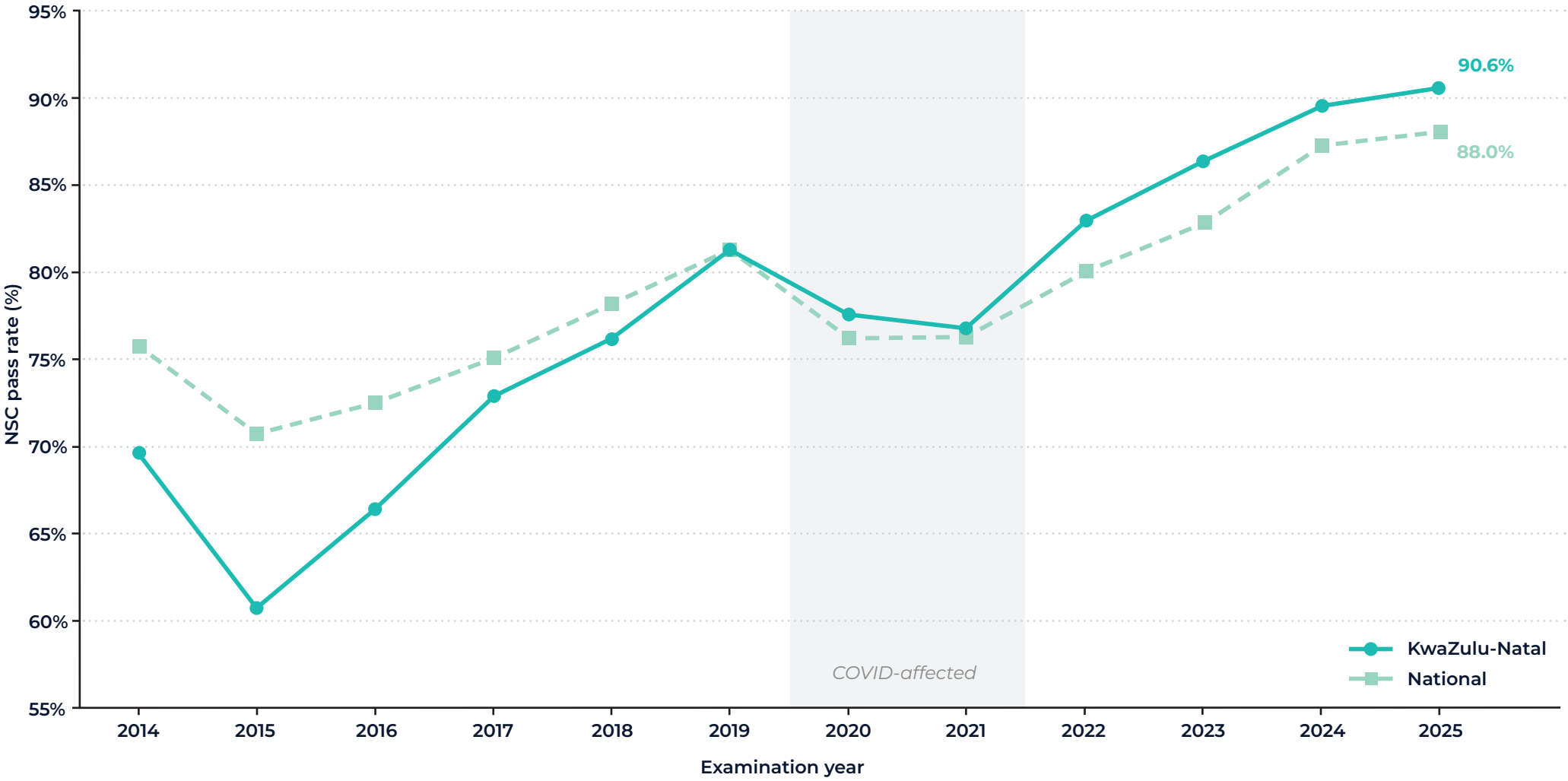


Figure 4.1: National Senior Certificate pass rate, KwaZulu-Natal versus national average, 2014 to 2025

Underlying data for Figure 4.1

YEAR	KZN WROTE	KZN ACHIEVED	KZN PASS RATE (%)	NATIONAL WROTE	NATIONAL ACHIEVED	NATIONAL PASS RATE (%)	KZN MINUS NATIONAL (PP)
2014	139,367	97,144	69.7	532,860	403,874	75.8	-6.1
2015	162,658	98,761	60.7	644,536	455,825	70.7	-10.0
2016	147,648	98,032	66.4	610,178	442,672	72.5	-6.2
2017	124,317	90,589	72.9	534,484	401,435	75.1	-2.2
2018	116,152	88,485	76.2	512,735	400,761	78.2	-2.0
2019	116,937	95,017	81.3	504,303	409,906	81.3	0.0
2020	135,225	104,938	77.6	578,468	440,702	76.2	+1.4
2021	166,570	127,990	76.8	704,021	537,687	76.4	+0.5
2022	164,308	136,388	83.0	725,146	580,555	80.1	+2.9
2023	157,911	136,366	86.4	691,160	572,983	82.9	+3.5
2024	161,962	144,990	89.5	705,291	615,429	87.3	+2.3
2025	171,368	155,258	90.6	746,110	656,415	88.0	+2.6

Source: DBE NSC Examination Reports 2014 to 2025; KZN SOI People workbook FINAL, Indicator 01 Dimension C. Shaded band on the chart indicates the COVID-affected 2020 and 2021 examination years. KZN minus National column reports the percentage-point difference in each year; positive values indicate KZN above national. Pass rate calculated as Total Achieved ÷ Total Wrote, expressed to one decimal place.

The conversion test for this finding sits downstream: KZN's secondary-school pipeline now produces a higher pass rate than the national average from the largest cohort in the country. Whether this scale and improvement converts into innovation-relevant skill is tested in Indicators 03 to 11, where the Bachelor pass share, mathematics and science achievement, Technical and Vocational Education and Training completion rates, and Science, Engineering and Technology enrolment and graduation trajectories carry the analytical weight.

4.2 National Senior Certificate District Performance and Convergence (Indicator 02)

INDICATOR 02

National Senior Certificate District Performance and Convergence

Three analytical dimensions presented in this section.

DIMENSION A	DIMENSION B	DIMENSION C
District performance levels	**Convergence over time**	**Equity classification**
12 KZN districts ranked on 2025 NSC pass rate, with provincial average benchmark.	District pass rates traced 2016 to 2025, showing dispersion compression.	Districts grouped as persistent leaders, persistent laggards, or crossover.
SHOWN AS **Table 4.2**	SHOWN AS **Figure 4.2**	SHOWN AS **Table 4.4**

KwaZulu-Natal is divided into 12 education districts, each reporting NSC examination results separately. Across the 2016 to 2025 period, all 12 districts have improved their pass rates, with district-level performance converging sharply on the provincial average. The standard deviation across district pass rates declined from 7.31 percentage points in 2016 to 1.91 percentage points in 2025, a 74% reduction in dispersion over nine years.

Table 4.2 sets out the 2025 district pass rates ordered by rank. Umkhanyakude leads at 93.6%, followed by Pinetown at 92.2% and Umlazi at 92.0%. Six districts sit above the provincial average of 90.6% and six below. Uthukela is the lowest performer at 86.2%, 4.4 percentage points below the provincial average and 7.4 percentage points below the leader. The 2025 spread of 7.4 percentage points compares to a 24.8 percentage-point spread in 2016 (52.4% in Ilembe to 77.2% in Amajuba), a compression of 70% over the period.

Table 4.2: KZN district NSC pass rate, 2025 (sorted by rank)

DISTRICT	WROTE	ACHIEVED	PASS RATE (%)	RANK
Umkhanyakude	16,066	15,043	93.6	1
Pinetown	19,134	17,642	92.2	2
Umlazi	21,757	20,013	92.0	3
Ugu	11,748	10,786	91.8	4
Ilembe	9,776	8,945	91.5	5
Amajuba	9,442	8,617	91.3	6
Umgungundlovu	13,989	12,644	90.4	7
Harry Gwala	7,817	7,015	89.7	8
King Cetshwayo	19,398	17,337	89.4	9
Zululand	18,795	16,705	88.9	10
Umzinyathi	11,325	10,061	88.8	11
Uthukela	12,121	10,450	86.2	12
KZN provincial average	**171,368**	**155,258**	**90.6**	**n/a**

Source: DBE NSC Examination Report 2025; KZN SOI People workbook FINAL, Indicator 02 Dimension A. Pass rate calculated as Total Achieved ÷ Total Wrote. The KZN provincial average row aggregates all 12 districts and is excluded from the rank column.

Figure 4.2 traces district pass rates over the full 2016 to 2025 window. The convergence is driven by faster improvement among the lowest-performing districts. Trend slopes for all 12 districts are positive, with R-squared values ranging from 0.65 to 0.95 indicating consistent linear trends. Ilembe shows the steepest slope at 3.75 percentage points per year, having moved from 52.4% in 2016 to 91.5% in 2025. Zululand and Umzinyathi follow at 3.23 and 3.15 percentage points per year respectively. The slowest improvers are Amajuba and Umgungundlovu at 1.32 percentage points per year. Both began the period above the provincial average (77.2% and 76.3% respectively in 2016). The catch-up dynamic is the structural mechanism behind the falling dispersion.

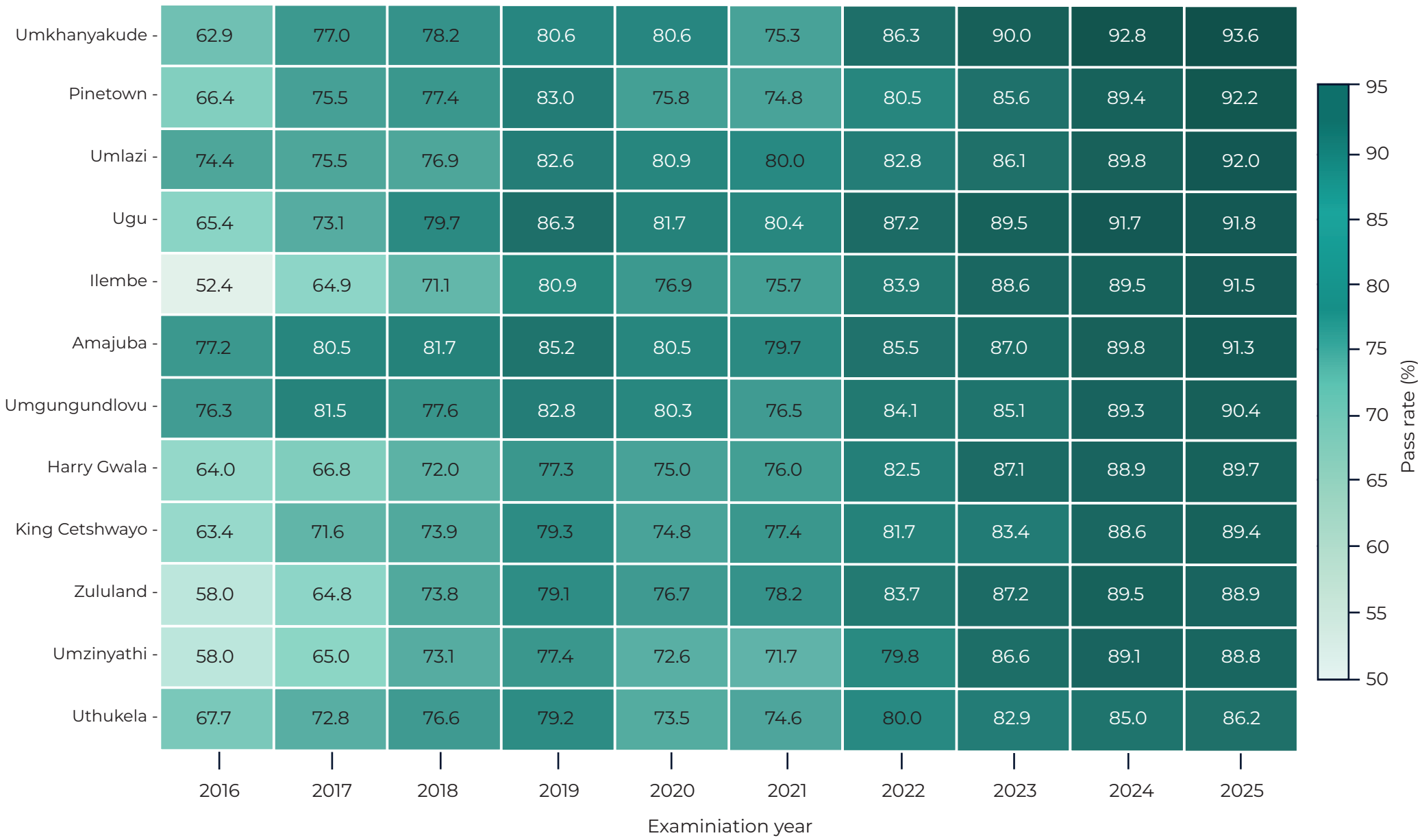


Figure 4.2: KZN district NSC pass rate, 2016 to 2025 (heatmap, with cross-district standard deviation by year)

Underlying data for Figure 4.2

DISTRICT	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Umkhanyakude	69.2	77.0	78.2	80.6	80.6	75.3	86.3	90.0	92.8	93.6
Pinetown	66.4	75.5	77.4	83.0	75.8	74.8	80.5	85.6	89.4	92.2
Umlazi	74.4	75.5	76.9	82.6	80.9	80.0	82.8	86.1	89.8	92.0
Ugu	65.4	73.1	79.7	86.3	81.7	80.4	87.2	89.5	91.7	91.8
Ilembe	52.4	64.9	71.1	80.9	76.9	75.7	83.9	88.6	89.5	91.5
Amajuba	77.2	80.5	81.7	85.2	80.5	79.7	85.5	87.0	89.8	91.3
Umgungundlovu	76.3	81.5	77.6	82.8	80.3	76.5	84.1	85.1	89.3	90.4
Harry Gwala	64.0	66.8	72.0	77.3	75.0	76.0	82.5	87.1	88.9	89.7
King Cetshwayo	63.4	71.6	73.9	79.3	74.8	77.4	81.7	83.4	88.6	89.4
Zululand	58.0	64.8	73.8	79.1	76.7	78.2	83.7	87.2	89.5	88.9
Umzinyathi	58.0	65.0	73.1	77.4	72.6	71.7	79.8	86.6	89.1	88.8
Uthukela	67.7	72.8	76.6	79.2	73.5	74.6	80.0	82.9	85.0	86.2
Std dev across districts (pp)	**7.31**	**5.70**	**3.09**	**2.76**	**3.08**	**2.47**	**2.32**	**2.08**	**1.78**	**1.91**

Source: DBE NSC Examination Reports 2016 to 2025; KZN SOI People workbook FINAL, Indicator 02 Dimensions A and B. Cell values are district pass rates as a percentage of candidates who wrote. Districts ordered by 2025 pass rate (highest at top). Cross-district standard deviation calculated across the 12 districts in each year.

Table 4.3 partitions the 12 districts on the basis of their long-run gap from the provincial average against their gap over the last five years. Three districts (Amajuba, Ugu, and Umkhanyakude) emerge as persistent leaders, with positive long-run and recent gaps. Three (King Cetshwayo, Umzinyathi, and Uthukela) are persistent laggards, with negative gaps in both windows. The remaining six are crossover districts that have moved between leadership and laggard status across the period, including Ilembe (long-run −2.5pp, last-5-year +0.6pp) which has crossed from below to above the provincial average. Uthukela is the only persistent laggard where the recent gap has deepened (last-5-year −3.5pp versus long-run −2.2pp) rather than closed.

Table 4.3: KZN district equity classification, long-run versus last-five-year gap from provincial average

DISTRICT	LONG-RUN GAP (PP)	LAST 5-YEAR GAP (PP)	EQUITY CLASSIFICATION
Amajuba	+3.79	+1.40	Persistent leader
Ugu	+2.62	+2.87	Persistent leader
Umkhanyakude	+2.31	+2.36	Persistent leader
Harry Gwala	−2.14	−0.43	Crossover / near-average
Ilembe	−2.52	+0.56	Crossover / near-average
Pinetown	0.00	−0.76	Crossover / near-average
Umgungundlovu	+2.33	−0.19	Crossover / near-average
Umlazi	+2.04	+0.88	Crossover / near-average
Zululand	−2.08	+0.21	Crossover / near-average
King Cetshwayo	−1.70	−1.16	Persistent laggard
Umzinyathi	−3.84	−2.05	Persistent laggard
Uthukela	−2.20	−3.53	Persistent laggard

Source: KZN SOI People workbook FINAL, Indicator 02 Dimension E. Long-run gap is the average district pass rate minus the provincial average across the 2016 to 2025 period. Last-5-year gap is the equivalent average across 2021 to 2025. Persistent leader = positive gap in both windows; persistent laggard = negative gap in both windows; crossover / near-average = sign change or near-zero in either window.

District convergence is the structural finding for KZN secondary education: the province's improving performance is shared across districts rather than concentrated in a few leaders, with all 12 districts on improving trajectories and the lowest performers improving fastest. The remaining concern is Uthukela, the only persistent laggard where the gap has deepened over the last five years rather than closed.

4.3 National Senior Certificate Bachelor Pass and Distinction Performance (Indicator 03)

INDICATOR 03

National Senior Certificate Bachelor Pass and Distinction Performance

Three analytical dimensions presented in this section.

DIMENSION A

Provincial Bachelor pass comparator

All nine provinces benchmarked on 2025 Bachelor pass share, with KZN ranked first.

SHOWN AS
Table 4.5

DIMENSION B

KZN versus national trend

Bachelor pass share traced for KZN and national average, 2013 to 2025.

SHOWN AS
Figure 4.3

DIMENSION C

Distinctions ranking

2025 distinctions per 1,000 candidates across all nine provinces.

SHOWN AS
Table 4.6

KwaZulu-Natal ranks first nationally on Bachelor pass share in 2025, the only province above 50%. The Bachelor pass is the only NSC outcome that qualifies a candidate for direct Bachelor's degree entry at a public university, making it the relevant quality metric for university-stream throughput. KZN's 2025 Bachelor pass share of 52.0% sits 5.7 percentage points above the national average of 46.4%. Western Cape ranked second at 49.2%, Gauteng third at 48.2%, and the lowest performer was Northern Cape at 39.3%.

Table 4.4 sets out the full provincial Bachelor pass share comparator for 2025. The top three provinces (KwaZulu-Natal, Western Cape, Gauteng) cluster between 48.2% and 52.0%, with the remaining six provinces ranging from 39.3% to 44.4%. KZN's 89,161 Bachelor passes accounted for 25.8% of all national Bachelor passes (345,857), a share that exceeds KZN's 23.0% share of the national NSC cohort. The province therefore produces a disproportionate fraction of national Bachelor-qualified school leavers.

Table 4.4: Provincial Bachelor pass share comparator, 2025 (sorted by rank)

PROVINCE	WROTE	BACHELOR PASSES	BACHELOR PASS SHARE (%)	RANK
KwaZulu-Natal	**171,368**	**89,161**	**52.0**	**1**
Western Cape	65,965	32,474	49.2	2
Gauteng	140,927	67,861	48.2	3
North West	40,913	18,166	44.4	4
Free State	38,205	16,728	43.8	5
Limpopo	100,973	43,052	42.6	6
Mpumalanga	67,114	28,610	42.6	7
Eastern Cape	106,561	44,267	41.5	8

PROVINCE	WROTE	BACHELOR PASSES	BACHELOR PASS SHARE (%)	RANK
Northern Cape	14,084	5,538	39.3	9
South Africa (national)	**746,110**	**345,857**	**46.4**	**n/a**

Source: DBE NSC Examination Report 2025; KZN SOI People workbook FINAL, Indicator 03 Dimension B. Bachelor pass share calculated as Bachelor Achieved ÷ Total Wrote. Rank computed across the nine provinces; the national row is excluded from the rank column.

Figure 4.3 traces the KZN and national Bachelor pass share trajectories from 2013 to 2025. KZN's position has shifted markedly across the series. The province sat above the national rate in 2013 (32.5% versus 30.6%, gap +1.9pp), fell below the national rate from 2014 to 2018 (drawing level in 2017 and sitting 0.3pp below in 2018), crossed back above the national rate in 2019, and has held a positive margin in every year since. The 2025 KZN rate of 52.0% represents a gain of 19.5 percentage points over the 12-year period, compared to a national gain of 15.8 percentage points. The 2024-to-2025 KZN figure shows a slight 0.2 percentage-point decline (52.2% to 52.0%) against a national decline of 1.4 percentage points (47.8% to 46.4%). The 2025 pause for KZN follows three consecutive years of strong gains and represents the first easing in the post-2022 upward run.

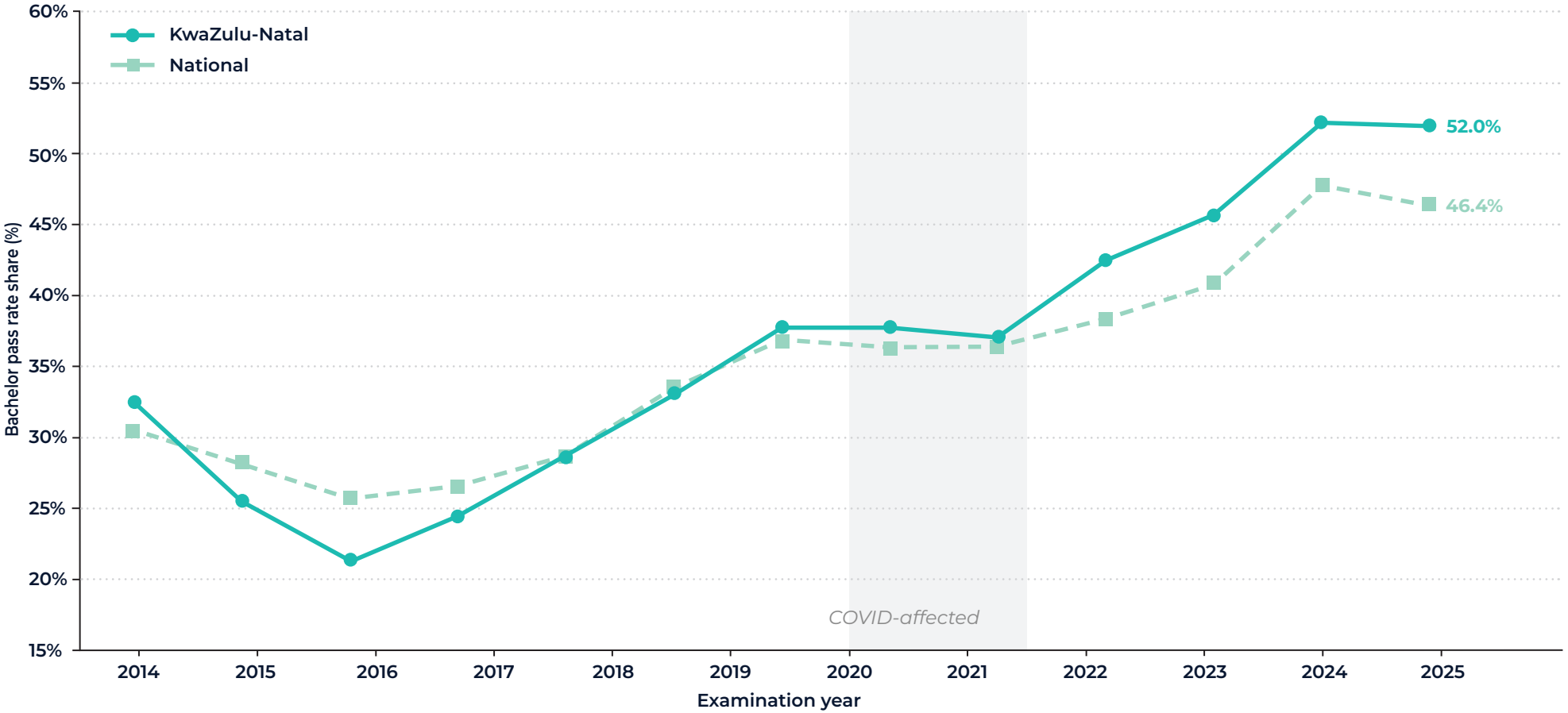


Figure 4.3: Bachelor pass share, KwaZulu-Natal versus national average, 2013 to 2025

Underlying data for Figure 4.3

YEAR	KZN WROTE	KZN BACHELOR	KZN BACH. SHARE (%)	NAT WROTE	NAT BACHELOR	NAT BACH. SHARE (%)	KZN MINUS NAT (PP)
2013	145,278	47,202	32.5	562,112	171,755	30.6	+1.9
2014	139,367	35,724	25.6	532,860	150,752	28.3	−2.7
2015	162,658	34,751	21.4	644,536	166,263	25.8	−4.4
2016	147,648	36,139	24.5	610,178	162,374	26.6	−2.1
2017	124,317	35,687	28.7	534,484	153,610	28.7	0.0
2018	116,152	38,571	33.2	512,735	172,043	33.6	−0.3
2019	116,937	44,189	37.8	504,303	186,058	36.9	+0.9
2020	135,225	51,060	37.8	578,468	210,820	36.4	+1.3
2021	166,570	61,856	37.1	704,021	256,031	36.4	+0.8
2022	164,308	69,849	42.5	725,146	278,814	38.4	+4.1
2023	157,911	72,099	45.7	691,160	282,894	40.9	+4.7
2024	161,962	84,470	52.2	705,291	337,158	47.8	+4.4
2025	171,368	89,161	52.0	746,110	345,857	46.4	+5.7

Source: DBE NSC Examination Reports 2013 to 2025; KZN SOI People workbook FINAL, Indicator 03 Dimensions A and C. Shaded band on the chart indicates the COVID-affected 2020 and 2021 examination years. Bachelor pass share calculated as Bachelor Achieved ÷ Total Wrote, expressed to one decimal place. KZN minus National column reports the percentage-point difference in each year; positive values indicate KZN above national.

Distinctions per 1,000 candidates is computed as total distinctions divided by candidates who wrote, expressed per 1,000. The metric mixes the concentration of high-achievers with cohort scale, and KZN's lead over the second-placed province reflects both factors.

KZN also leads the provincial distinctions ranking in 2025. Table 4.5 sets out distinctions per 1,000 candidates across the nine provinces. KZN posted 633.5 distinctions per 1,000 candidates, far ahead of second-placed Western Cape at 473.3, third-placed Gauteng at 365.6, and the national average of 404.8. The KZN figure is 56% above the national average and 34% above the second-placed province.

Table 4.5: Provincial distinctions per 1,000 candidates, 2025 (sorted by rank)

PROVINCE	WROTE	TOTAL DISTINCTIONS	DISTINCTIONS PER 1,000 CANDIDATES	RANK
KwaZulu-Natal	**171,368**	**108,557**	**633.5**	**1**
Western Cape	65,965	31,220	473.3	2
Gauteng	140,927	51,518	365.6	3
Mpumalanga	67,114	22,912	341.4	4
Eastern Cape	106,561	33,281	312.3	5
Limpopo	100,973	30,265	299.7	6
North West	40,913	11,401	278.7	7
Free State	38,205	10,580	276.9	8
Northern Cape	14,084	2,323	164.9	9
South Africa (national)	**746,110**	**302,057**	**404.8**	**n/a**

Source: DBE NSC Examination Report 2025, Table 6.2.4; KZN SOI People workbook FINAL, Indicator 03 Dimension E. Distinctions per 1,000 candidates calculated as Total Distinctions ÷ Total Wrote × 1,000. A distinction is awarded for an examination mark of 80% or above in any individual subject; the metric counts these subject-level distinctions and expresses them per 1,000 candidates writing the NSC. Rank computed across the nine provinces; the national row is excluded from the rank column.

KwaZulu-Natal ranks first nationally on both Bachelor pass share and distinctions per 1,000 candidates in 2025: the lead over the second-placed province is 2.8 percentage points on Bachelor pass share and 160 distinctions per 1,000 on the distinctions metric. The conversion test for these findings sits in the post-school indicators, where the question is whether the province's high Bachelor-qualified throughput translates into proportionate Science, Engineering and Technology enrolment and graduation downstream.

Indicator 03 reports the Bachelor pass-type as the primary university-stream eligibility signal. The Diploma, Higher Certificate and Senior Certificate pass-type distributions are tracked in the People workbook (Indicator 03 Dimension D) but are not anchored in the body of this section because they describe alternative post-school progression routes rather than the direct-entry university pipeline that the indicator is designed to measure. The province-level Diploma and Higher Certificate counts are available to the Discussion chapter where the broader post-school progression frame is relevant.

4.4 Mathematics Achievement (Indicator 04)

INDICATOR 04

Mathematics Achievement

Three analytical dimensions presented in this section.

DIMENSION A

Provincial Mathematics comparator

All nine provinces benchmarked at three attainment thresholds for 2025.

SHOWN AS
Table 4.7

DIMENSION B

KZN three-threshold trajectory

KZN Mathematics achievement at ≥30%, ≥40%, and ≥50% from 2014 to 2025.

SHOWN AS
Figure 4.4

DIMENSION C

KZN versus national crossover

Paired KZN and national series 2019 to 2025, gap at each threshold.

SHOWN AS
Inline narrative

NSC Mathematics achievement separates candidates who write the harder of the two mathematics subjects from those who write Mathematical Literacy. Mathematics is the subject of record for university admission to engineering, computing, the natural sciences, actuarial science, and the health sciences. In 2025, KwaZulu-Natal achieved the fourth-highest provincial pass rate at the ≥30% threshold (65.78%), the third-highest at the ≥40% threshold (43.99%), and the third-highest at the ≥50% threshold (26.15%). Western Cape leads at all three thresholds (73.71%, 55.30%, and 38.95% respectively). KZN sits above the national average at all three thresholds in 2025 for the first time in the paired series.

Table 4.6 sets out the full provincial Mathematics comparator for 2025. Western Cape's lead is widest at the ≥50% threshold (38.95% versus 30.30% for second-placed Gauteng, an 8.65 percentage-point gap), consistent with Western Cape's leading provincial Mathematics performance across all three thresholds. KZN's third-place ranking at ≥40% and ≥50% places it in a top-tier group with Gauteng. At the ≥30% threshold KZN sits behind Western Cape (73.71%), North West (67.80%) and Gauteng (66.98%), with KZN at 65.78% leading Free State (63.33%) by 2.45 percentage points. The lowest performer at each threshold is Northern Cape at ≥30% (55.33%) and ≥40% (33.13%), and Eastern Cape at ≥50% (18.75%). Spreads between leader and lowest performer range from 18 to 22 percentage points across the three thresholds.

Table 4.6: Provincial NSC Mathematics achievement comparator, 2025 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	≥30% (%)	≥40% (%)	≥50% (%)	RANK ≥30%	RANK ≥40%	RANK ≥50%
Eastern Cape	56.83	34.32	18.75	8	8	9
Free State	63.33	37.65	21.50	5	7	7
Gauteng	66.98	46.93	30.30	3	2	2
KwaZulu-Natal	**65.78**	**43.99**	**26.15**	**4**	**3**	**3**
Limpopo	62.76	39.01	22.00	7	6	6

PROVINCE	≥30% (%)	≥40% (%)	≥50% (%)	RANK ≥30%	RANK ≥40%	RANK ≥50%
Mpumalanga	62.89	40.20	23.29	6	5	5
North West	67.80	42.71	24.82	2	4	4
Northern Cape	55.33	33.13	19.52	9	9	8
Western Cape	73.71	55.30	38.95	1	1	1
South Africa (national)	**64.05**	**41.89**	**25.08**	**n/a**	**n/a**	**n/a**

Source: DBE NSC Examination Report 2025, Table 6.3.6 (p.67); KZN SOI People workbook FINAL, Indicator 04 Dimension A. Threshold percentages computed by formula from candidate counts (Achieved ÷ Wrote). Ranks computed across the nine provinces; the national row is excluded from the rank columns. The ≥60% threshold is not published at provincial level in the DBE 2025 report and is therefore not included.

Figure 4.4 traces KZN's Mathematics attainment at all three thresholds over the 2014 to 2025 period. The trajectory shows substantial improvement at all three thresholds, with each peaking in 2024 before easing in 2025. The ≥30% rate climbed from 40.7% in 2014 to a peak of 68.8% in 2024 before easing to 65.8% in 2025; the ≥40% rate climbed from 24.3% in 2014 to a peak of 48.4% in 2024 before easing to 44.0% in 2025. The ≥50% rate is available from 2018 onwards (the threshold was not published at provincial level in earlier DBE reports) and rose from 17.6% in 2018 to a peak of 30.3% in 2024 before easing to 26.1% in 2025, a net increase of 8.5 percentage points over seven years.

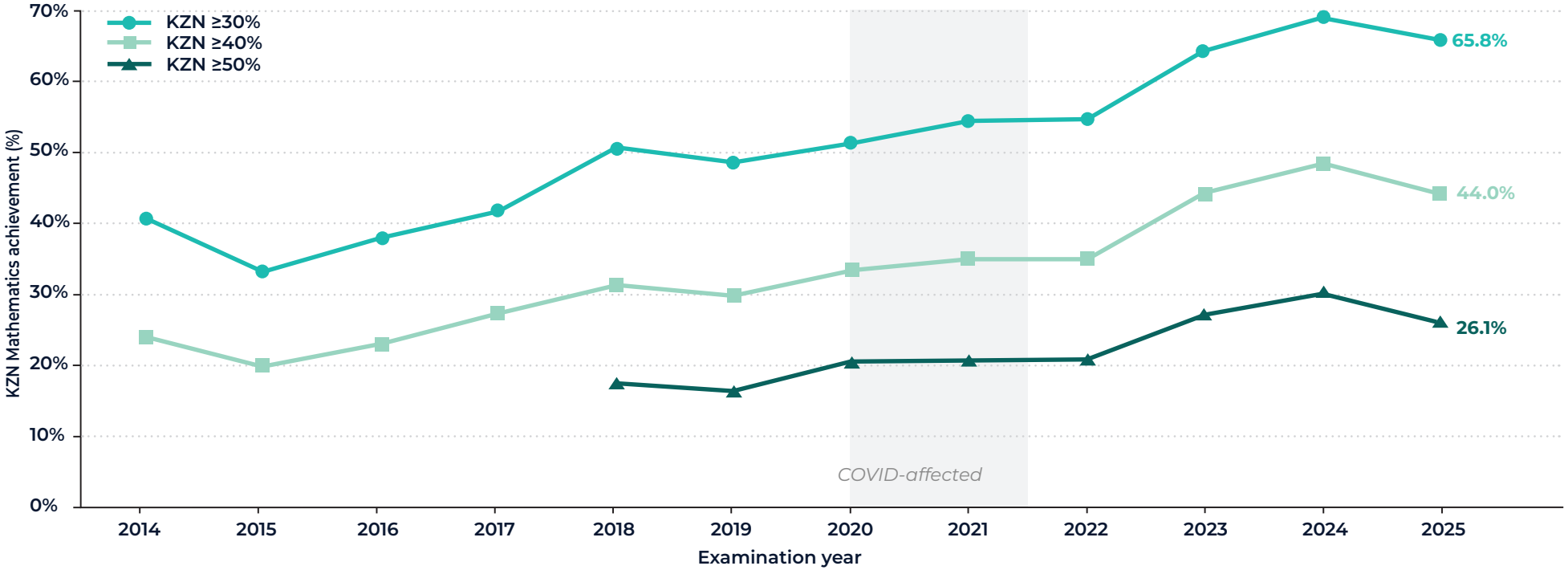


Figure 4.4: KZN NSC Mathematics achievement at three thresholds, 2014 to 2025 (≥50% available from 2018)

Underlying data for Figure 4.4

YEAR	KZN WROTE	KZN BACHELOR	KZN BACH. SHARE (%)	NAT WROTE	NAT BACHELOR	NAT BACH. SHARE (%)	KZN MINUS NAT (PP)
2013	145,278	47,202	32.5	562,112	171,755	30.6	+1.9
2014	139,367	35,724	25.6	532,860	150,752	28.3	−2.7
2015	162,658	34,751	21.4	644,536	166,263	25.8	−4.4
2016	147,648	36,139	24.5	610,178	162,374	26.6	−2.1
2017	124,317	35,687	28.7	534,484	153,610	28.7	0.0
2018	116,152	38,571	33.2	512,735	172,043	33.6	−0.3
2019	116,937	44,189	37.8	504,303	186,058	36.9	+0.9
2020	135,225	51,060	37.8	578,468	210,820	36.4	+1.3
2021	166,570	61,856	37.1	704,021	256,031	36.4	+0.8
2022	164,308	69,849	42.5	725,146	278,814	38.4	+4.1
2023	157,911	72,099	45.7	691,160	282,894	40.9	+4.7
2024	161,962	84,470	52.2	705,291	337,158	47.8	+4.4
2025	171,368	89,161	52.0	746,110	345,857	46.4	+5.7

Source: KZN values from DBE NSC Examination Reports 2015 to 2025 (provincial Mathematics tables); national values from DBE NSC Examination Reports for the corresponding years; KZN SOI People workbook FINAL, Indicator 04 Dimensions B and C. ≥50% threshold not published at provincial level before 2018; n/a entries reflect this. Gap columns report KZN minus National in percentage points; positive values indicate KZN above national. National threshold values for 2014 to 2018 are not consistently published in the DBE annual report series and are reported as n/a in this table.

KZN sat below the national average at all three Mathematics thresholds throughout the 2019 to 2022 window, and the position remained mixed across 2023 (KZN above at ≥30% and ≥40% but below at ≥50%) and 2024 (KZN above at ≥40% and ≥50% but below at ≥30%). The 2025 data show KZN above national at all three thresholds simultaneously for the first time in the paired series: gaps of +1.7 percentage points at ≥30%, +2.1 percentage points at ≥40%, and +1.1 percentage points at ≥50%. The 2024-to-2025 movement is characterised by a national pullback (the national ≥30% rate declined from 69.1% to 64.0%, a 5.1 percentage-point fall) against a smaller KZN decline (68.8% to 65.8%, a 3.0 percentage-point fall). The crossover therefore reflects a relative position change rather than a KZN gain.

Mathematics participation in the NSC cohort is a structural constraint on the indicator. In 2024 (the most recent year for which DBE provincial Mathematics versus Mathematical Literacy splits are reliably published), 36.7% of KZN candidates wrote Mathematics and 63.3% wrote Mathematical Literacy. The KZN proportion is fractionally higher than the national split (36.2% Mathematics, 63.8% Mathematical Literacy), but the broader picture is that almost two-thirds of the cohort writes the easier subject, capping the absolute number of candidates eligible for Science, Technology, Engineering and Mathematics (STEM) university admission.

KZN Mathematics achievement crossed above the national average at all three thresholds in 2025: the crossover reflects a national pullback rather than a KZN gain, but the absolute trajectory shows a 25.1 percentage-point improvement at ≥30% over the 12-year series. The structural ceiling on the indicator is participation: just over a third of KZN candidates write Mathematics rather than Mathematical Literacy, capping the absolute pool of STEM-qualified school leavers.

4.5 Physical Sciences Achievement (Indicator 05)

INDICATOR 05

Physical Sciences Achievement

Three analytical dimensions presented in this section.

DIMENSION A

Provincial Physical Sciences comparator

All nine provinces benchmarked at three attainment thresholds for 2025.

SHOWN AS
Table 4.9

DIMENSION B

KZN three-threshold trajectory

KZN Mathematics achievement at ≥30%, ≥40%, and ≥50% from 2014 to 2025.

SHOWN AS
Figure 4.5

DIMENSION C

Threshold ceiling at ≥50%

Plateau at the higher-order skills threshold contrasts with gains at ≥30% and ≥40%.

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Inline narrative

Physical Sciences is the second core STEM subject at NSC level and provides a complementary signal to Mathematics on the science-stream pipeline that feeds engineering, the natural sciences, and the health sciences. In 2025, KwaZulu-Natal achieved the fourth-highest provincial pass rate at the ≥30% threshold (77.91%), the second-highest at the ≥40% threshold (51.90%), and the third-highest at the ≥50% threshold (29.72%). Limpopo leads at the ≥30% threshold (81.90%); Western Cape leads at the ≥40% and ≥50% thresholds (59.69% and 42.29% respectively).

Table 4.7 sets out the full provincial Physical Sciences comparator for 2025. Western Cape's lead at the ≥50% threshold (42.29% versus 32.20% for second-placed Gauteng, a 10.1 percentage-point gap) is the widest single-position gap across all three Physical Sciences threshold rankings in 2025. At the ≥40% threshold KZN, Limpopo and Gauteng are tightly clustered (51.90%, 51.87%, and 51.47% respectively), with KZN ranked second at 51.90%, just 0.03 percentage points ahead of third-placed Limpopo. Northern Cape ranks ninth at the ≥30% and ≥40% thresholds (71.22% and 42.60%); at the ≥50% threshold Free State drops to ninth (23.72%) and Northern Cape moves to sixth (24.91%).

Table 4.7: Provincial NSC Physical Sciences achievement comparator, 2025 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	≥30% (%)	≥40% (%)	≥50% (%)	RANK ≥30%	RANK ≥40%	RANK ≥50%
Eastern Cape	74.22	45.75	24.83	8	7	7
Free State	74.45	44.40	23.72	7	8	9
Gauteng	76.48	51.47	32.20	5	4	2
KwaZulu-Natal	**77.91**	**51.90**	**29.72**	**4**	**2**	**3**
Limpopo	81.90	51.87	28.92	1	3	4
Mpumalanga	74.72	47.67	27.14	6	5	5
North West	79.06	47.12	24.51	3	6	8
Northern Cape	71.22	42.60	24.91	9	9	6
Western Cape	80.57	59.69	42.29	2	1	1
South Africa (national)	**77.33**	**50.06**	**28.97**	**n/a**	**n/a**	**n/a**

Source: DBE NSC Examination Report 2025, Table 6.3.7; KZN SOI People workbook FINAL, Indicator 05 Dimension A. Threshold percentages computed by formula from candidate counts (Achieved ÷ Wrote). Ranks computed across the nine provinces; the national row is excluded from the rank columns. The ≥60% threshold is not published at provincial level.

Figure 4.5 traces KZN's Physical Sciences attainment across the three thresholds from 2014 (≥30% and ≥40%) and 2018 (≥50%) to 2025. The ≥30% trajectory rose from 55.8% in 2014 to 77.9% in 2025, a gain of 22.1 percentage points. The ≥40% trajectory rose from 31.2% to 51.9%, a gain of 20.7 percentage points. The ≥50% trajectory is the structural feature unique to this indicator: KZN's ≥50% rate has fluctuated within a narrow 28.2% to 32.7% band since 2018, with a net change of just 0.4 percentage points over seven years. The contrast with the substantial gains at the lower thresholds suggests a structural ceiling at the higher-order skills threshold that is not being overcome by the broader improvements driving basic pass rates upward.

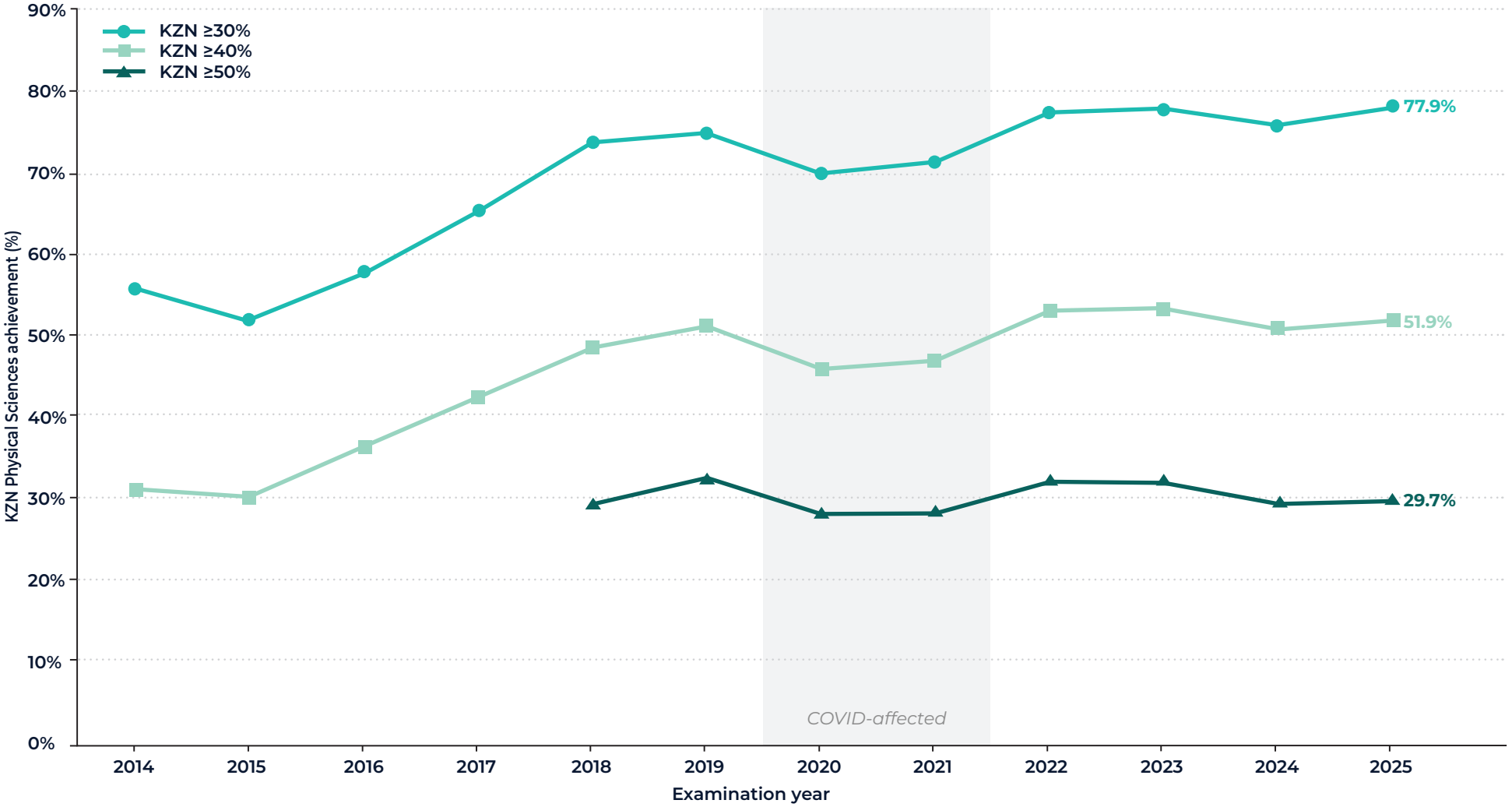

Figure 4.5: KZN NSC Physical Sciences achievement at three thresholds, 2014 to 2025 (≥50% available from 2018)

Underlying data for Figure 4.5

YEAR	KZN ≥30% (%)	KZN ≥40% (%)	KZN ≥50% (%)	NAT ≥30% (%)	NAT ≥40% (%)	GAP ≥30% (PP)	GAP ≥40% (PP)	GAP ≥50% (PP)
2014	55.8	31.2	n/a	n/a	n/a	n/a	n/a	n/a
2015	51.8	30.2	n/a	n/a	n/a	n/a	n/a	n/a
2016	57.8	36.4	n/a	n/a	n/a	n/a	n/a	n/a
2017	65.1	42.4	n/a	n/a	n/a	n/a	n/a	n/a
2018	73.6	48.5	29.3	n/a	n/a	n/a	n/a	n/a
2019	74.8	51.2	32.7	75.5	51.7	−0.7	−0.5	−0.4
2020	69.7	46.0	28.2	65.8	42.4	+3.9	+3.6	+1.9
2021	71.2	47.0	28.3	69.0	44.8	+2.2	+2.2	+1.0
2022	77.3	53.1	32.2	74.6	49.7	+2.7	+3.4	+1.8
2023	77.8	53.3	32.1	76.2	51.1	+1.5	+2.2	+0.9
2024	75.7	50.9	29.5	75.6	49.9	+0.1	+0.9	+0.1
2025	77.9	51.9	29.7	77.3	50.1	+0.6	+1.8	+0.8

Source: KZN values 2014 to 2018 from DBE NSC Annual Reports (Tables 7.3.7, 8.3.7); 2019 to 2022 from DBE NSC Examination Reports (Tables 5.3.6, 5.3.10, 6.3.7, 6.3.10); 2023 to 2025 formula-derived from canonical source block. National values from corresponding DBE NSC Examination Reports. KZN SOI People workbook FINAL, Indicator 05 Dimensions B and C. ≥50% threshold not published at provincial level before 2018. Gap columns report KZN minus National in percentage points; positive values indicate KZN above national. National threshold values for 2014 to 2018 are not consistently published and are reported as n/a.

KZN crossed above the national average at all three Physical Sciences thresholds in 2020 and has held a positive margin in every year since. The 2025 gaps are +0.6 percentage points at ≥30%, +1.8 percentage points at ≥40%, and +0.8 percentage points at ≥50%. The pattern is therefore distinct from Mathematics, where the all-three-thresholds crossover only occurred in 2025; KZN's Physical Sciences performance has held above the national benchmark across six consecutive examination years (2020 to 2025). The single year of below-national performance in the paired series was 2019, when KZN sat 0.7 percentage points below national at ≥30% and 0.5 percentage points below at ≥40%.

KZN Physical Sciences achievement crossed above the national average in 2020 and has held that position in every year since: the gains at the ≥30% and ≥40% thresholds are substantial (+22 and +21 percentage points since 2014), but the ≥50% rate has plateaued in a 28% to 33% band since 2018, suggesting a structural ceiling at the higher-order skills threshold relevant to STEM university admission.

4.6 Business Studies Achievement (Indicator 06)

INDICATOR 06

Business Studies Achievement

Three analytical dimensions presented in this section.

DIMENSION A

Provincial Business Studies comparator

All nine provinces benchmarked on attainment and participation share fpr 2025.

SHOWN AS
Table 4.11

DIMENSION B

KZN performance trajectory

KZN Business Studies attainment at ≥30% and ≥40% from 2014 to 2025.

SHOWN AS
Figure 4.6

DIMENSION C

Participation share decline

KZN Business Studies participation share fell from 44.86% peak (2017) to 37.97% (2025).

SHOWN AS
Inline narrative

Business Studies is the third subject indicator in the Secondary School sub-category and a new addition to the SOI indicator set in the 2025/26 edition. The indicator complements Mathematics and Physical Sciences by covering the commerce-stream pipeline that feeds knowledge-intensive services, including financial services, business management, and entrepreneurship-track post-school study. In 2025, KwaZulu-Natal achieved the fourth-highest provincial pass rate at the ≥30% threshold (89.43%) and the third-highest at the ≥40% threshold (71.99%). Limpopo leads at both thresholds (92.88% and 78.72% respectively). KZN's participation share (Business Studies candidates as a proportion of the NSC cohort) was 37.97% in 2025, the third-highest nationally behind Western Cape (40.62%) and Gauteng (40.41%).

Table 4.8 sets out the full provincial Business Studies comparator for 2025. Limpopo's lead is consistent across both performance thresholds, ranking first at ≥30% (92.88%) and ≥40% (78.72%). Northern Cape sits at ninth at both performance thresholds (74.47% at ≥30% and 50.63% at ≥40%), with the spread between Limpopo and Northern Cape at 18.4 percentage points at ≥30% and 28.1 percentage points at ≥40%. Western Cape leads on participation share at 40.62% but ranks eighth at ≥30% and seventh at ≥40%, a combination consistent with broad enrolment in the subject without commensurate top-end performance.

Table 4.8 Provincial NSC Business Studies comparator, 2025 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	≥30% (%)	≥40% (%)	≥50% (%)	RANK ≥30%	RANK ≥40%	RANK ≥50%
Eastern Cape	74.22	45.75	24.83	8	7	7
Free State	74.45	44.40	23.72	7	8	9
Gauteng	76.48	51.47	32.20	5	4	2
KwaZulu-Natal	**77.91**	**51.90**	**29.72**	**4**	**2**	**3**
Limpopo	81.90	51.87	28.92	1	3	4
Mpumalanga	74.72	47.67	27.14	6	5	5
North West	79.06	47.12	24.51	3	6	8
Northern Cape	71.22	42.60	24.91	9	9	6
Western Cape	80.57	59.69	42.29	2	1	1
South Africa (national)	**77.33**	**50.06**	**28.97**	**n/a**	**n/a**	**n/a**

Source: DBE NSC Examination Report 2025, Table 6.3.7; KZN SOI People workbook FINAL, Indicator 05 Dimension A. Threshold percentages computed by formula from candidate counts (Achieved ÷ Wrote). Ranks computed across the nine provinces; the national row is excluded from the rank columns. The ≥60% threshold is not published at provincial level.

Figure 4.6 traces KZN's Business Studies attainment over the 2014 to 2025 period. The trajectory shows a distinct U-shape: declining performance from 2014 through 2018 (≥30% rate fell from 71.74% to 59.46%, a 12.3 percentage-point decline) followed by a sharp recovery from 2019 onwards. The ≥30% rate climbed from 69.85% in 2019 to 89.43% in 2025, a 19.6 percentage-point gain. The ≥40% rate followed a similar U-shape: 48.24% in 2014, 35.52% in 2018, 71.99% in 2025. Net change over the 12-year period is +17.7 percentage points at ≥30% and +23.8 percentage points at ≥40%.

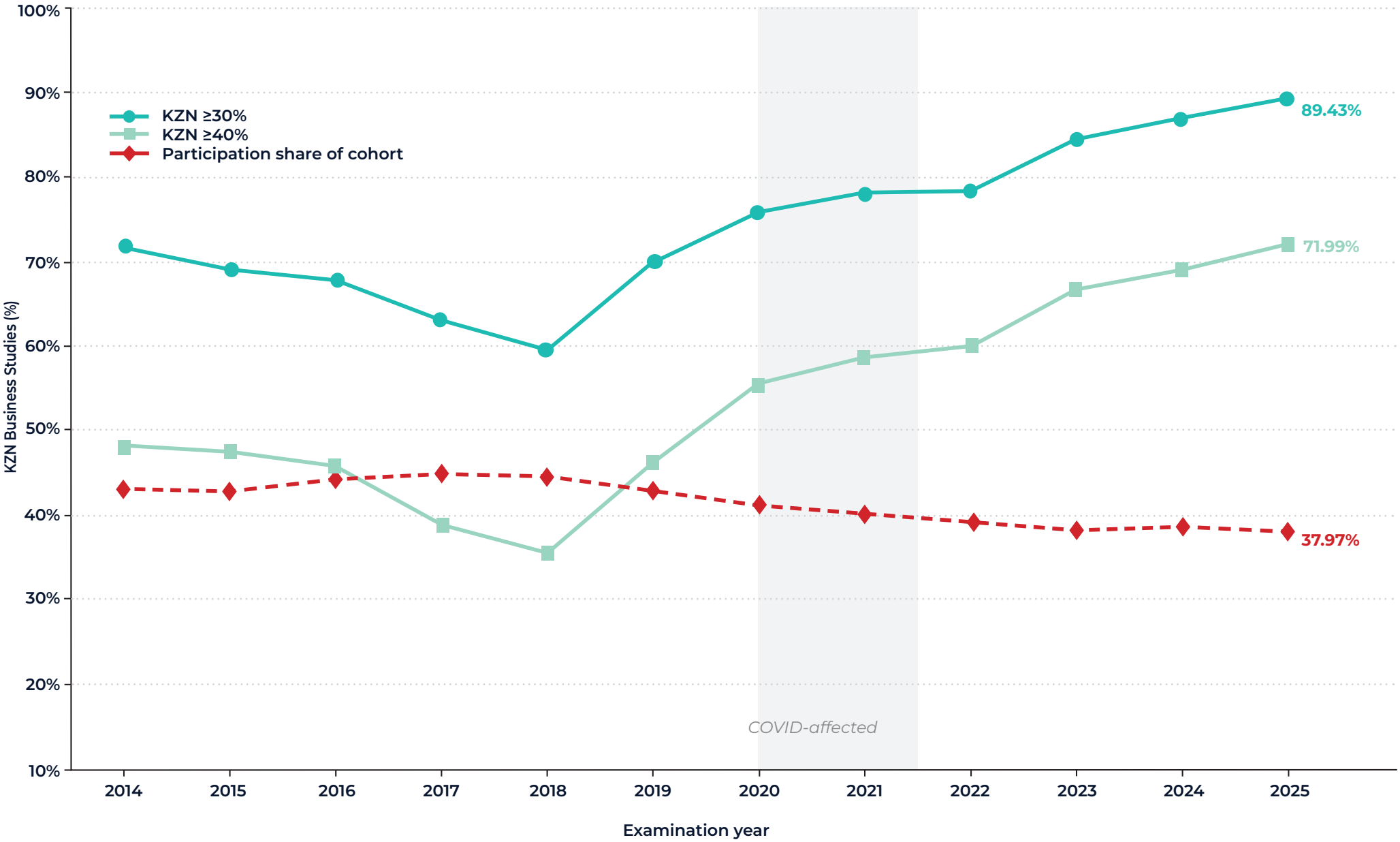

Figure 4.6: KZN NSC Business Studies achievement and participation share, 2014 to 2025

Underlying data for Figure 4.6

YEAR	KZN ≥30% (%)	KZN ≥40% (%)	PARTICIPATION (%)	NAT ≥30% (%)	NAT ≥40% (%)	GAP ≥30% (PP)	GAP ≥40% (PP)
2014	71.74	48.24	43.16	77.88	53.81	−6.14	−5.58
2015	69.09	47.45	42.80	75.65	51.43	−6.56	−3.98
2016	67.82	45.89	44.29	73.73	49.48	−5.92	−3.59
2017	63.11	38.84	44.86	68.04	42.73	−4.93	−3.89
2018	59.46	35.52	44.41	64.86	40.13	−5.40	−4.61
2019	69.85	46.33	43.20	70.95	46.16	−1.10	+0.17
2020	75.94	55.50	41.37	77.87	57.04	−1.93	−1.54
2021	78.11	58.76	40.62	80.48	60.45	−2.37	−1.68
2022	78.38	59.96	39.38	76.66	56.34	+1.72	+3.62
2023	84.56	66.74	38.21	81.79	62.21	+2.77	+4.53
2024	86.98	69.24	38.57	86.01	67.19	+0.97	+2.05
2025	89.43	71.99	37.97	88.39	70.47	+1.04	+1.52

Source: KZN values 2014 to 2018 from DBE NSC Annual Reports; 2019 to 2025 from DBE NSC Examination Reports; KZN SOI People workbook FINAL, Indicator 06 Dimensions B and C. National values from DBE NSC Examination Reports for the corresponding years. Performance threshold percentages = Achieved ÷ Wrote. Participation share = Business Studies candidates ÷ total NSC cohort. Gap columns report KZN minus National in percentage points; positive values indicate KZN above national.

KZN sat below the national rate at the ≥30% threshold from 2014 to 2021, crossing above in 2022 and holding a positive margin in every year since (gap +1.04 percentage points in 2025). At the ≥40% threshold, KZN sat below national from 2014 to 2018, crossed marginally above in 2019 (+0.17 percentage points), dipped below during the COVID-affected 2020 and 2021 examinations, and re-established a firm positive margin from 2022 onwards (gap +1.52 percentage points in 2025). The 2022 inflection is therefore the substantive crossover year for both thresholds, with KZN above national continuously since.

The participation pattern is the structural concern for this indicator. KZN's Business Studies participation share has declined from a 44.86% peak in 2017 to 37.97% in 2025, a fall of 6.9 percentage points. The decline is unbroken from 2018 onwards, with every year showing a year-on-year fall except 2024, which posted a small 0.4 percentage-point increase. The improving performance among those who write Business Studies has therefore been accompanied by a shrinking pool of writers, partially offsetting the absolute number of high-performing candidates produced each year.

KZN Business Studies performance has improved markedly whilst participation has declined: the province crossed above the national rate at both thresholds in 2022, with 2025 gaps of +1.0 percentage point at ≥30% and +1.5 percentage points at ≥40%. Participation share has fallen 6.9 percentage points since the 2017 peak. The improving performance is therefore being offset by a shrinking pool of writers, a divergence that reduces the absolute number of high-performing Business Studies candidates feeding the commerce-stream post-school pipeline.

4.7 TVET Engineering Pipeline (Indicator 07)

INDICATOR 07

TVET Engineering Pipeline

Three analytical dimensions presented in this section.

DIMENSION A

Provincial scale and conversion

N3 and N6 enginerring registration scale, completion rate and rank, all nine provinces, 2023.

SHOWN AS
Table 4.12 + 4.13

DIMENSION B

Completion rate trajectory

KZN versus national completion rates traced 2014 to 2023 for N3 and N6.

SHOWN AS
Figure 4.7

DIMENSION C

Attrition decomposition

Pre-exam loss and exam failure rates separated to identify where the completion gap arises.

SHOWN AS
Table 4.14

The Technical and Vocational Education and Training (TVET) engineering pipeline is the post-school stream that supplies technician-level engineering qualifications to South African industry. The Department of Higher Education and Training (DHET) Post-School Education and Training (PSET) reports publish results for the National Certificate engineering sequence (N1 to N6). The 2025/26 indicator uses the N3 and N6 examinations, the entry-stage and highest National Certificate engineering qualifications respectively, as proxies for the engineering pipeline. KwaZulu-Natal ranks second nationally on N3 engineering registrations in 2023 (5,087 registered candidates, 23.08% national share) but eighth on N3 completion rate (44.91% versus 50.81% national). The province's scale on registrations is not converting into proportionate completion outcomes.

Table 4.9 sets out the N3 Engineering Studies provincial comparator for 2023. KZN registered 5,087 candidates and produced 1,819 completions. Gauteng leads on both registration scale (5,581 registered, 25.32% national share) and completion rate (60.89%); Eastern Cape ranks ninth on completion rate (41.65%); Northern Cape ranks ninth on registration scale (499 registered, 2.26% national share). Three provinces (Gauteng, North West and Western Cape) sit above 59% completion rate; the remaining six provinces sit between 41% and 51%. The leader-to-lowest completion-rate spread is 19.2 percentage points (Gauteng 60.89% to Eastern Cape 41.65%).

Table 4.9: N3 Engineering Studies provincial comparator, 2023 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	REGISTERED	WROTE	COMPL.	CR (%)	NAT. SHARE (%)	RANK REG.	RANK CR
Eastern Cape	2,055	1,539	641	41.65	9.32	4	9
Free State	1,485	936	424	45.30	6.74	7	7
Gauteng	5,581	3,168	1,929	60.89	25.32	1	1
KwaZulu-Natal	**5,087**	**4,050**	**1,819**	**44.91**	**23.08**	**2**	**8**
Limpopo	2,204	1,584	745	47.03	10.00	3	6
Mpumalanga	1,997	1,259	634	50.36	9.06	5	4
North West	1,228	747	449	60.11	5.57	8	2
Northern Cape	499	357	175	49.02	2.26	9	5
Western Cape	1,909	1,366	809	59.22	8.66	6	3
South Africa (national)	**22,045**	**15,006**	**7,625**	**50.81**	**100.00**	**n/a**	**n/a**

Source: DHET Statistics on Post-School Education and Training 2023 report, Table 5.12 (provincial N3 engineering counts); KZN SOI People workbook FINAL, Indicator 07 Dimension A. Data year corresponds to the DHET 2023 PSET reporting cycle (calendar year). Compl. = Completed. CR = completion rate = Completed ÷ Wrote. Nat. share = share of national registrations = provincial Registered ÷ national Registered. Ranks computed across the nine provinces; the national row is excluded from rank columns.

Table 4.10 sets out the N6 Engineering Studies provincial comparator for 2023. KZN registered 1,731 candidates (rank 2 nationally, 20.57% national share) and produced 633 completions, giving a 43.96% completion rate that ranks sixth of the nine provinces. Gauteng again leads on both registration scale (1,831 registered, 21.76% national share) and completion rate (49.61%); Limpopo ranks ninth on completion rate (36.94%). The N6 completion-rate dispersion is narrower than at N3: the leader-to-lowest spread is 12.7 percentage points compared to 19.2 percentage points at N3. KZN's relative ranking is better at N6 (sixth) than at N3 (eighth), albeit the province sits below the median at both programme levels.

Table 4.10: N6 Engineering Studies provincial comparator, 2023 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	REGISTERED	WROTE	COMPL.	CR (%)	NAT. SHARE (%)	RANK REG.	RANK CR
Eastern Cape	1,494	1,289	546	42.36	17.75	3	8
Free State	531	424	194	45.75	6.31	7	3
Gauteng	1,831	1,290	640	49.61	21.76	1	1
KwaZulu-Natal	**1,731**	**1,440**	**633**	**43.96**	**20.57**	**2**	**6**
Limpopo	1,306	1,034	382	36.94	15.52	4	9
Mpumalanga	570	336	144	42.86	6.77	6	7
North West	296	229	108	47.16	3.52	8	2
Northern Cape	25	22	10	45.45	0.30	9	4
Western Cape	631	557	253	45.42	7.50	5	5
South Africa (national)	**8,415**	**6,621**	**2,910**	**43.95**	**100.00**	**n/a**	**n/a**

Source: DHET Statistics on Post-School Education and Training 2023 report, Table 5.13 (provincial N6 engineering counts); KZN SOI People workbook FINAL, Indicator 07 Dimension B. Data year corresponds to the DHET 2023 PSET reporting cycle (calendar year). Compl. = Completed. CR = completion rate = Completed ÷ Wrote. Nat. share = share of national registrations = provincial Registered ÷ national Registered. Ranks computed across the nine provinces; the national row is excluded from rank columns.

Figure 4.7 traces KZN and national completion rates for N3 and N6 over the available data years from 2014 to 2023. Three years are absent from the series for confirmed source-side reasons: the DHET 2015 and 2017 reports explicitly excluded TVET examination results in their forewords, and no DHET PSET report was published for 2018. The 2020 reading is anomalously high across both series at both programme levels (KZN N3 91.4%, KZN N6 92.6%) and reflects the reduced cohort that wrote the 2020 trimester examinations rather than a methodology change. KZN's N3 completion rate sat above the national rate in 2014 and 2016 (gaps of +2.5 percentage points and +1.0 percentage point) but has tracked below the national rate at every measurement from 2019 onwards excluding the 2020 anomaly, with the 2023 gap at −5.9 percentage points. KZN's N6 completion rate sat above the national rate in every available year from 2014 to 2021 (gaps of +0.5 to +2.2 percentage points), dropped to −4.6 percentage points in 2022, and recovered to parity (zero gap) in 2023.

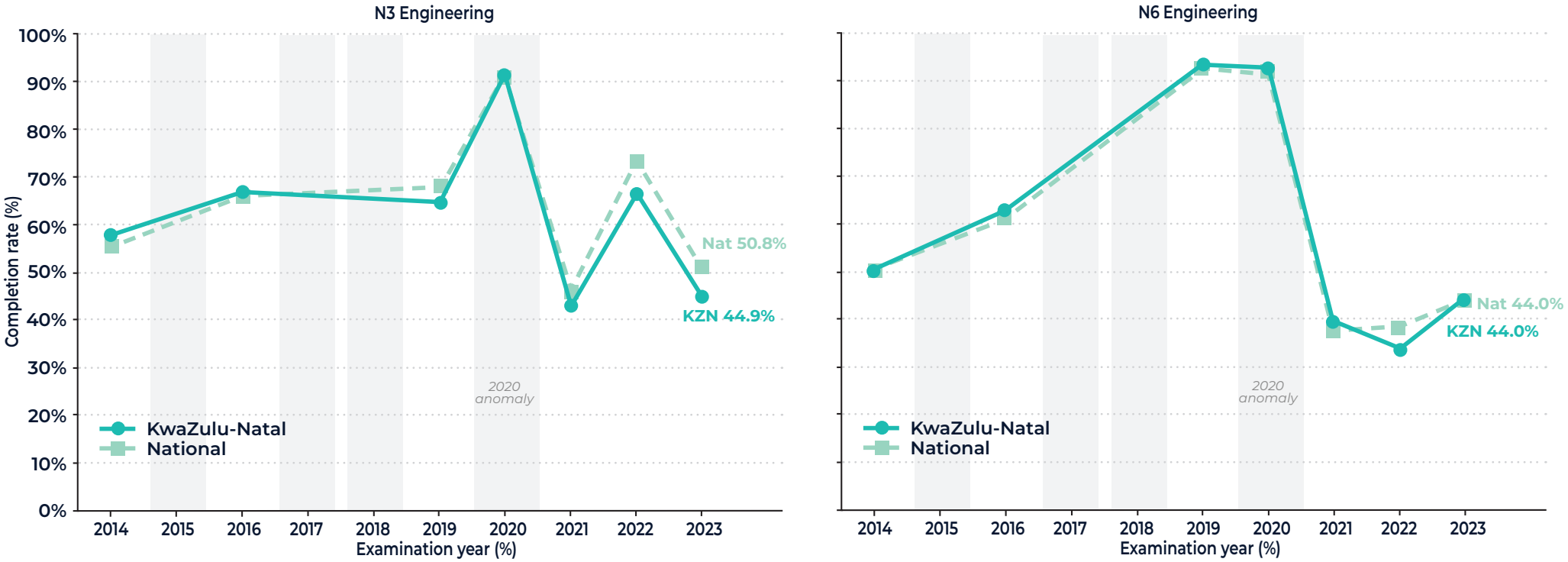

Figure 4.7 KZN and National TVET engineering completion rates, N3 and N6, 2014 to 2023

Underlying data for Figure 4.7

YEAR	KZN N3 CR (%)	NAT N3 CR (%)	GAP N3 (PP)	KZN N6 CR (%)	NAT N6 CR (%)	GAP N6 (PP)
2014	57.9	55.4	+2.5	50.3	49.8	+0.5
2015	n/a	n/a	n/a	n/a	n/a	n/a
2016	66.8	65.8	+1.0	62.6	61.0	+1.6
2017	n/a	n/a	n/a	n/a	n/a	n/a
2018	n/a	n/a	n/a	n/a	n/a	n/a
2019	64.8	68.0	−3.2	93.5	92.2	+1.3
2020	91.4	90.8	+0.6	92.6	91.2	+1.4

YEAR	KZN N3 CR (%)	NAT N3 CR (%)	GAP N3 (PP)	KZN N6 CR (%)	NAT N6 CR (%)	GAP N6 (PP)
2021	43.1	46.7	−3.6	39.4	37.2	+2.2
2022	66.7	73.4	−6.7	33.6	38.2	−4.6
2023	44.9	50.8	−5.9	44.0	44.0	0.0

Source: DHET Statistics on Post-School Education and Training annual reports 2014, 2016, 2019, 2020, 2021, 2022 and 2023; KZN SOI People workbook FINAL, Indicator 07 Dimensions C, D, E and F. Data years correspond to DHET PSET reporting cycles (calendar years). Gap columns report KZN minus national in percentage points; positive values indicate KZN above national.

The completion deficit decomposes into two underlying mechanisms: pre-exam loss (the share of registered candidates who do not sit the examination) and exam failure (the share of those who sit but fail). Table 4.11 sets out both rates for KZN and the national series at N3 and N6 in 2023. At N3, KZN's pre-exam loss rate of 20.4% sits 11.5 percentage points below the national rate of 31.9%: a higher share of KZN candidates who register actually arrive at the examination. KZN's N3 exam failure rate of 55.1% sits 5.9 percentage points above the national 49.2%. The N3 completion deficit is therefore exam-failure-driven rather than driven by registration-to-examination attrition. The decomposition does not identify the underlying mechanism: a curriculum or examination-preparation gap is one explanation consistent with the data, but other factors (invigilation conditions, marker calibration, candidate composition) cannot be ruled out from this analysis. The N6 pattern in 2023 shows zero completion gap (44.0% in both KZN and national), reflecting an offsetting combination in which KZN's pre-exam loss rate (16.8%) is 4.5 percentage points below the national rate (21.3%) but KZN's exam failure rate (56.0%) matches national exactly.

Table 4.11: TVET engineering attrition decomposition, KZN and national, 2023

SERIES (2023)	PROGRAMME	PRE-EXAM LOSS RATE (%)	EXAM FAILURE RATE (%)	COMPLETION RATE (%)
KwaZulu-Natal	**N3 Engineering**	**20.4**	**55.1**	**44.9**
South Africa (national)	N3 Engineering	31.9	49.2	50.8
KwaZulu-Natal	**N6 Engineering**	**16.8**	**56.0**	**44.0**
South Africa (national)	N6 Engineering	21.3	56.0	44.0

Source: DHET Statistics on Post-School Education and Training 2023 report, Tables 5.12 and 5.13; KZN SOI People workbook FINAL, Indicator 07 Dimension G. Pre-exam loss rate = (Registered − Wrote) ÷ Registered. Exam failure rate = (Wrote − Completed) ÷ Wrote. Completion rate = Completed ÷ Wrote. The three rates do not sum to 100% because they are computed from different denominators.

Methodology notes: DHET 2015 and DHET 2017 reports explicitly excluded TVET examination results in their forewords; no DHET PSET report was published for 2018. The 2020 reading reflects a reduced cohort sitting the COVID-affected examinations rather than a methodology change. National and provincial registration counts (not shown in this figure) fell sharply between 2019 and 2021 owing to the DHET PSET database transition during 2020 to 2021; pre-2021 and post-2021 registration counts are not directly comparable, but completion rates (ratios) remain comparable across the boundary.

The TVET engineering pipeline shows the conversion failure pattern at its sharpest: KZN ranks second nationally on N3 engineering registration scale but eighth on N3 completion rate, with the 2023 completion deficit of 5.9 percentage points driven by exam failure rather than registration-to-examination attrition. The N3 completion rate has fallen further behind national over the data series (linear slope −1.0 percentage points per year, excluding the 2020 anomaly), and the N6 completion-rate advantage that KZN held throughout 2014 to 2021 has narrowed (linear slope −0.3 percentage points per year, excluding the 2020 anomaly), with the 2023 gap at parity.

4.8 SET Enrolment at Public Universities (Indicator 08)

INDICATOR 08

SET Enrolment at Public Universities

Three analytical dimensions presented in this section.

DIMENSION A

Provincial scale and rank

Provincial SET enrolment counts and rank, all nine provinces, 2023.

A

SHOWN AS
Table 4.12

DIMENSION B

KZN versus national growth

KZN and national SET enrolment indexed to 2015 = 100, traced 2015 to 2023.

B

SHOWN AS
Figure 4.8

DIMENSION C

Institutional concentration

Institutional shares and Herfindahl-Hirschman Index for KZN's four SET-providing universities.

C

SHOWN AS
Table 4.16

Science, Engineering and Technology (SET) enrolment at public universities is the formal pipeline that supplies graduates to the regional knowledge economy. The Higher Education Management Information System (HEMIS) classifies enrolments by Classification of Educational Subject Matter (CESM) field, with SET fields covering the natural sciences, engineering, computer science, mathematics and the health sciences. KwaZulu-Natal's public-university SET cohort is hosted across four institutions: the Durban University of Technology (DUT), the Mangosuthu University of Technology (MUT), the University of KwaZulu-Natal (UKZN), and the University of Zululand (UNIZULU). In the 2023 academic year, the four institutions collectively enrolled 43,713 SET students, ranking the province third nationally. KZN accounts for approximately 19% of South Africa's population but 15.6% of campus-based national SET enrolment in 2023 (excluding UNISA, the distance-based institution). The rank inversion is structural rather than episodic: KZN held rank 3 across the full 2015 to 2023 series.

Table 4.12 sets out the provincial SET enrolment comparator for the 2023 academic year, with growth measured against the 2015 baseline. Gauteng leads on absolute scale at 102,887 SET enrolments (36.71% national share excluding UNISA); Western Cape sits second at 55,013 (19.63% share); KZN third at 43,713 (15.60% share). The leader-to-third gap of 59,174 SET enrolments places Gauteng on a different scale altogether. Over the 2015 to 2023 window KZN posted absolute growth of 4.35%, well below the national average of 9.7% and behind every other province bar North West (−8.87%). Mpumalanga (+554%) and Northern Cape (+990%) recorded large percentage increases from very small bases, with the absolute headcounts in 2023 still combined at approximately 4,800 SET enrolments.

Table 4.12: Provincial SET enrolment comparator, 2023 academic year (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	SET ENROLMENT	SHARE EXCL. UNISA (%)	Δ VS 2015 (%)	RANK
Eastern Cape	25,442	9.08	+8.9	4
Free State	19,363	6.91	+23.7	5
Gauteng	102,887	36.71	+7.3	1
KwaZulu-Natal	**43,713**	**15.60**	**+4.3**	**3**
Limpopo	16,212	5.78	+15.6	6
Mpumalanga	3,737	1.33	+554.5	8
North West	12,781	4.56	−8.9	7
Northern Cape	1,101	0.39	+990.1	9
Western Cape	55,013	19.63	+10.3	2
South Africa (national, excl. UNISA)	**280,249**	**100.00**	+8.9	**n/a**

Source: DHET HEMIS, compiled from public university institutional submissions; KZN SOI People workbook FINAL, Indicator 08 Dimensions 1, 2 and 6. Data year is the 2023 academic year (1 January to 31 December 2023). UNISA is a distance institution with no meaningful campus-based provincial attribution and is excluded from the provincial comparison; UNISA SET enrolment in 2023 was 39,049. National total excluding UNISA in 2023 was 280,249. Δ vs 2015 columns use 2015 as the baseline year. Ranks computed across the nine provinces; the national row is excluded from the rank column.

Figure 4.8 indexes KZN and national SET enrolment to 2015 and traces both series to 2023. The two trajectories tracked closely between 2015 and 2018, with KZN slightly above national in 2016 and slightly below in 2018. KZN's SET enrolment peaked in 2019 at 47,503 (index 113.4), 3.8 index points above national at the equivalent point. The series then diverged: KZN's SET enrolment contracted through 2020, 2021 and 2022, reaching a trough of 42,851 in 2022 (index 102.3) before a partial recovery to 43,713 in 2023 (index 104.3). The national series (including UNISA) showed a shallower dip, with the trough at 313,788 in 2021 (index 106.4) and a recovery to 319,300 in 2023 (index 108.3). The 2019 to 2023 KZN contraction was 8.0% versus a national contraction of 1.2% over the equivalent window: the KZN shortfall is approximately 6.5 times the national shortfall. The CAGR over the full 2015 to 2023 window is 0.53% per annum for KZN versus 1.00% per annum nationally, an under-tracking of 0.46 percentage points per annum that masks the mid-period contraction.

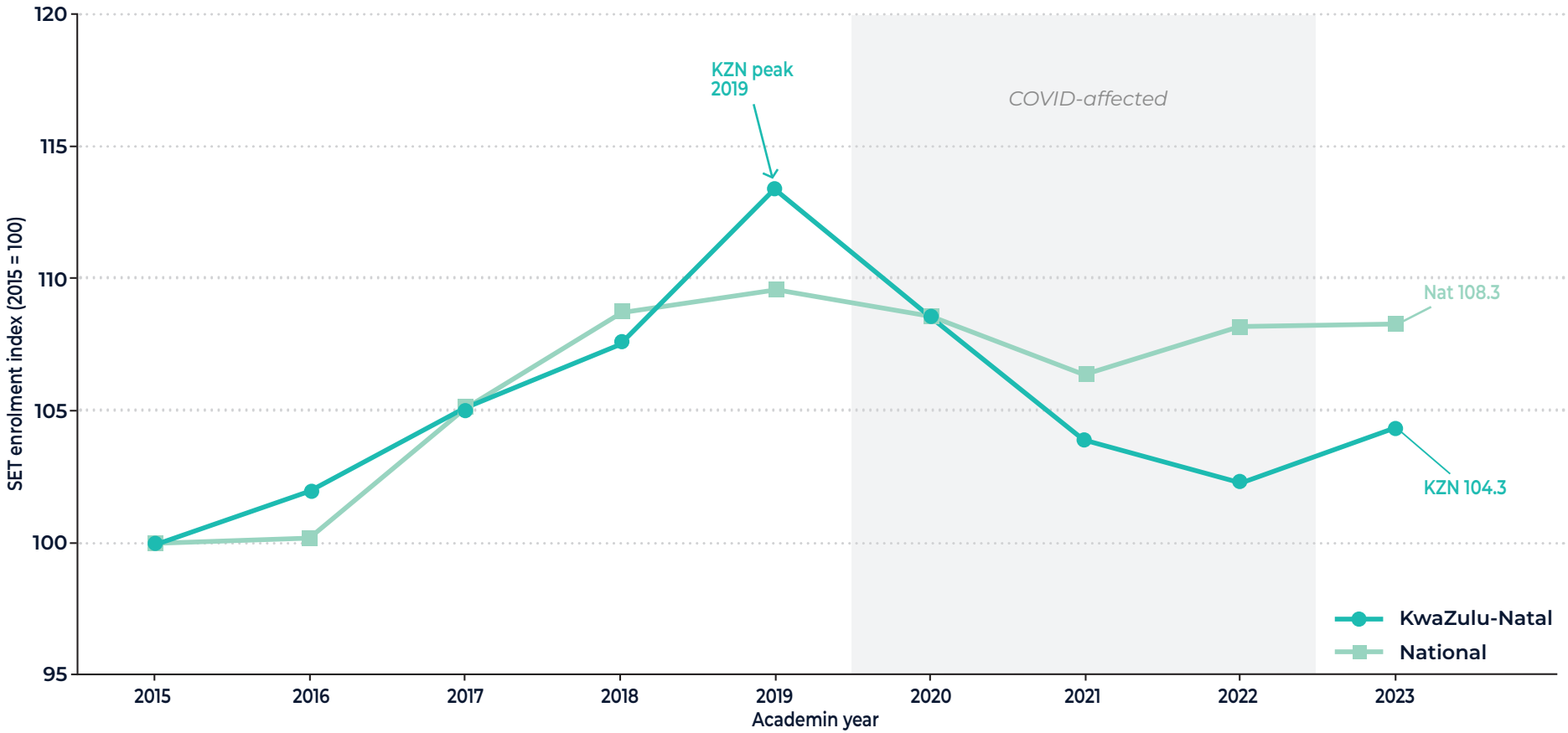

Figure 4.8: KZN and national SET enrolment indexed to 2015 = 100, 2015 to 2023 academic years

Underlying data for Figure 4.8

YEAR	KZN SET ENROLMENT	NATIONAL SET (INCL. UNISA)	KZN SHARE (%)	KZN INDEX	NAT. INDEX
2015	41,892	294,935	14.20	100.0	100.0
2016	42,736	295,383	14.47	102.0	100.2
2017	44,001	310,115	14.19	105.0	105.2
2018	45,062	320,671	14.05	107.6	108.7
2019	47,503	323,287	14.69	113.4	109.6

YEAR	KZN SET ENROLMENT	NATIONAL SET (INCL. UNISA)	KZN SHARE (%)	KZN INDEX	NAT. INDEX
2020	45,459	319,902	14.21	108.5	108.5
2021	43,521	313,788	13.87	103.9	106.4
2022	42,851	319,065	13.43	102.3	108.2
2023	43,713	319,300	13.69	104.3	108.3

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 08 Dimensions 1, 4 and 5. Data years are academic years (1 January to 31 December of each calendar year). National SET column includes UNISA, consistent with HEMIS-published national totals; the indexed series used in the figure also includes UNISA throughout. KZN share column reports KZN as a share of the incl-UNISA national total. The provincial comparator in Table 4.12 above uses an excl-UNISA national denominator instead, because UNISA has no campus-based provincial attribution; the two share series therefore differ by design. Indices are calculated from raw counts with 2015 as the base year. 2024 data not yet released by DHET at the time of publication.

Table 4.13 sets out institutional shares of KZN SET enrolment for the four KZN public universities, with the Herfindahl-Hirschman Index (HHI) reported alongside. UKZN is the largest single contributor at 39.71% of KZN SET in 2023, followed by DUT at 29.07%, MUT at 19.15%, and UNIZULU at 12.08%. Comparing 2015 to 2023, UKZN's share declined by 3.46 percentage points (43.17% to 39.71%), DUT's declined by 2.54 percentage points (31.61% to 29.07%), and UNIZULU's share rose by 4.05 percentage points (8.03% to 12.08%); MUT's share rose by 1.95 percentage points. The HHI fell from 32.23% in 2015 to 29.34% in 2023, a 2.89 percentage-point decline indicating modest diversification of the KZN SET enrolment base. The minimum achievable HHI for four institutions with equal shares is 25.0%, so the 2023 HHI of 29.34% sits 4.34 percentage points above the equal-shares floor; absolute concentration thresholds are not applied because the four-institution structure constrains the achievable range.

Table 4.13: KZN institutional shares of provincial SET enrolment and HHI, 2015 to 2023 academic years

KZN INSTITUTION	2015	2016	2017	2018	2019	2020	2021	2022	2023
DUT	31.61	31.43	30.68	30.54	32.76	31.80	30.91	29.44	29.07
MUT	17.20	16.88	17.62	17.68	18.03	18.51	19.54	19.42	19.15
UKZN	43.17	43.28	43.23	42.67	40.17	40.00	39.06	39.41	39.71
UNIZULU	8.03	8.40	8.47	9.11	9.04	9.69	10.48	11.73	12.08
HHI (KZN SET enrolment, %)	***32.23***	***32.17***	***31.92***	***31.49***	***30.94***	***30.48***	***29.73***	***29.35***	***29.34***

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 08 Dimension 7 Sections B and C. Data years are academic years. HHI is reported as a percentage (sum of squared institutional shares, range 0% to 100%); for four KZN institutions the minimum achievable HHI is 25.0% (equal shares). Absolute concentration thresholds are not applied because the four-institution structure constrains the achievable range. DUT = Durban University of Technology; MUT = Mangosuthu University of Technology; UKZN = University of KwaZulu-Natal; UNIZULU = University of Zululand.

KZN holds rank 3 on SET enrolment across the full 2015 to 2023 series with a 15.6% national share against a population share of approximately 19% (Stats SA, 2025a; KZN at 19.1% in 2023, revised series): the rank inversion is structural rather than episodic. KZN's 8.0% contraction from the 2019 peak is approximately 6.5 times the equivalent national contraction, and KZN under-tracked the national SET CAGR by 0.46 percentage points per annum over the period. Institutional concentration has moderated as UNIZULU's share has risen and DUT's share has declined, but the four-institution structure means absolute concentration thresholds do not apply to the KZN sector.

4.9 SET Graduation at Public Universities (Indicator 09)

INDICATOR 09

SET Graduation at Public Universities

Three analytical dimensions presented in this section.

DIMENSION A

Provincial scale and rank

Provincial SET graduate counts and rank, all nine provinces, 2023.

SHOWN AS
Table 4.17

DIMENSION B

Per-capita graduation rate

KZN SET graduates per 100,000 population traced 2015 to 2023.

SHOWN AS
Figure 4.9

DIMENSION C

Institutional shares and growth

Institutional shares and KZN SET graduates and CAGR comparison versus national.

SHOWN AS
Table 4.18

SET graduation at public universities measures the throughput of the provincial SET pipeline traced as SET enrolment in Indicator 08. KwaZulu-Natal's 2023 SET graduate cohort across DUT, MUT, UKZN and UNIZULU was 8,238, ranking the province third nationally on graduation as it does on enrolment. The rank inversion against population share is sharper at graduation than at enrolment: KZN's ~19% population share contrasts with a 13.9% share of national campus-based SET graduates in 2023 (excluding UNISA), 1.7 percentage points below the equivalent enrolment share of 15.6%. Net SET graduate output across the 2015 to 2023 window was essentially flat for KZN at +0.27% (8,216 to 8,238) against national growth of +13.07% (58,090 to 65,680). The 2020 and 2021 graduate counts of 10,339 and 10,270 represent a COVID-affected peak of deferred completions clearing through the system rather than structural improvement; the 2022 to 2023 series returned to approximately the 2015 level.

Table 4.14 sets out the provincial SET graduate comparator for the 2023 academic year, with growth measured against the 2015 baseline. Gauteng leads at 22,877 SET graduates (38.57% share excluding UNISA); Western Cape sits second at 12,618 (21.28%); KZN third at 8,238 (13.89%). Over the 2015 to 2023 window, KZN was essentially flat (+0.27%); Eastern Cape contracted (−6.47%); North West contracted more sharply (−27.60%). All other established provinces grew between 9.76% (Western Cape) and 19.27% (Limpopo), with Gauteng growing 13.47% over the same window. National growth (excluding UNISA) was +8.4%; KZN under-tracked national by approximately 8 percentage points over the nine-year window.

Table 4.14: Provincial SET graduate comparator, 2023 academic year (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	SET GRADUATES	SHARE EXCL. UNISA (%)	Δ VS 2015 (%)	RANK
Eastern Cape	4,844	8.17	−6.5	4
Free State	4,154	7.00	+17.7	5
Gauteng	22,877	38.57	+13.5	1
KwaZulu-Natal	**8,238**	**13.89**	**+0.3**	**3**
Limpopo	3,089	5.21	+19.3	6
Mpumalanga	738	1.24	n/a	8
North West	2,553	4.30	−27.6	7
Northern Cape	198	0.33	n/a	9
Western Cape	12,618	21.28	+9.8	2
South Africa (national, excl. UNISA)	**59,309**	**100.00**	**+8.4**	**n/a**

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 09 Dimensions 1, 2 and 7. Data year is the 2023 academic year. UNISA is excluded from the provincial comparison; UNISA SET graduate count in 2023 was 6,373. National total excluding UNISA in 2023 was 59,309. Δ vs 2015 columns use 2015 as the baseline year; n/a entries reflect cases where the 2015 graduate count was zero (the institution had not yet produced its first SET graduates in 2015). Ranks computed across the nine provinces; the national row is excluded from the rank column.

Figure 4.9 traces the per-capita SET graduation rate, expressed as KZN SET graduates per 100,000 KZN population, across the 2015 to 2023 period. The series rose from 76.79 in 2015 to a peak of 89.66 in 2020 before declining sharply through 2022 (77.78) and 2023 (69.01). The 2023 rate of 69.01 sits 7.78 percentage units below the 2015 baseline, a fall of 10.1% relative to 2015. The per-capita decline is the compound result of two trends: SET graduate counts that recovered to approximately 2015 levels by 2023 (8,238 versus 8,216), and a KZN population that grew from 10.7 million in 2015 to 11.9 million in 2023, a 11.6% increase. The per-capita measure shows that even at the absolute graduate counts produced in 2023, the rate per population unit is below where the province sat at the start of the data series.

Table 4.15 sets out the four KZN institutions' SET graduate output for 2015 and 2023 with institutional CAGRs and the gap to national CAGR. UKZN and DUT both lost SET graduate output across the period (UKZN −323 graduates; DUT −205 graduates); MUT and UNIZULU grew (MUT +354 graduates; UNIZULU +196 graduates). UKZN's CAGR of −1.29% per annum sits 2.84 percentage points below national; DUT's CAGR of −0.90% per annum sits 2.45 percentage pointas below national. The KZN total CAGR of 0.03% per annum sits 1.51 percentage points below the national 1.55% per annum. The two technology universities (DUT, MUT) and the comprehensive university (UKZN) are pulling in opposite directions, with the smaller institutions (MUT and UNIZULU) growing whilst the two larger institutions (UKZN, DUT) contracted; the net is approximately zero growth at provincial level.

Table 4.15: KZN institutional SET graduate output and CAGR comparison, 2015 to 2023 academic years

ENTITY	2015 SET GRADS	2023 SET GRADS	ABSOLUTE Δ	CAGR (% P.A.)	VS NATIONAL CAGR (PP)
Durban University of Technology (DUT)	2,934	2,729	−205	−0.90	−2.45
Mangosuthu University of Technology (MUT)	1,388	1,742	+354	+2.88	+1.33
University of KwaZulu-Natal (UKZN)	3,267	2,944	−323	−1.29	−2.84
University of Zululand (UNIZULU)	627	823	+196	+3.46	+1.91
KZN total (4 institutions)	**8,216**	**8,238**	**+22**	**+0.03**	**−1.51**
South Africa (national)	**58,090**	**65,680**	**+7,590**	**+1.55**	**n/a**

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 09 Dimension 8 Section A. Data years are academic years. CAGR is the compound annual growth rate over 2015 to 2023, calculated over 8 intervals. Both endpoints sit either side of the COVID-distorted 2020 to 2021 peak; the CAGR understates both the 2020 to 2021 expansion and the 2022 to 2023 contraction, and should not be read as a smooth trend. The vs national CAGR column reports the institution's CAGR minus the national CAGR; positive values indicate growth above the national benchmark.

KZN SET graduate output was essentially flat over the 2015 to 2023 window at +0.27% against national growth of +13.07%, and the per-capita rate fell 10.1% below 2015: the gap between KZN's 15.6% national share of SET enrolment and its 13.9% share of SET graduates in 2023 sits at 1.7 percentage points, although the same-year comparison conflates 2023 enrolments with 2023 graduates from earlier enrolment cohorts. The 2020 and 2021 graduate peaks reflect deferred completions clearing through the system during the COVID-disrupted years rather than structural pipeline improvement.

Methodology note: cohort-level graduation rates from DHET Statistics on PSET would distinguish throughput weakness from compositional or COVID-deferral effects, and are flagged as a priority data addition for the 2026/27 edition.

4.10 Doctoral SET Enrolment at Public Universities (Indicator 10)

INDICATOR 10

Doctoral SET Enrolment at Public Universities

Three analytical dimensions presented in this section.

DIMENSION A

Provincial scale and rank

Provincial doctoral SET enrolment counts and rank, all nine provinces, 2023.

SHOWN AS
Table 4.16

DIMENSION B

KZN versus national growth

KZN and national doctoral SET enrolment indexed to 2015 = 100, traced 2015 to 2023.

SHOWN AS
Figure 4.10

DIMENSION C

Institutional concentration

Institutional shares and Herfindahl-Hirschman Index for KZN's three doctoral-SET-provding universities.

SHOWN AS
Table 4.17

Doctoral Science, Engineering and Technology (SET) enrolment measures the apex of the formal research training pipeline. Doctoral programmes typically span four to six years, so enrolments in any given year reflect the accumulated stock of researchers in training rather than annual intake alone. KwaZulu-Natal's public-university doctoral SET cohort is hosted across three institutions: the Durban University of Technology (DUT), the University of KwaZulu-Natal (UKZN), and the University of Zululand (UNIZULU). The Mangosuthu University of Technology (MUT) does not run doctoral programmes and is excluded from this indicator. In the 2023 academic year, the three institutions collectively enrolled 1,890 doctoral SET students, ranking the province third nationally. KZN's share of campus-based national doctoral SET enrolment was 16.45% in 2023 (excluding UNISA, the distance-based institution); KZN held rank 3 across the full 2015 to 2023 series.

Table 4.16 sets out the provincial doctoral SET enrolment comparator for the 2023 academic year, with growth measured against the 2015 baseline. Gauteng leads on absolute scale at 4,262 doctoral SET enrolments (37.09% national share excluding UNISA); Western Cape sits second at 3,166 (27.55%); KZN third at 1,890 (16.45%). The leader-to-third gap is 2,372 doctoral SET enrolments, broadly proportional to the equivalent gap at masters level. Over the 2015 to 2023 window KZN posted absolute growth of 25.75%, ahead of Western Cape (+22.48%) but behind Gauteng (+39.92%), Limpopo (+48.43%) and Free State (+71.23%). Eastern Cape is the only province with a non-zero 2015 baseline to contract over the period (−22.62%, from 778 to 602). Mpumalanga began producing doctoral SET enrolments only in 2022 (12 enrolments, rising to 19 in 2023); Northern Cape has zero doctoral SET enrolment across the full series.

Table 4.16: Provincial doctoral SET enrolment comparator, 2023 academic year (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	DOCTORAL SET ENROLMENT	SHARE EXCL. UNISA (%)	Δ VS 2015 (%)	RANK
Eastern Cape	602	5.24	−22.6	6
Free State	613	5.33	+71.2	4
Gauteng	4,262	37.09	+39.9	1
KwaZulu-Natal	**1,890**	**16.45**	**+25.8**	**3**
Limpopo	331	2.88	+48.4	7
Mpumalanga	19	0.17	n/a	8
North West	608	5.29	+8.8	5
Northern Cape	0	0.00	n/a	9
Western Cape	3,166	27.55	+22.5	2
South Africa (national, excl. UNISA)	**11,491**	**100.00**	**+26.9**	**n/a**

Source: DHET HEMIS, compiled from public university institutional submissions; KZN SOI People workbook FINAL, Indicator 10 Dimensions 1, 2 and 6. Data year is the 2023 academic year (1 January to 31 December 2023). UNISA is a distance institution with no meaningful campus-based provincial attribution and is excluded from the provincial comparison; UNISA doctoral SET enrolment in 2023 was 783. National total excluding UNISA in 2023 was 11,491. Δ vs 2015 columns use 2015 as the baseline year; n/a entries reflect provinces with zero doctoral SET enrolment in 2015. Ranks computed across the nine provinces; the national row is excluded from the rank column.

Figure 4.10 indexes KZN and national doctoral SET enrolment to 2015 and traces both series to 2023. KZN out-tracked national from 2016 to 2022, peaking at index 133.5 in 2021 against national 127.8. The 2023 inflection is the most striking feature of the series: KZN slipped to index 125.7 whilst national continued to rise to 128.8, the first year in which the KZN series sits below national across the indexed window. The 2019 to 2023 KZN contraction was 5.6% (from 2,003 to 1,890) versus national that was essentially flat (−0.2%) over the same window. The CAGR over the full 2015 to 2023 window is 2.91% per annum for KZN versus 3.21% per annum nationally, an under-tracking of 0.30 percentage points per annum. The under-tracking at enrolment is modest; the equivalent gap at graduation, which Section 4.11 documents, is more than ten times larger.

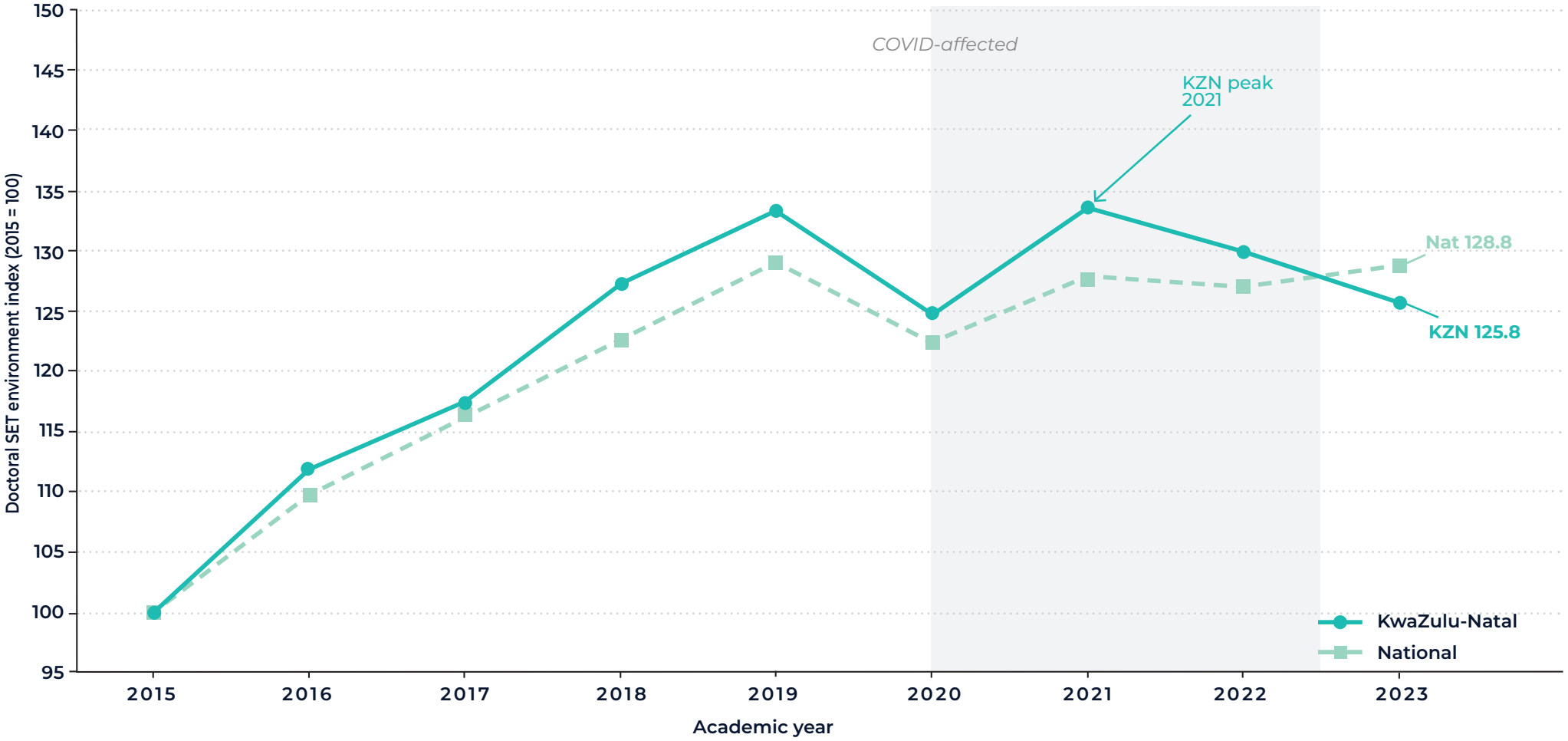

Figure 4.9: KZN and national doctoral SET enrolment indexed to 2015 = 100, 2015 to 2023 academic years

Underlying data for Figure 4.10

YEAR	KZN DOCTORAL SET	NATIONAL DOCTORAL SET (INCL. UNISA)	KZN SHARE (%)	KZN INDEX	NAT. INDEX
2015	1,503	9,532	15.77	100.0	100.0
2016	1,682	10,460	16.08	111.9	109.7
2017	1,765	11,103	15.90	117.4	116.5
2018	1,913	11,678	16.38	127.3	122.5
2019	2,003	12,302	16.28	133.3	129.1
2020	1,876	11,662	16.09	124.8	122.3
2021	2,007	12,179	16.48	133.5	127.8
2022	1,952	12,122	16.10	129.9	127.2
2023	1,890	12,274	15.40	125.8	128.8

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 10 Dimensions 1, 4 and 5. Data years are academic years (1 January to 31 December of each calendar year). National doctoral SET column includes UNISA, consistent with HEMIS-published national totals; the indexed series used in the figure also includes UNISA throughout. KZN share column reports KZN as a share of the incl-UNISA national total. The provincial comparator in Table 4.16 above uses an excl-UNISA national denominator instead, because UNISA has no campus-based provincial attribution; the two share series therefore differ by design. Indices are calculated from raw counts with 2015 as the base year. 2024 data not yet released by DHET at the time of publication.

Table 4.17 sets out institutional shares of KZN doctoral SET enrolment for the three KZN public universities, with the Herfindahl-Hirschman Index (HHI) reported alongside. UKZN dominated KZN doctoral SET in 2015 at 91.55% of the provincial total, with DUT at 6.25% and UNIZULU at 2.20%. By 2023, UKZN's share had fallen to 81.32%, DUT had risen to 14.50%, and UNIZULU had risen to 4.18%. The 2015 to 2023 share movements reflect rapid growth in DUT's small base (94 to 274 doctoral SET enrolments, CAGR 14.3% per annum) and a contraction at UKZN over the second half of the series (1,762 in 2019 to 1,537 in 2023). The HHI fell from 84.25% in 2015 to 68.41% in 2023, a 15.84 percentage-point decline indicating substantial diversification, although the index sits 35.08 percentage points above the 33.33% equal-shares floor for three institutions. Concentration in KZN doctoral SET enrolment is structurally extreme: even after eight years of diversification, more than four in five doctoral SET enrolments are at a single institution.

Table 4.17: KZN institutional shares of provincial doctoral SET enrolment and HHI, 2015 to 2023 academic years

KZN INSTITUTION	2015	2016	2017	2018	2019	2020	2021	2022	2023
DUT	6.25	7.79	6.69	7.32	8.69	10.13	10.71	12.65	14.50
UKZN	91.55	89.54	89.75	88.97	87.97	87.37	86.60	84.07	81.32

KZN INSTITUTION	2015	2016	2017	2018	2019	2020	2021	2022	2023
UNIZULU	2.20	2.68	3.57	3.71	3.34	2.51	2.69	3.28	4.18
HHI (KZN doctoral SET enrolment, %)	***84.25***	***80.85***	***81.12***	***79.83***	***78.25***	***77.42***	***76.21***	***72.38***	***68.41***

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 10 Dimension 7 Sections B and C. Data years are academic years. HHI is reported as a percentage (sum of squared institutional shares, range 0% to 100%); for three KZN institutions the minimum achievable HHI is 33.33% (equal shares). Absolute concentration thresholds are not applied because the three-institution structure constrains the achievable range. DUT = Durban University of Technology; UKZN = University of KwaZulu-Natal; UNIZULU = University of Zululand. MUT does not run doctoral programmes and is excluded from this indicator.

KZN holds rank 3 on doctoral SET enrolment across the full 2015 to 2023 series with a 16.45% national share against a population share of approximately 19%: the rank inversion is structural, although less severe than at masters level. KZN out-tracked national from 2016 to 2022 before slipping below in 2023, and the under-tracking at enrolment is modest at 0.30 percentage points per annum CAGR. UKZN's share of KZN doctoral SET fell from 91.55% to 81.32% over the period as DUT's small base grew rapidly, but the three-institution structure means absolute concentration thresholds do not apply to the KZN doctoral sector.

4.11 Doctoral SET Graduation at Public Universities (Indicator 11)

INDICATOR 11

Doctoral SET Graduation at Public Universities

Three analytical dimensions presented in this section.

DIMENSION A

Provincial scale and rank

Provincial doctoral SET graduate counts and rank, all nine provinces, 2023.

SHOWN AS
Table 4.21

DIMENSION B

UKZN national rank trajectory

UKZN's national rank by doctoral SET graduates traced 2015 to 2023, with annual graduate counts.

SHOWN AS
Figure 4.11

DIMENSION C

Institutional shares and growth

Institutional shares and CAGR of KZN's three doctoral SET institution versus national.

SHOWN AS
Table 4.22

Doctoral SET graduation measures the throughput of the doctoral SET pipeline traced as enrolment in Indicator 10. Doctoral programmes typically span four to six years, so 2023 graduates broadly reflect the 2017 to 2019 enrolment cohorts rather than 2023 enrolments. KwaZulu-Natal's 2023 doctoral SET graduate cohort across DUT, UKZN and UNIZULU was 227, ranking the province third nationally. KZN's share of national campus-based doctoral SET graduates in 2023 was 13.62% excluding UNISA, 2.83 percentage points below the equivalent enrolment share of 16.45%. Net doctoral SET graduate output across the 2015 to 2023 window grew 9.13% for KZN (208 to 227) against national growth of 35.86% excluding UNISA (1,227 to 1,667). The under-tracking against national is sharper at graduation than at any preceding stage of the People pipeline.

Table 4.18 sets out the provincial doctoral SET graduate comparator for the 2023 academic year, with growth measured against the 2015 baseline. Gauteng leads at 594 doctoral SET graduates (35.63% share excluding UNISA); Western Cape sits second at 468 (28.07%); KZN third at 227 (13.62%). KZN's 9.13% growth over the 2015 to 2023 window is the second-lowest among provinces with non-zero 2015 graduates; only Eastern Cape recorded slower growth at 6.86%. Free State (+109.62%), Limpopo (+341.67%) and Gauteng (+49.25%) recorded substantially stronger growth from various base sizes. National growth (excluding UNISA) was +35.86%; KZN under-tracked national by approximately 26.7 percentage points over the nine-year window.

Table 4.18: Provincial doctoral SET graduate comparator, 2023 academic year (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	DOCTORAL SET GRADUATES	SHARE EXCL. UNISA (%)	Δ VS 2015 (%)	RANK
Eastern Cape	109	6.54	+6.9	4
Free State	109	6.54	+109.6	5
Gauteng	594	35.63	+49.3	1
KwaZulu-Natal	**227**	**13.62**	**+9.1**	**3**
Limpopo	53	3.18	+341.7	7
Mpumalanga	0	0.00	n/a	8
North West	107	6.42	+28.9	6
Northern Cape	0	0.00	n/a	9
Western Cape	468	28.07	+25.8	2
South Africa (national, excl. UNISA)	**1,667**	**100.00**	**+35.9**	**n/a**

Source: DHET HEMIS, compiled from public university institutional submissions; KZN SOI People workbook FINAL, Indicator 10 Dimensions 1, 2 and 6. Data year is the 2023 academic year (1 January to 31 December 2023). UNISA is a distance institution with no meaningful campus-based provincial attribution and is excluded from the provincial comparison; UNISA doctoral SET enrolment in 2023 was 783. National total excluding UNISA in 2023 was 11,491. Δ vs 2015 columns use 2015 as the baseline year; n/a entries reflect provinces with zero doctoral SET enrolment in 2015. Ranks computed across the nine provinces; the national row is excluded from the rank column.

Figure 4.11 traces UKZN's national rank by doctoral SET graduates across 2015 to 2023, paired with UKZN's annual graduate counts. UKZN held rank 1 nationally for seven of the nine years in the series (2015 to 2018 and 2020 to 2022), behind only the University of Pretoria in 2019 (rank 2). The 2023 reading is the most distinctive feature: UKZN dropped to rank 4, with UP at rank 1 and 21 graduates ahead. UKZN's annual graduate count peaked at 272 in 2020 and declined sharply to 191 in 2023, a 29.8% decline over three years that brought UKZN within 6 graduates of its 2015 starting level of 185. The pattern is consistent with the 2020 to 2021 graduate peak being a COVID-affected catch-up of deferred completions clearing through the system, with the 2022 to 2023 decline reflecting a smaller residual cohort.

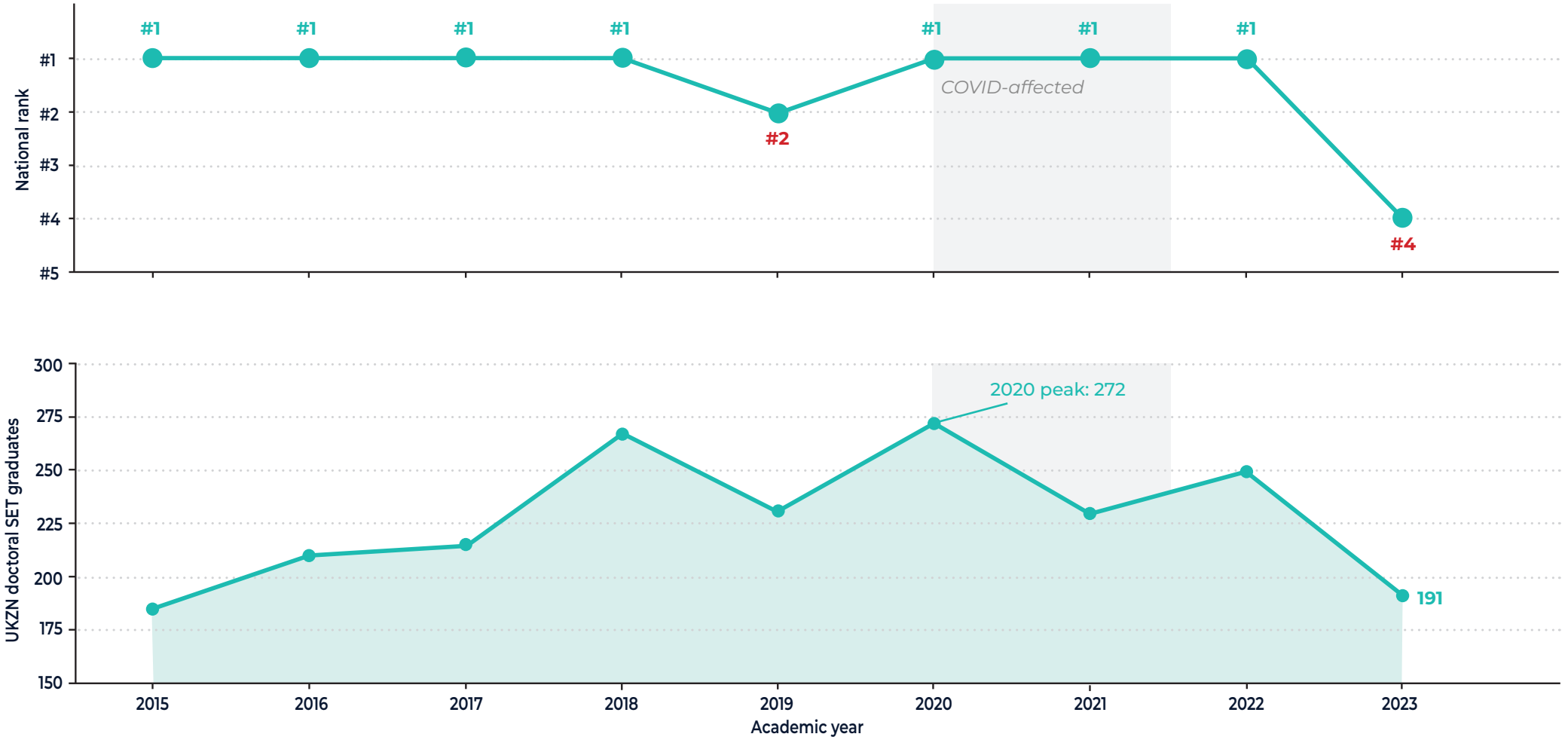

Figure 4.10: UKZN national rank by doctoral SET graduates, 2015 to 2023 academic years

Underlying data for Figure 4.11

YEAR	UKZN DOCTORAL SET GRADS	UKZN NATIONAL RANK	RANK-1 INSTITUTION	RANK-1 GRADS
2015	185	#1	UKZN	185
2016	210	#1	UKZN	210
2017	215	#1	UKZN	215
2018	267	#1	UKZN	267
2019	231	#2	UP	246
2020	272	#1	UKZN	272
2021	230	#1	UKZN	230
2022	249	#1	UKZN	249
2023	191	#4	UP	212

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 11 Dimension 5. Data years are academic years. National rank is computed across all 25 South African public universities reporting doctoral SET graduates in each year. Rank-1 institution column shows the institution holding the largest doctoral SET graduate cohort nationally in that year; rank-1 grads column shows that institution's graduate count. UP = University of Pretoria. The 2020 to 2021 graduate peak across multiple institutions reflects deferred completions clearing through the system during the COVID-disrupted years.

Table 4.19 sets out the three KZN institutions' doctoral SET graduate output for 2015 and 2023 with institutional CAGRs and the gap to national CAGR. UKZN's output rose from 185 to 191 graduates (+6, CAGR 0.40% per annum), DUT from 16 to 24 (+8, CAGR 5.20%), and UNIZULU from 7 to 12 (+5, CAGR 6.97%). The KZN total CAGR of 1.10% per annum sits 3.11 percentage points below the national 4.21% per annum. UKZN's 0.40% CAGR sits 3.81 percentage points below national, the largest gap of any KZN institution. Doctoral graduate counts are inherently volatile at small scale: UNIZULU recorded 2 graduates in 2022 against a series average near 8, a single-year anomaly reflecting cohort timing rather than structural collapse. The CAGR is endpoint-based and unaffected by the 2022 anomaly.

Table 4.19: KZN institutional doctoral SET graduate output and CAGR comparison, 2015 to 2023 academic years

ENTITY	2015 GRADS	2023 GRADS	ABSOLUTE Δ	CAGR (% P.A.)	VS NATIONAL CAGR (PP)
Durban University of Technology (DUT)	16	24	+8	+5.20	+0.99
University of KwaZulu-Natal (UKZN)	185	191	+6	+0.40	−3.81
University of Zululand (UNIZULU)	7	12	+5	+6.97	+2.76
KZN total (3 institutions)	**208**	**227**	**+19**	**+1.10**	**−3.11**
South Africa (national)	**1,263**	**1,757**	**+494**	**+4.21**	**n/a**

Source: DHET HEMIS; KZN SOI People workbook FINAL, Indicator 11 Dimension 8 Section A. Data years are academic years. CAGR is the compound annual growth rate over 2015 to 2023, calculated over 8 intervals. Doctoral graduation counts are volatile at small institutional scale: UNIZULU's 2022 reading of 2 graduates against a series average near 8 is a single-year anomaly. The CAGR is endpoint-based and unaffected by the 2022 reading. The vs national CAGR column reports the institution's CAGR minus the national CAGR; positive values indicate growth above the national benchmark.

KZN doctoral SET graduate output grew 9.13% over the 2015 to 2023 window against national growth of 35.86% excluding UNISA, an under-tracking of 26.7 percentage points: the gap between KZN's 16.45% national share of doctoral SET enrolment and its 13.62% share of doctoral SET graduates in 2023 sits at 2.83 percentage points, although the same-year comparison conflates 2023 enrolments with 2023 graduates from earlier enrolment cohorts. The KZN total CAGR of 1.10% per annum under-tracks national by 3.11 percentage points per annum, more than ten times the equivalent under-tracking at enrolment. UKZN's national rank dropped from rank 1 (held in seven of nine years) to rank 4 in 2023; the institution's 2023 graduate count of 191 sits within 6 graduates of its 2015 starting level after a 29.8% decline from the 2020 peak.

4.12 Key Observations for the People Category

The following highlights key observations from the eleven indicators in the People category. The observations are organised by the three sub-domains of the People pipeline: Secondary School Education, TVET Engineering, and Public University Education. The organising thesis across the eleven indicators is one of conversion failure: KwaZulu-Natal is consistently strong on scale and participation at every entry point of the human-capital pipeline, but the province's share of national output declines at each successive stage of throughput, with the sharpest under-tracking appearing at the doctoral graduation stage.

Secondary School Education

- KwaZulu-Natal recorded the highest provincial NSC pass rate in 2025 at 90.6%, ranking first nationally and sitting 2.6 percentage points above the national average of 88.0%. The province's 2014-to-2025 gain of 20.9 percentage points exceeds the national gain of 12.2 percentage points over the same window.
- KZN's share of the national NSC cohort declined from 26.2% in 2014 to 23.0% in 2025, with 171,368 KZN candidates writing the 2025 NSC out of a national cohort of 746,110.

Methodology note: cohort-level doctoral graduation rates would distinguish throughput weakness from cohort-timing and COVID-deferral effects, and are flagged as a priority data addition for the 2026/27 edition.

- District-level performance dispersion compressed sharply across the 2016 to 2025 period. The standard deviation across the twelve KZN districts declined from 7.31 percentage points in 2016 to 1.91 percentage points in 2025, a 74% reduction in dispersion. The leader-to-lowest spread narrowed from 24.8 percentage points (52.4% Ilembe to 77.2% Amajuba in 2016) to 7.4 percentage points (86.2% Uthukela to 93.6% Umkhanyakude in 2025).
- KZN ranked first nationally on Bachelor pass share in 2025 at 52.0%, the only province above 50% and 5.7 percentage points above the national average of 46.4%. The province also ranked first nationally on distinctions per 1,000 candidates at 633.5, 56% above the national average of 404.8 and 160 distinctions ahead of second-placed Western Cape.
- Mathematics performance crossed above the national average at all three thresholds simultaneously in 2025 for the first time in the paired series, with KZN ranking fourth at the ≥30% threshold (65.78%), third at ≥40% (43.99%), and third at ≥50% (26.15%). Western Cape leads at all three thresholds; the KZN-to-Western Cape gap at the ≥50% threshold sits at 12.80 percentage points.
- Physical Sciences performance ranked fourth at the ≥30% threshold (77.91%), second at ≥40% (51.90%), and third at ≥50% (29.72%). The ≥50% pass rate has plateaued in a 28% to 33% band since 2018, suggesting a structural ceiling at the higher-order skills threshold relevant to STEM university admission.
- Business Studies, a new addition to the indicator set in the 2025/26 edition, ranked KZN fourth at the ≥30% threshold (89.43%) and third at the ≥40% threshold (71.99%). KZN's Business Studies participation share was 37.97%, the third-highest nationally.

TVET Engineering Pipeline

- KZN ranked second nationally on N3 Engineering Studies registrations in 2023 at 5,087 candidates (23.08% of the national total) and second on N6 Engineering Studies registrations at 1,731 candidates (20.57% national share).
- N3 completion rates ranked KZN eighth of nine provinces at 44.91%, sitting 5.90 percentage points below the national rate of 50.81%. N6 completion rates ranked KZN sixth of nine at 43.96%.
- The N3 completion deficit decomposes asymmetrically: KZN's pre-exam loss rate of 20.4% sits 11.5 percentage points below the national rate of 31.9%, but KZN's exam failure rate of 55.1% sits 5.9 percentage points above the national 49.2%. The completion deficit at N3 is therefore exam-failure-driven rather than registration-to-examination attrition. At N6 the offset is exact: KZN's lower pre-exam loss is fully cancelled by KZN's exam-failure rate matching national.

Public University Education

- KZN's 2023 SET enrolment at public universities was 43,713, ranking the province third nationally at 15.60% of campus-based national SET enrolment (excluding UNISA), against an estimated population share of approximately 19%. KZN held rank 3 across the full 2015 to 2023 series.
- KZN's SET enrolment CAGR over 2015 to 2023 was 0.53% per annum versus 1.00% per annum nationally, an under-tracking of 0.46 percentage points per annum that masks the mid-period contraction. KZN's 2019-to-2023 contraction of 8.0% was approximately 6.5 times the national contraction of 1.2% over the equivalent window.
- KZN's 2023 SET graduate count was 8,238, ranking third nationally at 13.89% national share (excluding UNISA), 1.71 percentage points below the equivalent enrolment share. SET graduates per 100,000 KZN population fell 10.1% below the 2015 baseline (76.79 to 69.01), reflecting both flat absolute graduate counts and an 11.6% population growth over the period. (Same-year shares; cohort-level throughput data not currently published.)
- KZN's doctoral SET enrolment in 2023 was 1,890, ranking third nationally at 16.45% national share. The CAGR under-tracking against national was 0.30 percentage points per annum at the doctoral enrolment stage, the smallest under-tracking gap across the post-school indicators.
- Institutional concentration at the doctoral stage is structurally extreme. UKZN held 81.32% of KZN doctoral SET enrolment in 2023, with the Herfindahl-Hirschman Index of 68.41% sitting 35.08 percentage points above the equal-shares floor of 33.33% for three institutions. UKZN held national rank 1 on doctoral SET graduate output in seven of the nine years between 2015 and 2023, before dropping to rank 4 in 2023.

4.13 Implications for Innovation in KwaZulu-Natal

The People category indicators describe a provincial human-capital pipeline that is strong at the entry stage and weakens systematically as candidates progress through it. The implications below trace the conversion failure thesis to its consequences for the regional innovation system, distinguishing positive signals that an innovation policy response should consolidate from negative signals where the response should target the throughput mechanisms identified in the indicator data.

Strong entry, weak conversion

The 2025 NSC results give KwaZulu-Natal a top-ranked Bachelor-qualified school-leaver cohort, with 52.0% of KZN candidates achieving Bachelor pass and 633.5 distinctions per 1,000 candidates. Both metrics are first nationally. The pool of school-leavers eligible for direct university admission is therefore proportionately larger in KZN than in any other province in 2025. The post-school indicators document what happens to that pool: KZN's share of national SET enrolment in 2023 was 15.60%, its share of SET graduates was 13.89%, and its share of doctoral SET graduates was

13.62%. The proportional advantage at school-leaving stage is not visible at any post-school stage. The implication is that the binding constraint on KZN's contribution to the national knowledge economy sits in the transition from school to post-school study and in the throughput of post-school institutions, rather than in the secondary school system itself.

Throughput, not enrolment, is the doctoral stage problem

The under-tracking of national CAGR at the doctoral SET enrolment stage is modest at 0.30 percentage points per annum. The under-tracking at the doctoral SET graduation stage is 3.11 percentage points per annum, more than an order of magnitude larger. Doctoral programmes typically span four to six years, so 2023 graduates broadly reflect the 2017 to 2019 enrolment cohorts: the throughput weakness is therefore not attributable to recent enrolment flows but to completion rates within KZN doctoral programmes over the past decade. Cohort-level graduation rates from DHET Statistics on PSET would distinguish throughput weakness from compositional or COVID-deferral effects, and have been flagged as a priority data addition for the 2026/27 edition. In the interim, the policy implication is that targeted support for in-programme doctoral completion (supervisor capacity, candidate funding continuity, completion-time interventions) carries a higher expected return than additional enrolment expansion at the doctoral stage.

TVET completion deficit is exam-failure-driven

The N3 completion deficit between KZN and national in 2023 is 5.90 percentage points, decomposing into a pre-exam loss rate that is 11.5 percentage points better than national and an exam failure rate that is 5.9 percentage points worse than national. KZN therefore retains a higher share of registered N3 candidates through to the examination than the national average, but a smaller share of those who write the examination achieve the completion threshold. The implication is that intervention at the registration-to-examination retention stage carries less effect on completion outcomes than intervention at examination preparation and curriculum delivery. The decomposition does not identify the underlying mechanism uniquely; a curriculum or examination-preparation gap is one explanation consistent with the data, but other factors (invigilation conditions, marker calibration, candidate composition) cannot be ruled out from this analysis. A targeted analytical study into the N3 examination-failure mechanism is therefore a candidate for further work that would tighten the policy implication.

Institutional concentration and pipeline resilience

KZN doctoral SET enrolment is concentrated at UKZN to a degree that the three-institution structure of the KZN doctoral sector cannot fully diversify: even at the modest n=3 floor of 33.33%, the 2023 HHI of 68.41% sits 35.08 percentage points above the achievable floor. UKZN's 2023 graduate count contraction (272 in 2020 to 191 in 2023) and the corresponding fall from rank 1 nationally to rank 4 in a single year illustrates the resilience cost of this concentration: provincial doctoral SET output is structurally exposed to single-institution shocks. The implication is twofold. First, DUT and UNIZULU's doctoral SET capacity is a strategic asset for provincial pipeline resilience, and the rapid growth at DUT (94 to 274 enrolments, CAGR 14.3% per annum) is a positive signal that warrants continued support. Second, the KZN provincial innovation strategy should treat UKZN's research-throughput stability as a system-level dependency rather than an institutional matter, with the 2023 reading underscoring the case for a co-ordinated provincial response to research-pipeline volatility.

Mathematics participation as a structural ceiling

KZN's 2025 Mathematics performance crossed above the national average at all three thresholds simultaneously for the first time in the paired series. The crossover, however, was driven primarily by a national pullback rather than a KZN gain: the national ≥30% pass rate declined from 69.1% to 64.0% between 2024 and 2025, a 5.1 percentage-point fall, against a smaller KZN decline of 3.0 percentage points. The relative position change therefore overstates absolute progress. A more durable structural constraint sits in Mathematics participation: just over a third of KZN candidates write Mathematics rather than Mathematical Literacy, capping the absolute pool of STEM-qualified school leavers. The Physical Sciences ≥50% pass rate plateau in the 28% to 33% band since 2018 reinforces the same ceiling at the higher-order skills threshold relevant to STEM university admission. The implication is that increasing the absolute pipeline of STEM-eligible school leavers from KZN requires expansion of Mathematics participation, not just performance improvement among existing Mathematics candidates.

A consolidating positive signal: district convergence

The 74% compression in district NSC pass-rate dispersion between 2016 and 2025 is the strongest positive structural signal in the People category. All twelve KZN districts now perform within a 7.4 percentage-point band, against a 24.8 percentage-point band in 2016. The convergence is attributable to substantial pass-rate improvements in previously-lagging districts rather than performance declines among district leaders. From an innovation-system perspective, district convergence widens the geographic catchment from which KZN draws its NSC-qualified school leavers, reducing the structural dependence of post-school enrolment on a small number of high-performing districts. This represents a mature foundation for the post-school throughput improvements that the doctoral and TVET observations identify as priority intervention areas.

5.
INFRASTRUCTURE

The Infrastructure category examines the physical and digital foundations on which KwaZulu-Natal's innovation ecosystem depends. The 2025/26 edition draws on data from the DBE's Education Facility Management System (EFMS) and National Education Infrastructure Management System (NEIMS), Stats SA's General Household Survey (GHS), and the Independent Communications Authority of South Africa (ICASA) State of ICT Sector reports. Seven indicators are active for the period (Indicator 12 to Indicator 18), spanning school infrastructure (electricity, library, laboratory and computer centre provision) and digital infrastructure (household internet, mobile network coverage and LTE device adoption).

School internet connectivity for teaching and learning, which was reported as a separate Infrastructure indicator in earlier editions of this publication, has been removed from the 2025/26 edition. The August 2025 EFMS report no longer publishes the school-level connectivity field that was the source of the prior series, and no comparable provincial alternative was available.

5.1 School Electricity Access (Indicator 12)

INDICATOR 12

School Electricity Access

Three analytical dimensions presented in this section.

DIMENSION A

Provincial off-grid share

All nine provinces compared on the proportion of school not connected to the grid, 2024 sites.

A

SHOWN AS
Table 5.1

DIMENSION B

KZN supply-type composition

Solar and generator capacity reported within the KZN school population, expressed as a share of provincial sites.

B

SHOWN AS
Figure 5.1

DIMENSION C

Geographic concentration

Eastern Cape and KwaZulu-Natal share of all off-grid schools nationally, set against their share of the school population.

C

SHOWN AS
Inline narrative

EFMS reports 100% formal electrification across all public ordinary schools in KwaZulu-Natal in 2025, with 5,753 schools recorded as having an electricity supply in the August 2025 release. The same threshold is reported across all nine provinces. The headline measure does not, however, distinguish between grid-connected supply and off-grid arrangements that may rely on solar installations or generators, and the more informative comparison sits in the type of supply available.

Drawing on the EFMS source-type extract on the 2024 sites cross-section of 5,790 schools, KwaZulu-Natal records 434 schools (7.5%) that are not connected to the grid. The province ranks second nationally on off-grid share, narrowly behind the Eastern Cape at 7.6% (381 of 5,016 schools), and 3.1 percentage points above the national average of 4.4%. Within KZN's school sites, 440 schools (7.6%) report solar installations and 203 (3.5%) report generator capacity, with the source disclosure noting that one site may report more than one source type. The provincial concentration is striking: Eastern Cape and KwaZulu-Natal between them account for 815 of the 993 off-grid schools nationally (82%), against a combined share of 48% of the national school count in the 2024 cross-section. Table 5.1 sets out the source-type composition by province for the 2024 sites snapshot, sorted by off-grid share.

Table 5.1: Electricity source type by province, 2024 sites snapshot (sorted by off-grid share)

PROVINCE	SCHOOLS (SITES)	GRID-CONNECTED	NOT GRID-CONNECTED	OFF-GRID (%)	SOLAR (%)	GENERATOR (%)	RANK (OFF-GRID)
Eastern Cape	5,016	4,635	381	7.6%	11.8%	4.5%	1
KwaZulu-Natal	**5,790**	**5,356**	**434**	**7.5%**	**7.6%**	**3.5%**	**2**
Northern Cape	543	525	18	3.3%	2.8%	2.0%	3
Limpopo	**3,622**	**3,504**	**118**	**3.3%**	**6.3%**	**2.7%**	**4**
North West	1,443	1,421	22	1.5%	0.3%	4.3%	5
Mpumalanga	1,632	1,614	18	1.1%	0.4%	9.6%	6
Gauteng	2,061	2,059	2	0.1%	0.3%	0.1%	7
Free State	937	937	0	0.0%	1.1%	3.7%	8
Western Cape	1,467	1,467	0	0.0%	0.1%	0.3%	9
South Africa (national)	**22,511**	**21,518**	**993**	**4.4%**	**5.8%**	**3.5%**	**n/a**

Source: DBE EFMS source-type extract (2024 sites denominator); KZN SOI Infrastructure workbook FINAL, Indicator 12 Dimensions B and C. Off-grid share calculated as (sites − grid-connected) ÷ sites. Solar and generator percentages reflect schools reporting that source type; a school may report more than one type, so solar and generator do not sum with grid to 100%. EFMS source-type counts are subject to under-capture for solar and generator installations not formally registered with the provincial education infrastructure system. National solar % is computed as 1,301 ÷ 22,511 = 5.8%; national generator % as 798 ÷ 22,511 = 3.5%. Rank computed across the nine provinces; the national row is excluded from rank calculations

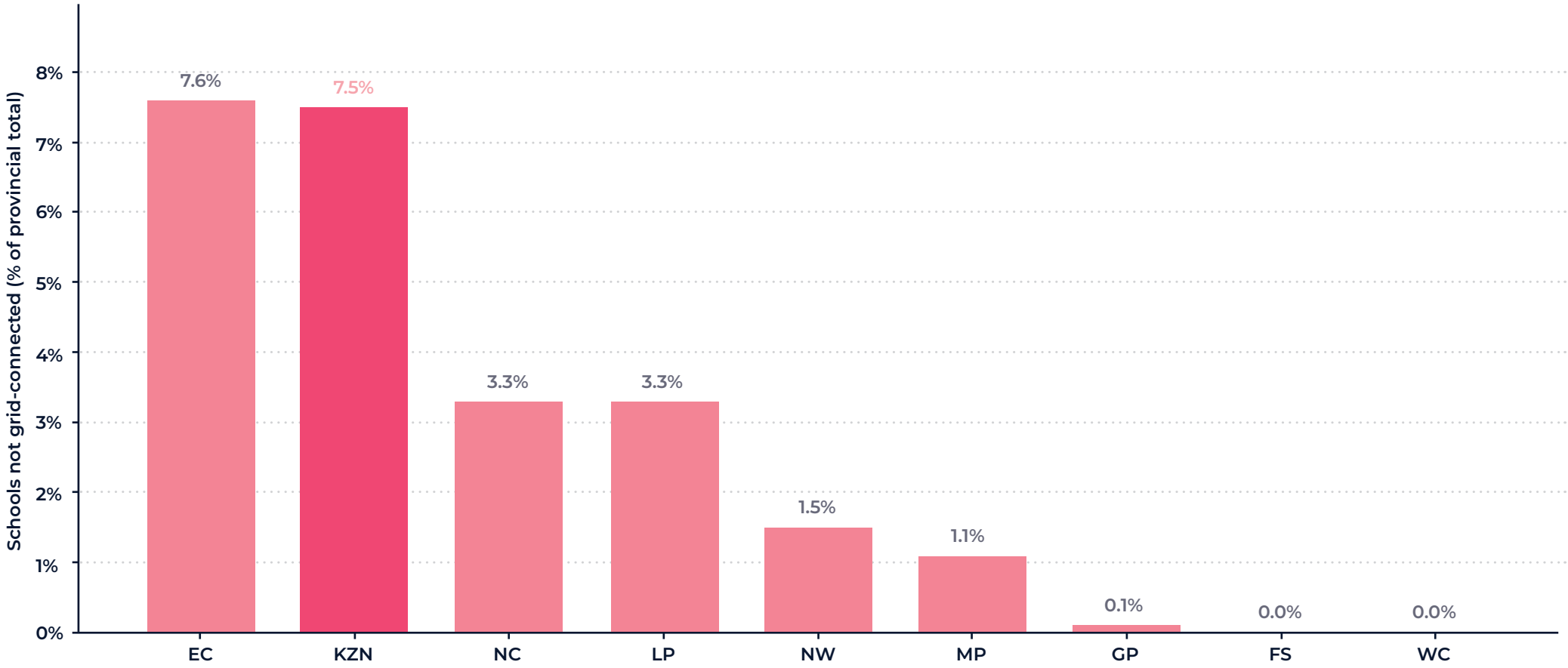

Figure 5.1: Schools not grid-connected by province (% of provincial schools total, 2024 sites snapshot)

Source: DBE EFMS source-type extract (2024 sites denominator); KZN SOI Infrastructure workbook v27, Indicator 12 Dimension C.

Reframing the electricity picture from a binary connected-or-not measure to one that distinguishes grid from off-grid supply is the more informative reading. Schools that lack grid connection rely on capital-intensive alternatives that carry recurring fuel and maintenance costs and that often supply only part of the school's electrical load. The geographic concentration of off-grid provision in Eastern Cape and KwaZulu-Natal is consistent with the rural and dispersed-settlement profile of both provinces, particularly in their inland districts. The reported solar and generator counts should be read as lower-bound estimates: per the EFMS source footnote, schools have been installing alternative supply, including UPS systems, that has not yet been captured in the national infrastructure system. Reliability data, including frequency of power interruptions and backup capacity, remains outside the EFMS reporting scope and is not reflected in this indicator.

5.2 School Library Access (Indicator 13)

INDICATOR 13

School Library Access

Three analytical dimensions presented in this section.

DIMENSION A

Provincial comparator

All nine provinces compared on share of schools with a library, 2024, with absolute with-library and without-library counts.

A

SHOWN AS
Table 5.2

DIMENSION B

KZN versus national

KZN and national library access rates traced across the 2019 to 2024 comparable series.

B

SHOWN AS
Figure 5.2

DIMENSION C

Library stocking ration

KZN stocked-library count as a share of total libraries, 2021 to 2024, against the national trend.

C

SHOWN AS
Inline narrative

School library access in KwaZulu-Natal sat at 26.1% in 2024, marginally above the national average of 26.0% but well below the levels observed in Free State (68.8%), Gauteng (68.1%) and Western Cape (55.6%). Of the province's 5,790 public ordinary schools in 2024, 1,509 had a library and 4,281 did not. KZN ranked fourth of nine provinces on this measure.

The 2024 figure is treated as the headline year for cross-provincial comparison because the EFMS August 2025 publication introduces a definitional change that breaks comparability with the prior series. The 2025 release includes corner libraries and community libraries that had been excluded in earlier years. The resulting KZN figure of 67.1% (3,858 schools) cannot be reconciled with the 2019 to 2024 series and is noted here for context only, not included in the trajectory analysis. Table 5.2 presents the comparable 2019 to 2024 series with 2024 absolute counts.

Table 5.2: School library access by province, 2019 to 2024 (sorted by 2024 share)

PROVINCE	2019 (%)	2021 (%)	2023 (%)	2024 (%)	2024 WITH LIBRARY	2024 WITHOUT	RANK (2024)
Free State	38.7%	39.5%	67.7%	68.8%	645	292	1
Gauteng	60.8%	63.3%	67.9%	68.1%	1,403	658	2
Western Cape	51.9%	54.9%	55.1%	55.6%	816	651	3
KwaZulu-Natal	**23.1%**	**24.3%**	**25.9%**	**26.1%**	**1,509**	**4,281**	**4**
North West	40.1%	24.5%	25.0%	25.2%	364	1,079	5

PROVINCE	2019 (%)	2021 (%)	2023 (%)	2024 (%)	2024 WITH LIBRARY	2024 WITHOUT	RANK (2024)
Mpumalanga	38.1%	19.6%	20.6%	20.9%	341	1,291	6
Northern Cape	29.2%	34.2%	19.6%	19.7%	107	436	7
Limpopo	14.3%	6.7%	8.6%	8.7%	314	3,308	8
Eastern Cape	6.3%	6.7%	7.0%	7.3%	364	4,652	9
South Africa (national)	**26.0%**	**23.4%**	**25.8%**	**26.0%**	**5,863**	**16,648**	**n/a**

Source: DBE EFMS/NEIMS, 2019, 2021, 2023, 2024 publications; KZN SOI Infrastructure workbook FINAL, Indicator 13 Dimensions A and B. National 2019 and 2023 with-library figures use provincial sums (6,052 and 5,820 respectively) following confirmed national-total discrepancies in the published EFMS reports. The 2025 EFMS publication reflects a confirmed definitional change (inclusion of corner and community libraries previously excluded) and is not comparable with the 2019 to 2024 series. Rank computed across the nine provinces.

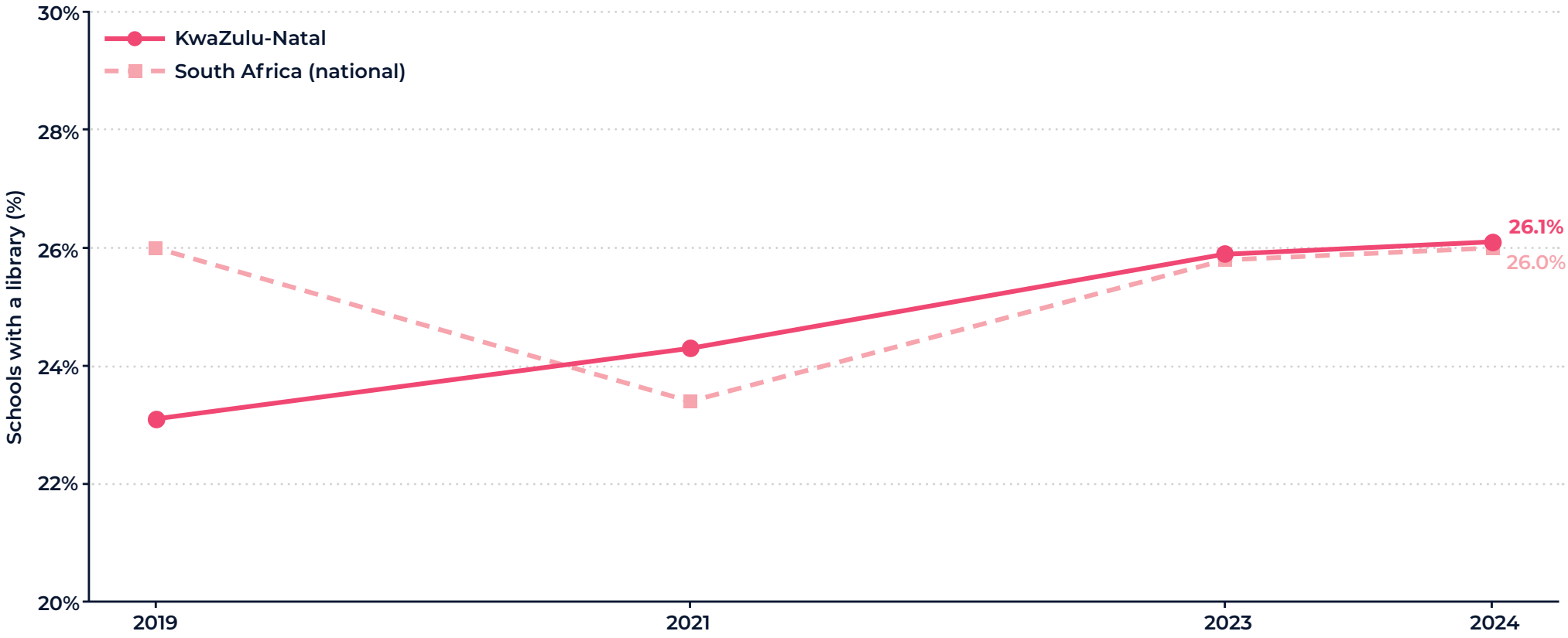

Figure 5.2: School library access, KwaZulu-Natal versus national average, 2019 to 2024

Source: DBE EFMS/NEIMS, 2019, 2021, 2023, 2024; KZN SOI Infrastructure workbook FINAL, Indicator 13 Dimensions A and B.

Of the 1,509 KZN schools with a library, 995 (65.9%) held a stocked collection in 2024. The stocking rate has eased modestly from 71.4% in 2021 (1,005 of 1,408 libraries stocked), consistent with a broader national downward trend over the same period. The library indicator suggests that KZN's challenge is less the loss of existing infrastructure than the pace of new provision relative to a large school base. With three-quarters of KZN schools without a library, the absolute gap of 4,281 schools is the second largest in the country, behind only the Eastern Cape's 4,652.

5.3 School Laboratory Access (Indicator 14)

INDICATOR 14

School Laboratory Access

Three analytical dimensions presented in this section.

DIMENSION A

Provincial comparator

All nine provinces compared on laboratory access, 2024, with three anomaly-flagged provinces excluded from rank.

A

SHOWN AS
Table 5.3

DIMENSION B

KZN longitudinal trajectory

KZN laboratory access traced from 2019 to 2024, with sub-period commentary on where the improvement was concentrated.

B

SHOWN AS
Inline narrative

DIMENSION C

Anomaly diagnostic

Free State, Gauteng and Northern Cape year-on-year shifts inconsistent with school construction patterns.

C

SHOWN AS
Table 5.3

Laboratory access in KwaZulu-Natal has improved from a low base. The province moved from 11.5% in 2019 to 13.5% in 2024, the equivalent of approximately 782 schools, representing a compound annual growth rate of 3.3% over the five-year window. The improvement was concentrated in the 2021 to 2023 sub-period (11.5% to 13.4%); the rate was unchanged between 2019 and 2021 and essentially flat between 2023 and 2024. Among the six provinces with reliable comparable data, KZN ranks second on laboratory access in 2024, behind Western Cape (35.5%) and ahead of Mpumalanga (13.3%), North West (12.8%), Eastern Cape (7.4%) and Limpopo (6.3%).

The national picture for laboratory access is complicated by confirmed data anomalies in three provinces. Free State, Gauteng and Northern Cape report year-on-year shifts that are inconsistent with school construction patterns and that likely reflect EFMS reporting or classification changes rather than real infrastructure changes. The largest of these is Gauteng's 2019 to 2021 shift from 6.1% to 33.5% (a 449% relative increase). Free State moved from 30.3% in 2021 to 70.8% in 2023 (a 134% increase), and Northern Cape dropped from 23.7% in 2021 to 10.3% in 2023 (a 57% decrease). These three provinces are flagged in Table 5.3 and are not included in the rank calculation.

Table 5.3: School laboratory access by province, 2019 to 2024 (sorted by 2024 share, anomaly-flagged provinces excluded from rank)

PROVINCE	2019 (%)	2021 (%)	2023 (%)	2024 (%)	2024 SCHOOLS (APPROX.)	RANK (2024)
Western Cape	33.7%	34.7%	34.8%	35.5%	521	1
KwaZulu-Natal	**11.5%**	**11.5%**	**13.4%**	**13.5%**	**782**	**2**
Mpumalanga	12.4%	12.5%	13.0%	13.3%	217	3
North West	20.1%	20.3%	12.6%	12.8%	185	4
Eastern Cape	7.1%	7.0%	7.3%	7.4%	371	5
Limpopo	6.0%	6.1%	6.2%	6.3%	228	6
Free State*	30.2%	30.3%	70.8%	71.8%	673	n/a
Gauteng*	6.1%	33.5%	44.8%	45.0%	928	n/a
Northern Cape*	23.2%	23.7%	10.3%	10.3%	56	n/a

*Source: DBE EFMS/NEIMS, 2019, 2021, 2023, 2024; KZN SOI Infrastructure workbook FINAL, Indicator 14 Dimensions A and B. * Provinces with confirmed year-on-year data anomalies (FS, GP, NC) reflect likely EFMS reporting or classification changes rather than real infrastructure changes and are excluded from the rank calculation. 2024 school counts are approximate, derived as percentage × provincial school sites; the EFMS 2025 absolute supplement records a KZN total of 1,999 schools (34.7%) under an expanded definitional scope, not comparable with the 2019 to 2024 series.*

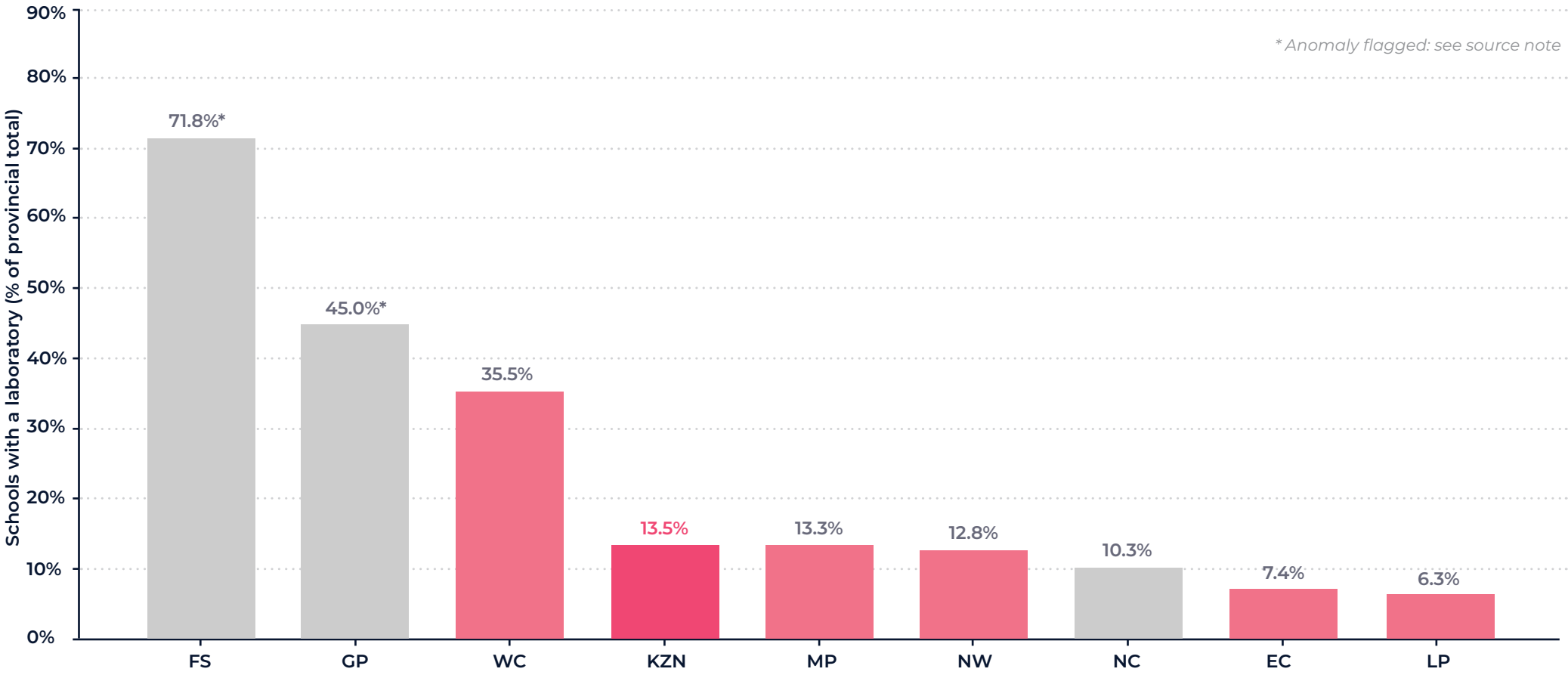

Figure 5.3: School laboratory access by province, 2024 (anomaly-flagged provinces shaded grey)

Source: DBE EFMS/NEIMS, 2024; KZN SOI Infrastructure workbook FINAL, Indicator 14 Dimension A. Free State, Gauteng and Northern Cape are flagged for confirmed year-on-year anomalies.

Of the four school infrastructure components covered in this category, laboratories are the most directly relevant to the science and technology pipeline that feeds Mathematics and Physical Sciences NSC achievement. KZN's 13.5% provision rate sits 22.0 percentage points below the leading Western Cape rate of 35.5%, leaving 86.5% of the province's public ordinary schools without dedicated laboratory infrastructure. The supplementary EFMS 2025 figure of 34.7% under an expanded definition shifts the headline upward but does not resolve the underlying scale gap: under either definition, the majority of KZN public ordinary schools do not have a dedicated laboratory facility.

5.4 School Computer Centres (Indicator 15)

INDICATOR 15

School Computer Centres

Three analytical dimensions presented in this section.

DIMENSION A

Provincial comparator

All nine provinces compared on share of schools with a computer centre, 2024, with sites-weighted national average.

A

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Table 5.4

DIMENSION B

KZN versus comparators

KZN traced against Gauteng, Western Cape and Limpopo across the 2019 to 2024 comparable series.

B

SHOWN AS
Figure 5.4

DIMENSION C

Trajectory and school base

KZN computer centre rate over 2019 to 2024, set against the essentially flat KZN school population over the same window.

C

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Inline narrative

Access to computer centres is the most directly relevant school infrastructure indicator for the development of digital skills at school level. In KwaZulu-Natal, 34.9% of schools had a computer centre in 2024 (2,021 schools), a marginal decline from 36.5% in 2019. The weighted national average sat at 34.1% in 2024, placing KZN 0.8 percentage points above the national level and ranked fifth of nine provinces. Gauteng leads at 81.9%, followed by Free State at 71.0% and Western Cape at 61.1%.

As with the library indicator, the EFMS August 2025 publication reflects a definitional change that breaks comparability with prior years. The 2025 KZN figure of 60.7% (3,494 schools) reflects expanded scope and is not directly comparable with the 2019 to 2024 series. The 2019 to 2024 series shown in Table 5.4 remains the basis for trajectory analysis.

Table 5.4: School computer centre access by province, 2019 to 2024 (sorted by 2024 share)

PROVINCE	2019 (%)	2021 (%)	2023 (%)	2024 (%)	2024 SCHOOLS (APPROX.)	RANK (2024)
Gauteng	80.9%	80.1%	81.7%	81.9%	1,688	1
Free State	49.3%	39.8%	69.8%	71.0%	665	2
Western Cape	65.8%	60.5%	60.6%	61.1%	896	3
North West	41.6%	45.3%	38.0%	38.3%	553	4
KwaZulu-Natal	**36.5%**	**33.4%**	**35.0%**	**34.9%**	**2,021**	**5**
Mpumalanga	43.0%	38.2%	33.3%	33.8%	552	6
Northern Cape	21.2%	52.9%	18.3%	18.4%	100	7
Limpopo	16.2%	15.0%	16.9%	17.1%	619	8
Eastern Cape	12.5%	10.9%	11.4%	11.6%	582	9
South Africa (national, weighted)	**n/a**	**n/a**	**n/a**	**34.1%**	**7,676**	**n/a**

Source: DBE EFMS/NEIMS, 2019, 2021, 2023, 2024; KZN SOI Infrastructure workbook FINAL, Indicator 15 Dimensions A and B. The 2025 EFMS publication reflects a confirmed definitional change (KZN 2025 figure of 60.7%, 3,494 schools, under expanded scope) and is not comparable with the 2019 to 2024 series. National row is a sites-weighted average computed across the nine provinces. Rank computed across the nine provinces.

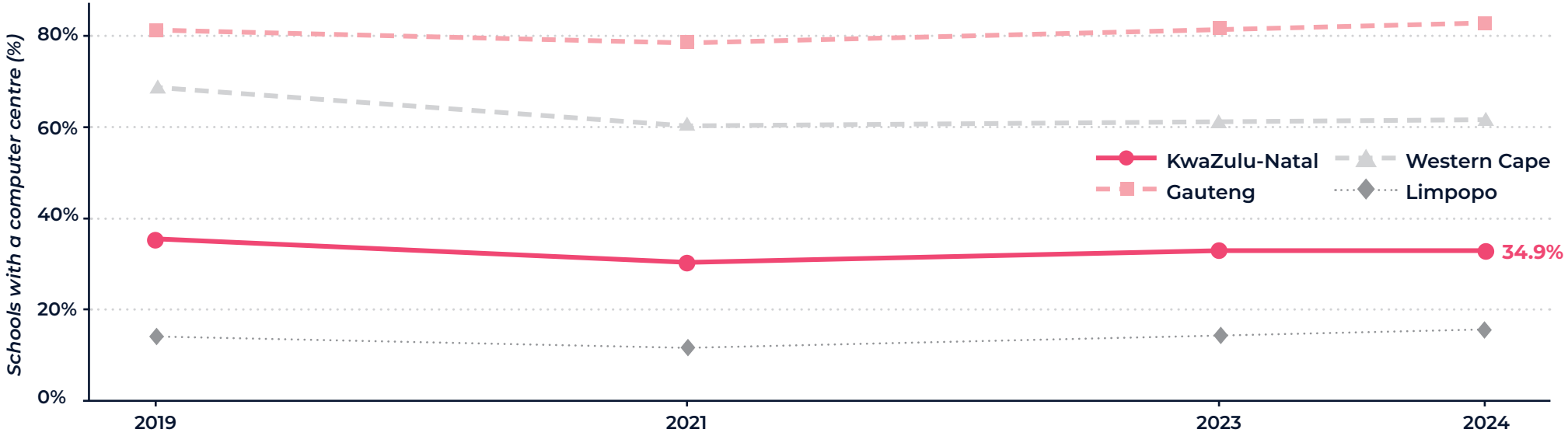

Figure 5.4: School computer centre access, KwaZulu-Natal versus comparator provinces, 2019 to 2024

Source: DBE EFMS/NEIMS, 2019, 2021, 2023, 2024; KZN SOI Infrastructure workbook FINAL, Indicator 15 Dimension A. Comparator provinces selected to illustrate the upper, middle and lower bands of provincial provision.

The KZN computer centre rate fell from 36.5% in 2019 to 34.9% in 2024, a 1.6 percentage point decline. Year-on-year shifts of this order should be read directionally given known volatility in the EFMS administrative dataset for other provinces. Across the same window the school base in KZN held essentially flat (5,803 sites in 2019, 5,790 in 2024), so the decline in the rate cannot be explained by a growing denominator. The 2,021 schools with a computer centre in 2024 represent a measurable provincial digital footprint, whilst the 3,769 schools without a centre represent the dominant pattern across KZN's public ordinary school sites.

5.5 Household Internet Access (Indicator 16)

INDICATOR 16

Household Internet Access

Three analytical dimensions presented in this section.

DIMENSION A	DIMENSION B	DIMENSION C
Provincial comparator	**Access type composition**	**Settlement-type breakdown**
All nine provinces compared on internet access by channel, GHS 2024.	KZN versus national breakdown across mobile, fixed-line, work, public Wi-Fi and other channels.	KZN access disaggregated by metropolitan, urban and rural settlement, with the rural fixed-line gap as anchor.
SHOWN AS **Table 5.5**	SHOWN AS **Figure 5.5**	SHOWN AS **Inline narrative**

Household internet access in KwaZulu-Natal sat at 84.2% in 2024, 2.1 percentage points above the national average of 82.1% and ranking third nationally behind Western Cape (92.0%) and Gauteng (86.0%). Within that headline figure, the access channels diverge sharply. KZN leads all provinces on mobile internet access at 80.0%, marginally ahead of Western Cape (79.5%) and Mpumalanga (77.9%). On fixed-line internet at home, the position reverses: KZN sits at 7.5% in 2024, ranking sixth of nine provinces (joint with North West). The provincial fixed-line rate sits 9.9 percentage points below the national average of 17.4%, with Western Cape leading at 44.9% and Gauteng at 25.8%.

Two further channels merit attention. Library-based internet access in KZN sits at 3.3%, ranking second nationally behind Western Cape's 5.0% and 1.4 percentage points above the national average of 1.9%. Internet at work, however, fell sharply between GHS 2023 and GHS 2024: from 16.9% to 5.9%, a year-on-year decline of 11.0 percentage points that places KZN eighth of nine provinces and well below the national average of 12.1%. The magnitude and speed of this drop is unusual against KZN's longitudinal series and against neighbouring provinces' trajectories. The result is reported as published, with the caveat that the underlying Stats SA microdata has not yet been independently reviewed for the 2024 GHS round. Table 5.5 sets out internet access by channel for all nine provinces.

Table 5.5: Household internet access by channel and province, GHS 2024 (sorted by any-access share)

PROVINCE	MOBILE (%)	FIXED AT HOME (%)	AT WORK (%)	PUBLIC WI-FI (%)	INTERNET CAFE (%)	EDUCATIONAL FAC. (%)	LIBRARY (%)	ANY ACCESS (%)	RANK (ANY)
Western Cape	79.5%	44.9%	21.7%	12.9%	8.8%	8.6%	5.0%	92.0%	1
Gauteng	75.7%	25.8%	18.9%	10.0%	8.5%	5.6%	1.1%	86.0%	2
KwaZulu-Natal	**80.0%**	**7.5%**	**5.9%**	**5.5%**	**1.6%**	**1.8%**	**3.3%**	**84.2%**	**3**
Mpumalanga	77.9%	5.6%	6.6%	5.3%	7.3%	1.6%	0.5%	80.2%	4
KwaZulu-Natal	80.0%	7.5%	5.9%	5.5%	1.6%	1.8%	3.3%	84.2%	3
Limpopo	74.4%	7.0%	4.5%	1.4%	0.8%	1.1%	0.5%	76.9%	6
North West	73.2%	7.5%	7.1%	5.4%	2.9%	3.5%	1.7%	75.0%	7
Eastern Cape	68.0%	8.0%	8.6%	1.7%	3.1%	2.4%	0.4%	70.7%	8
Northern Cape	65.3%	11.1%	9.1%	10.5%	0.4%	0.6%	0.1%	70.3%	9
South Africa (national)	**75.6%**	**17.4%**	**12.1%**	**7.0%**	**5.2%**	**4.0%**	**1.9%**	**82.1%**	**n/a**

Source: Stats SA General Household Survey 2024 (extracted via ICASA State of ICT Sector Report, March 2026); KZN SOI Infrastructure workbook FINAL, Indicator 16 Dimension A. Channels are reported separately and may overlap; a household reporting more than one channel will appear in each. The KZN GHS 2024 'at work' value (5.9%) represents an 11.0 percentage point year-on-year decline from GHS 2023 (16.9%) and is reported as published pending Stats SA microdata review. Rank computed across the nine provinces on the any-access measure; the national row is excluded from rank calculations.

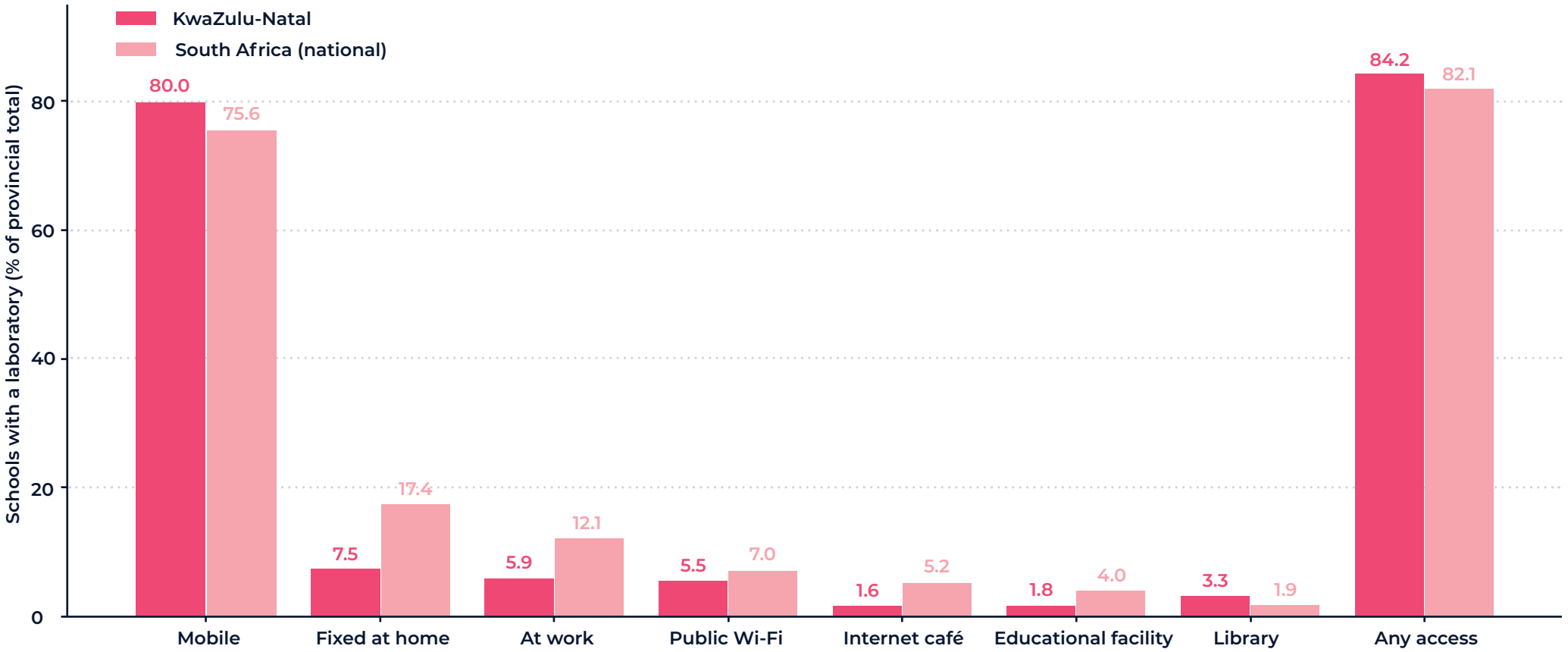

Figure 5.5: Household internet access by channel, KwaZulu-Natal versus national, GHS 2024

Source: Stats SA GHS 2024 via ICASA March 2026; KZN SOI Infrastructure workbook FINAL, Indicator 16 Dimension A.

Disaggregating internet access by settlement type, drawing on the GHS 2023 data published in the ICASA State of ICT Sector Report (March 2025), shows the rural-urban divergence that the headline figures conceal. KZN home internet access stands at 12.9% in metropolitan areas, 7.5% in urban areas and 0.4% in rural areas. Mobile internet, by contrast, is more evenly distributed: 88.8% in metropolitan, 79.8% in urban and 67.0% in rural settlements. The fixed-line metropolitan-rural gap of 12.5 percentage points follows the same pattern as the at-work channel, where KZN sits at 31.0% in metropolitan settlements and 3.1% in rural settlements (a 27.9 percentage point gap). The mobile channel shows a much narrower gap of 21.8 percentage points. The composition of KZN's strong headline performance is therefore mobile-led for rural reach, with fixed-line and at-work channels heavily concentrated in metropolitan areas. The settlement-type disaggregation is from the GHS 2023 round; the equivalent GHS 2024 disaggregation has not yet been published at the time of writing.

5.6 Mobile Network Coverage (Indicator 17)

INDICATOR 17

Mobile Network Coverage

Three analytical dimensions presented in this section.

DIMENSION A

Rural coverage by technology

All nine provinces compared on rural 5G, 4G/LTE and 3G population coverage, 2025.

SHOWN AS
Table 5.6

DIMENSION B

Urban-rural 5G gap

KZN 5G urban and rural coverage from 2020 to 2025, with the gap shaded across the window.

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Figure 5.6

DIMENSION C

Urban 5G expansion

KZN urban 5G expansion in pp added 2020 to 2025, ranked against other provinces.

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Inline narrative

Mobile network coverage in KwaZulu-Natal shows a sharp generational divide between technologies and between urban and rural geographies. On urban 5G in 2025, KZN reaches 80% of the urban population, ranking third nationally behind Gauteng (89%) and Western Cape (83%). On rural 5G, KZN sits at 15%, ranking seventh of nine provinces, well behind Gauteng (74%), Mpumalanga (63%) and Western Cape (34%). The provincial urban-rural 5G gap of 65 percentage points is the largest in South Africa, ahead of Eastern Cape (57pp) and Western Cape (49pp). These rural coverage figures are licensee self-reported estimates of population coverage and may overstate effective service availability.

On rural 4G/LTE coverage, the picture is more uniform. KZN reaches 99% of its rural population on 4G/LTE in 2025, joint-fourth nationally alongside Eastern Cape and Limpopo, with Gauteng, Mpumalanga and North West at 100%. 3G coverage is essentially complete (100%) in rural KZN, with seven of the nine provinces at 100% rural 3G; Western Cape (97%) and Northern Cape (94%) are the exceptions. The provincial deficit is therefore 5G-specific: 4G and 3G have largely closed the rural-urban infrastructure gap, but 5G build-out has concentrated in metropolitan areas. Table 5.6 sets out rural mobile coverage by technology and province for 2025.

Table 5.6: Rural mobile network coverage by technology and province, 2025 (sorted by rural 5G share)

PROVINCE	3G RURAL (%)	4G/LTE RURAL (%)	5G RURAL (%)	RANK (5G RURAL)
Gauteng	100.0%	100.0%	74.0%	1
Mpumalanga	100.0%	100.0%	63.0%	2
Western Cape	97.0%	93.0%	34.0%	3
Limpopo	100.0%	99.0%	29.0%	4

PROVINCE	3G RURAL (%)	4G/LTE RURAL (%)	5G RURAL (%)	RANK (5G RURAL)
Free State	100.0%	98.0%	25.0%	5
North West	100.0%	100.0%	16.0%	6
KwaZulu-Natal	**100.0%**	**99.0%**	**15.0%**	**7**
Northern Cape	94.0%	89.0%	13.0%	8
Eastern Cape	100.0%	99.0%	7.0%	9

Source: ICASA State of ICT Sector Report, March 2026, reporting 2025 coverage values; KZN SOI Infrastructure workbook FINAL, Indicator 17 Dimensions A and B. Coverage values are licensee self-reported and reflect estimated population coverage in rural areas of each province. Rank computed across the nine provinces on the rural 5G share.

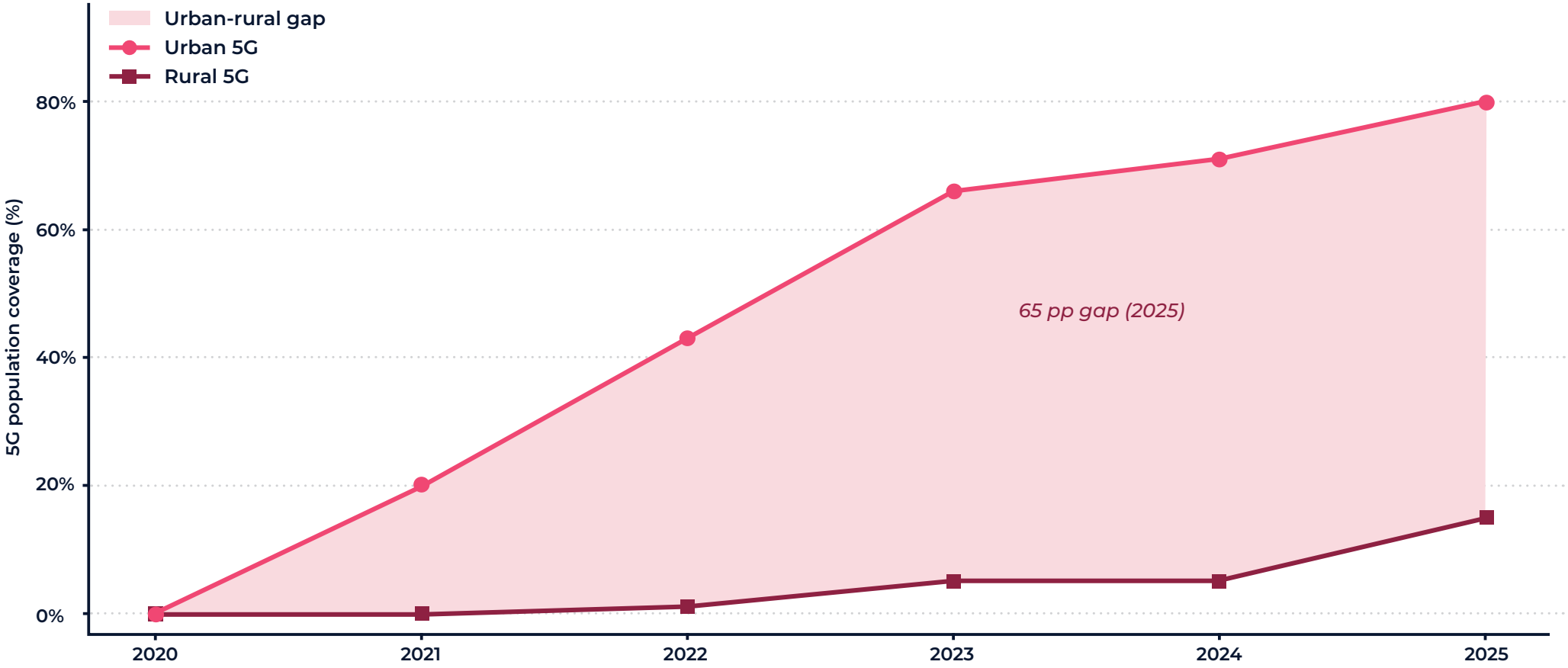

Figure 5.6: KwaZulu-Natal urban and rural 5G coverage, 2020 to 2025

Source: ICASA State of ICT Sector Reports, 2020 to 2025; KZN SOI Infrastructure workbook FINAL, Indicator 17 Dimensions B and C

KZN's urban 5G expansion has been substantial. From 0% urban 5G coverage in 2020, the province reached 80% in 2025, an increase of 80 percentage points over five years. This expansion ranks third nationally behind Gauteng (+87pp) and Western Cape (+82pp). Rural 5G expansion over the same window has been considerably slower: 0% to 15%, an increase of 15 percentage points. At the average rural expansion pace observed since 2023 (approximately 5 percentage points per year), KZN's rural 5G coverage would extend into the next decade before reaching 50%, although 5G rollouts typically follow non-linear deployment curves and the recent 2024 to 2025 acceleration may indicate steeper near-term gains, leaving the province dependent on 4G/LTE for rural mobile broadband through the medium term.

5.7 LTE Device Adoption (Indicator 18)

INDICATOR 18

LTE Device Adoption

Three analytical dimensions presented in this section.

DIMENSION A

Provincial trajectory

Provincial LTE-capable SIM device counts traced 2018 to 2025, with KZN ranking on absolute count and growth rate.

A

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Table 5.7

DIMENSION B

KZN share of national

KZN device base and KZN share of the national LTE total traced across the 2018 to 2025 series.

B

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Figure 5.7

DIMENSION C

Per-capita SIM density

Provincial LTE SIM density per 100 population, 2025, with KZN rank against the national average.

C

SHOWN AS
Inline narrative

KwaZulu-Natal's LTE-capable SIM device base has grown from 1.9 million in 2018 to 13.0 million in 2025, a compound annual growth rate of 32.1% over seven years. The growth rate ranks third nationally, behind Eastern Cape (35.8%) and Free State (32.8%). The absolute device count places KZN second only to Gauteng (21.1 million in 2025). Table 5.7 sets out the full provincial series for 2018 to 2025.

Table 5.7: LTE-capable SIM devices by province, 2018 to 2025 (millions, sorted by 2025 count)

PROVINCE	2018 (M)	2019 (M)	2021 (M)	2022 (M)	2023 (M)	2024 (M)	2025 (M)	RANK (2025)
Gauteng	4.3	9.9	16.2	18.2	21.5	20.1	21.1	1
KwaZulu-Natal	**1.9**	**4.8**	**8.6**	**10.3**	**11.3**	**11.9**	**13.0**	**2**
Limpopo	1.5	2.5	3.8	6.9	7.2	7.8	8.8	3
Western Cape	1.6	3.8	5.5	6.4	7.5	8.0	8.0	4
Mpumalanga	1.3	2.0	3.0	5.1	5.3	5.7	6.4	5
Eastern Cape	0.7	2.0	3.6	4.9	5.4	5.6	6.3	6
North West	0.7	1.5	3.9	3.7	3.7	3.9	4.4	7
Free State	0.4	1.1	1.1	3.7	2.8	2.8	3.2	8
Northern Cape	0.2	0.5	1.9	1.0	1.2	1.3	1.4	9
South Africa (national)	**12.6**	**28.0**	**47.7**	**60.3**	**66.0**	**67.2**	**72.6**	**n/a**

Source: ICASA State of ICT Sector Reports, 2019 to 2026; KZN SOI Infrastructure workbook FINAL, Indicator 18 Dimension A. Counts are LTE-capable SIM cards (not unique users) reported by mobile network operators; a single user may hold more than one SIM. The 2020 column is omitted from this table for space; full annual series available in the workbook. Rank computed across the nine provinces on 2025 absolute count.

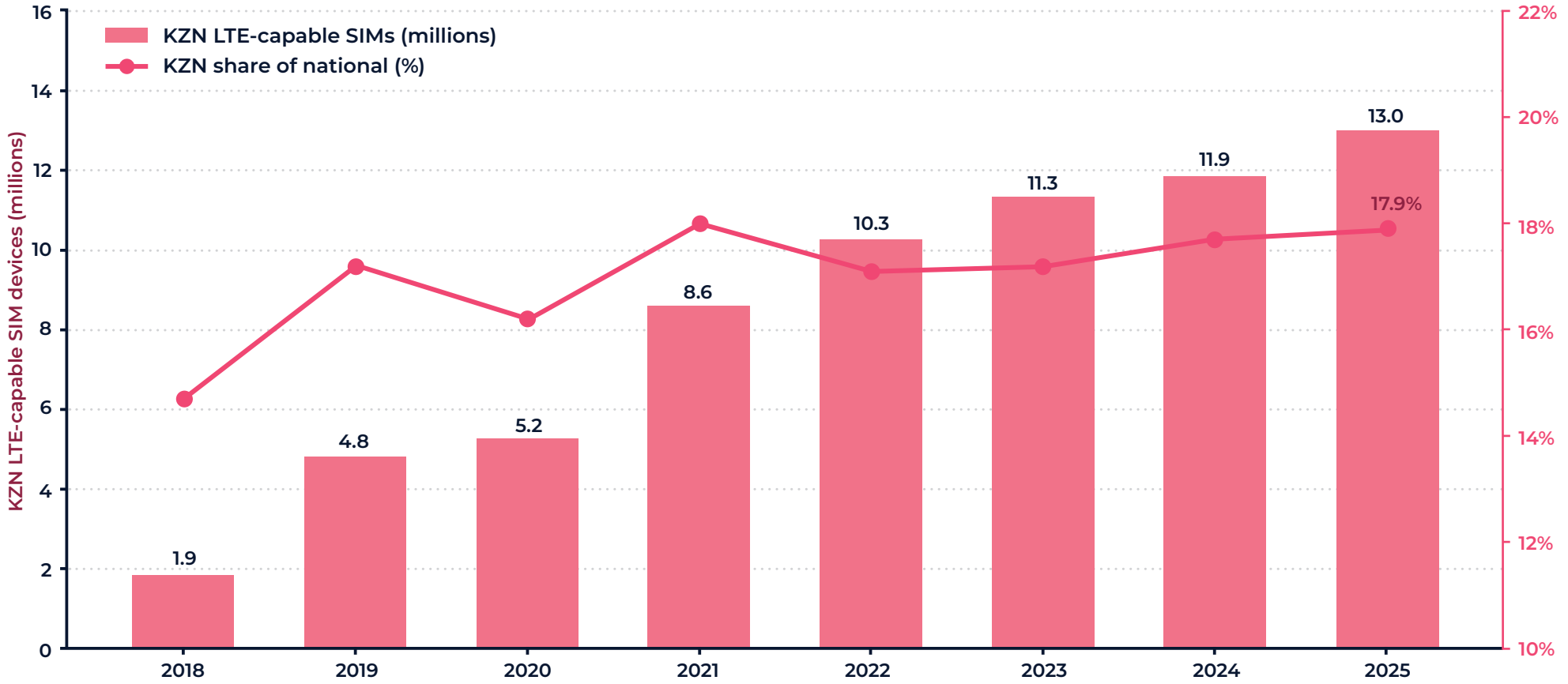

Figure 5.7: KwaZulu-Natal LTE-capable SIM devices and KZN share of national, 2018 to 2025

Source: ICASA State of ICT Sector Reports, 2019 to 2026; KZN SOI Infrastructure workbook FINAL, Indicator 18 Dimensions A and B. Bars represent KZN LTE-capable SIM devices in millions; line represents KZN share of the national total.

On a per-capita basis the picture changes. With 105.7 LTE-capable SIMs per 100 population in 2025, calculated against the Stats SA 2024 mid-year population estimate of 12.31 million for KZN, the province ranks fifth of nine on per-capita SIM density. Limpopo leads at 137.6 SIMs per 100 population, followed by Gauteng (132.6) and Mpumalanga (126.5). KZN sits 9.5 SIMs per 100 population below the national average of 115.2, indicating that the province's large absolute device base is driven by population scale rather than by above-average device density per resident.

KZN's share of national LTE devices has tracked between 17.1% and 18.0% since 2021. The 2025 share of 17.9% is the second-highest recorded for KZN in the eight-year series, marginally below the 18.0% peak in 2021. KZN's national share of LTE devices has stabilised in the 17.1% to 18.0% band since 2021, consistent with a market in late-stage growth where shifts increasingly reflect device replacement and machine-to-machine SIM expansion rather than first-time adoption.

5.8 Key Observations for the Infrastructure Category

The following highlights key observations from the seven active indicators in the Infrastructure category. The observations are organised by the two sub-domains of the Infrastructure category: School Infrastructure and Digital Infrastructure. The organising thesis across the seven indicators is one of headline strength concealing structural depth. KwaZulu-Natal performs strongly on the headline measures, including universal school electrification, any-access internet, mobile internet penetration, and absolute LTE device count. The province carries persistent gaps in fixed-line capacity, school facility provision (libraries, laboratories, computer centres), and the rural-urban distribution of digital capability. The observations below set out the headline-strong and depth-weak dimensions across both sub-domains.

School Infrastructure

- KwaZulu-Natal reached 100% formal school electrification by 2025, matching the national pattern of universal electrification across all nine provinces, but the province also records the second-highest off-grid share nationally at 7.5% (434 schools), narrowly behind the Eastern Cape's 7.6%, against a national average of 4.4%. Eastern Cape and KwaZulu-Natal together account for 815 of South Africa's 993 off-grid schools, or 82% of the national total.

- School library provision in KZN sat at 26.1% in 2024, marginally above the national average of 26.0%, ranking fourth of nine provinces. The 4,281 KZN schools without a library represent the second-largest absolute gap in the country, behind only the Eastern Cape's 4,652. Of the 1,509 KZN schools with a library, 995 (65.9%) held a stocked collection in 2024, falling 5.5 percentage points from 71.4% (1,005 of 1,408 libraries) in 2021. The library indicator therefore shows a divergence between the headline access measure (rising) and the underlying stocking quality measure (falling).

- Laboratory provision in KZN sat at 13.5% in 2024, ranking second of the six provinces with reliable comparable data, behind Western Cape (35.5%). The provincial rate sits 22.0 percentage points below Western Cape, leaving 86.5% of KZN public ordinary schools without dedicated laboratory infrastructure. The improvement from 11.5% in 2019 was concentrated in the 2021 to 2023 sub-period; the rate was unchanged between 2019 and 2021 and essentially flat between 2023 and 2024.

- Computer centre provision sat at 34.9% in 2024 (2,021 schools), fifth of nine provinces and 0.8 percentage points above the weighted national average of 34.1%. The provincial rate fell from 36.5% in 2019, a 1.6 percentage point decline. Across the same window the school base in KZN held essentially flat (5,803 sites in 2019 to 5,790 in 2024), so the percentage decline cannot be explained by a growing denominator.

- The four school infrastructure components covered in this category resolve into two patterns. School electrification has reached universal provision (100% across all nine provinces). The other three components show majority-without patterns in KZN: 86.5% of schools without dedicated laboratory provision, 73.9% without a library, and 65.1% without an on-site computer centre. The cumulative effect is that the majority of KZN public ordinary schools cannot offer practical science teaching, library-mediated independent learning, or on-site digital skills development. These provincial gaps connect to the indicators traced in the People category, particularly the Mathematics and Physical Sciences NSC achievement ceiling identified in Sections 4.4 and 4.5; the laboratory access rate in particular sits as a candidate physical constraint on the Physical Sciences ≥50% pass rate plateau.

Digital Infrastructure

- Household internet access in KZN sat at 84.2% on the any-channel measure in GHS 2024, ranking third nationally behind Western Cape (92.0%) and Gauteng (86.0%) and 2.1 percentage points above the national average of 82.1%. The provincial mobile internet rate of 80.0% leads all provinces, marginally ahead of Western Cape (79.5%) and Mpumalanga (77.9%).

- Fixed-line internet at home in KZN sat at 7.5% in GHS 2024, ranking sixth of nine provinces (joint with North West). The provincial fixed-line rate sits 9.9 percentage points below the national average of 17.4% and 37.4 percentage points below the leading Western Cape rate of 44.9%. The internet-at-work measure fell sharply between GHS 2023 and GHS 2024 (16.9% to 5.9%, a year-on-year decline of 11.0 percentage points), placing KZN eighth of nine provinces; the result is reported as published pending Stats SA microdata review.

- Settlement-type disaggregation from GHS 2023 shows mobile internet distributed comparatively evenly across KZN settlement types (88.8% metropolitan, 79.8% urban, 67.0% rural). Fixed-line and at-work channels concentrate in metropolitan areas: 12.9% home metro versus 0.4% home rural, and 31.0% work metro versus 3.1% work rural. The composition of KZN's strong headline performance is therefore mobile-led for rural reach, with fixed-line and at-work channels heavily metropolitan-concentrated.

- Mobile network coverage shows a pronounced generational divide. KZN reaches 80% urban 5G coverage in 2025, ranking third nationally behind Gauteng (89%) and Western Cape (83%), but only 15% rural 5G coverage, ranking seventh of nine. The resulting urban-rural 5G gap of 65 percentage points is the largest in South Africa, ahead of Eastern Cape (57pp) and Western Cape (49pp). At the average rural expansion pace observed since 2023 (approximately 5 percentage points per year), KZN's rural 5G coverage would extend into the next decade before reaching 50%, although 5G rollouts typically follow non-linear deployment curves and the recent 2024 to 2025 acceleration may indicate steeper near-term gains.

- Rural 4G/LTE coverage is more uniform: KZN reaches 99% of its rural population in 2025, joint-fourth nationally alongside Eastern Cape and Limpopo, with Gauteng, Mpumalanga and North West at 100%. Rural 3G coverage is essentially complete in seven of the nine provinces, including KZN; Western Cape (97%) and Northern Cape (94%) are the exceptions. The provincial deficit is therefore 5G-specific.

- KZN's LTE-capable SIM device base reached 13.0 million in 2025, ranking second nationally on absolute count behind Gauteng (21.1 million). The compound annual growth rate of 32.1% from 2018 to 2025 ranks third nationally, behind Eastern Cape (35.8%) and Free State (32.8%). The KZN share of national LTE devices, at 17.9% in 2025, is the second-highest share recorded for the province in the eight-year series, marginally below the 18.0% peak in 2021.

- On a per-capita basis, KZN's LTE SIM density of 105.7 per 100 population in 2025 sits 9.5 below the national average of 115.2 and ranks fifth of nine provinces. Limpopo leads at 137.6, followed by Gauteng (132.6) and Mpumalanga (126.5). The KZN absolute device base is driven by population scale rather than by above-average device density per resident.

5.9 Implications for Innovation in KwaZulu-Natal

The Infrastructure category indicators describe a province that performs strongly at the headline measures of access, adoption and aggregate volume, but carries structural gaps in fixed-line capacity, school facility provision, and the spatial distribution of digital capability. The implications below trace these gaps to their consequences for the regional innovation system, distinguishing positive signals that an innovation policy response should consolidate from negative signals where the response should target the structural mechanisms identified in the indicator data. The implications are ordered as: three concerned with digital infrastructure (fixed-line scarcity, the rural-urban 5G gap, and the per-capita LTE adoption gap), two concerned with school infrastructure (the People-pipeline ceiling and the off-grid cost burden), and a closing positive signal on the library trajectory.

Headline connectivity strength conceals fixed-line scarcity

KZN's 84.2% any-access internet rate ranks third nationally and the 80.0% mobile internet rate ranks first. The fixed-line at-home rate of 7.5%, however, sits 9.9 percentage points below the national average and 37.4 percentage points below leading Western Cape. The composition of KZN's headline strength is mobile-led, and mobile-led access supports consumption-side activity (browsing, messaging, mobile payments, video) effectively but is less suited to bandwidth-intensive and stable-connection uses such

as sustained video conferencing for remote work, large dataset transfers, university and research workloads, and cloud-based collaborative tools that depend on uncapped, low-latency connectivity. These uses typically rely on fixed-line bandwidth and are constrained where fixed-line infrastructure is absent. The implication is that the province's consumption-side connectivity strength does not translate directly into production-side innovation capacity at scale. The consumption-versus-production distinction is an interpretive overlay on the access-channel data; the workbook does not directly measure bandwidth, latency, data caps, or productive use intensity. Targeted fixed-line capacity expansion in metropolitan and urban settings, including the Durban metropolitan area and KZN's secondary urban centres, is the binding constraint on extending innovation-relevant infrastructure beyond the existing concentration. The fixed-line gap to Western Cape (37.4 percentage points) is large enough that closing it represents a multi-year capacity programme rather than an incremental adjustment.

The rural-urban 5G gap is structurally large and slow-closing

KZN's 65 percentage point urban-rural 5G gap is the largest of any province in South Africa. At the observed expansion pace of approximately 5 percentage points per year since 2023, the province would extend into the next decade before reaching 50% rural 5G coverage, although 5G rollouts typically follow non-linear deployment curves and the recent 2024 to 2025 acceleration may indicate steeper near-term gains. Rural KZN remains dependent on 4G/LTE through the medium term. The implication is that 5G-dependent applications, which include real-time IoT, edge computing, advanced augmented and virtual reality, and low-latency industrial automation, will remain spatially concentrated in eThekwini and other urban areas through the rest of the decade. Innovation policy responses targeting rural digital opportunity should plan around 4G/LTE as the working network rather than 5G, and should treat 5G rural coverage as a separate and longer-horizon infrastructure question.

Per-capita LTE density reveals an adoption gap below the national average

KZN's 105.7 LTE-capable SIMs per 100 population in 2025 sits 9.5 below the national average of 115.2 and substantially below leading Limpopo (137.6), Gauteng (132.6) and Mpumalanga (126.5). The province's strong absolute LTE base reflects population scale rather than penetration depth. The 9.5 per-100 gap to the national average, applied to KZN's 2024 population of 12.31 million, implies approximately 1.17 million LTE-capable SIMs that would be on the network if KZN matched national density. The implication is that KZN's strong absolute count masks a population segment whose connectivity has not yet reached parity with national levels, plausibly concentrated in lower-income, rural, and older population groups for whom device cost, data cost, and coverage in less-served rural sub-regions remain barriers. Innovation policy interventions targeting digital literacy, low-cost device access, and community connectivity hubs would address the adoption gap that the per-capita measure reveals; the headline absolute count does not surface this opportunity. The per-capita comparison should be read with awareness that provincial SIM density is sensitive to where SIMs are registered (RICA address) versus where they are physically used, and the ranking of Limpopo at 137.6 may partly reflect such measurement effects rather than penetration depth alone.

School infrastructure constrains the People-pipeline ceiling

Section 4 documented KZN's strong NSC pass-rate position alongside weaker post-school throughput, and identified a Mathematics and Physical Sciences performance ceiling at the higher-order skills threshold relevant to STEM university admission. The Infrastructure indicators document an underlying physical constraint: 86.5% of KZN public ordinary schools without dedicated laboratory provision, 73.9% without a library, and 65.1% without a computer centre. The Physical Sciences ≥50% pass rate plateau in the 28% to 33% band since 2018 cannot be addressed by curriculum or pedagogical intervention alone whilst the underlying laboratory infrastructure is absent. The implication is that pipeline interventions targeting Mathematics and STEM throughput should run in parallel with sustained school-infrastructure investment, particularly in laboratory provision. The Physical Sciences ceiling and the laboratory access rate form a pair that should be addressed together rather than as separate education-system or infrastructure questions.

Off-grid school concentration creates a province-specific cost burden

Eastern Cape and KwaZulu-Natal together account for 815 of South Africa's 993 off-grid schools, or 82% of the national off-grid total, against a combined share of 48% of the national school count. The over-representation in off-grid status is therefore approximately 1.7 times the combined share of schools. Off-grid arrangements involve solar installations, generators, or both, all of which carry capital and operating costs that grid-connected schools do not face: photovoltaic system maintenance, battery replacement cycles, fuel for generator backup, and managed service contracts. These costs concentrate in two provinces against a national education funding formula that does not differentiate by grid status, although the quintile-based component of the funding model partly compensates by allocating higher per-learner amounts to lower-quintile schools, which off-grid schools typically are. The residual cost burden after quintile compensation remains geographically specific. The implication is that the per-school operational cost of education delivery in KZN runs higher than in grid-saturated provinces, with downstream effects on the resources available for other infrastructure improvements (libraries, laboratories, computer centres). A targeted policy response could include a grid-status differential in the school operational funding formula, recognising that the off-grid cost burden is geographically specific and reduces the resource envelope for the school facilities investment that the People pipeline requires.

A consolidating positive signal: the library access trajectory

KZN library access rose from 23.1% in 2019 to 26.1% in 2024, a 3.0 percentage point gain and a compound annual growth rate of 2.5% per annum. The national pattern returned to its 2019 level of 26.0% over the same window, after a mid-period dip. The KZN with-library count grew from 1,339 to 1,509 schools, a net addition of 170 libraries over five years. Laboratory provision improved at a higher CAGR (3.3% per annum) but from a much smaller base, with the rate moving from 11.5% to 13.5% over the same window; computer centre provision moved in the opposite direction, declining 1.6 percentage points. The implication is that targeted school-infrastructure investment can move provincial provision rates measurably, with library and laboratory rates both improving over the 2019 to 2024 window. The KZN library trajectory is the strongest positive signal in the school infrastructure indicator set on the absolute percentage-point measure: it demonstrates that an established provincial floor of 23.1% can be raised by 3.0 percentage points within five years, the largest absolute gain across the four school infrastructure components. Comparable progress at the laboratory provision rate, which currently leaves 86.5% of KZN public ordinary schools without dedicated laboratory infrastructure, is the priority that the structural ceiling argument identifies. The library trajectory shows that the type of co-ordinated infrastructure rollout required is both feasible and recently demonstrated at provincial scale; the laboratory and computer centre rates are the next candidates for that approach.

Read against the People category, the Infrastructure evidence indicates that part of the post-school conversion gap reflects a school-facility deficit (laboratory access at 13.5%) and a household connectivity deficit (fixed-home internet at 7.5%), both of which constrain the depth and quality of human-capital formation that the People indicators measure at the headline level.

6. INVESTMENT

The Investment category captures R&D expenditure flows by sector and R&D intensity as a share of provincial economic activity. These are financial inputs into the innovation system, not venture capital, general foreign direct investment, or non-R&D project finance. All monetary values are in current prices (nominal) in R'000 unless stated otherwise; real-terms values are in constant 2015 rand and use the GDP deflator series published in HSRC/CeSTII Statistical Report 2023/24 Table C.2. Indicator data are drawn from the HSRC/CeSTII National Survey of Research and Experimental Development, Statistical Report 2023/24 (released October 2025), with two-year backfill from the Statistical Report 2015/16 for 2012/13 and 2013/14, and provincial GVA from Quantec EasyData for the R&D intensity denominator.

The 2025/26 edition reports seven active indicators (19 to 25). R&D Personnel Intensity (FTE) is deferred from this edition because provincial Full-Time Equivalent personnel data are not published at the resolution required for the SOI's nine-province comparator in the HSRC/CeSTII 2023/24 Statistical Report. The architectural placeholder is retained for the 2026/27 edition pending publication of provincial personnel tables. Two further indicator-level extensions, the Higher Education R&D institutional split and the Business R&D industry split, are flagged in Section 6.8 as deferred for the same dissemination-gap reasons. The seven active indicators are not aggregated into a single 'total innovation investment' metric. Aggregating across sectors with different data-quality profiles would conflate series with known anomalies and series that are clean.

Rounding convention. All numerical figures are rounded once from the underlying precise values. Tables report shares to two decimal places; narrative claims report shares and percentage-point changes to one decimal place. Change columns in tables are computed from the precise underlying values and then rounded to two decimal places, which means the change column may differ by 0.01 percentage points from the result of subtracting the displayed (rounded) shares. Where this occurs it is a rounding artefact, not a data error.

Window choice. Three analytical windows are used in this chapter. The nine-year window (2014/15 to 2023/24) is the primary analytical anchor because it spans the post-base-year period for which the HSRC/CeSTII Statistical Report 2023/24 publishes provincial CAGR comparators directly, and because the 2014/15 starting point is the first year of full nine-province coverage in the current HSRC tabulation. The full series (2012/13 to 2023/24, 11 or 12 years depending on the indicator) is used as a robustness check, particularly for sectors where the 2012/13 reading is atypical (HERD and NFP R&D both fall into this category). The ten-year intensity window (2013 to 2022) reflects the NACI publication cycle for R&D intensity. Where 9-year and 12-year readings diverge meaningfully, both are reported and the divergence is discussed in the narrative rather than reconciled to a single number.

6.1 Gross Expenditure on R&D (Indicator 19)

Gross Expenditure on R&D (GERD) is the total monetary value of R&D performed within a defined geography in a given year, summed across the five performing sectors. KwaZulu-Natal has ranked third nationally on absolute GERD throughout the entire 12-year series, behind Gauteng and the Western Cape and ahead of every other province in every year. Provincial GERD rose from R3.01 billion in 2012/13 to R4.33 billion in 2023/24 in nominal terms, a nominal CAGR of 3.4% over the full series and 3.5% over the 9-year window from 2014/15. The R-squared of the linear trend on the KZN nominal series is 0.57, which reflects a weakly trending series with material year-on-year volatility.

The headline rank conceals a relative-share decline. The KZN share of national GERD has fallen from 10.9% in 2014/15 to 10.0% in 2023/24, a decline of 0.9 percentage points over the 9-year window, and from 12.6% in 2012/13 over the full 12-year series, a decline of 2.6 percentage points. National GERD grew at a nominal CAGR of 4.4% over the 9-year window and 5.6% over the full series, whilst KZN GERD grew at 3.5% over the same 9-year window. The province has therefore held its absolute rank but lost relative weight. Table 6.1 sets out the full provincial comparator across the 9-year window. The Western Cape recorded the largest gain, with a nominal increase of 108.1% and a share gain of 8.1 percentage points; Gauteng grew nominally by 27.5% but lost 6.5 percentage points of share, reflecting national GERD growing faster than its own. Northern Cape and Limpopo are the only other two provinces to gain share, by 1.2 and 0.5 percentage points respectively, albeit from much smaller bases.

Table 6.1: Provincial Gross Expenditure on R&D, 2014/15 versus 2023/24 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	GERD 2014/15 (R'000)	GERD 2023/24 (R'000)	NOMINAL CHANGE	SHARE 2014/15 (%)	SHARE 2023/24 (%)	SHARE CHANGE (PP)	RANK 2023/24
Eastern Cape	1 734 411	2 215 516	+27.7%	5.91	5.10	−0.81	4
Free State	1 456 461	1 803 561	+23.8%	4.96	4.15	−0.81	6
Gauteng	13 686 734	17 446 171	+27.5%	46.64	40.19	−6.45	1
KwaZulu-Natal	**3 187 481**	**4 329 981**	**+35.8%**	**10.86**	**9.97**	**−0.89**	**3**
Limpopo	628 607	1 156 344	+84.0%	2.14	2.66	+0.52	8
Mpumalanga	859 201	1 073 106	+24.9%	2.93	2.47	−0.46	9
Northern Cape	575 584	1 366 751	+137.5%	1.96	3.15	+1.19	7
North West	1 402 742	1 921 505	+37.0%	4.78	4.43	−0.35	5
Western Cape	5 813 758	12 099 683	+108.1%	19.81	27.87	+8.06	2
South Africa (national)	**29 344 977**	**43 412 618**	**+47.9%**	**100.00**	**100.00**	**–**	**n/a**

Source: HSRC/CeSTII South African National Survey of Research and Experimental Development, Statistical Report 2023/24 (Table C.4 equivalent); KZN SOI Investment workbook FINAL, Indicator 19 Dimensions A and B. All values in current prices (nominal). Nominal change = (2023/24 ÷ 2014/15) − 1. Share change reported in percentage points. Ranks computed across the nine provinces on absolute 2023/24 GERD; the national row is excluded from the rank column.

The KZN sectoral composition of provincial GERD in 2023/24 is dominated by Higher Education at 34.9%, followed by Business at 32.0%, Science Councils at 16.3%, Not-for-Profit at 10.0% and Government at 6.8%. Table 6.2 sets out the composition. Two features stand out against the national 2023/24 composition. The KZN Not-for-Profit share, at 10.0% of provincial GERD, is materially higher than the national NFP share, which sits at 4.05% of national GERD (R1,757,600 of national GERD R43,412,618). The KZN Business R&D share, at 32.0%, is correspondingly lower than the national Business R&D share, which sits at approximately 35%. The other three sectors (Higher Education, Science Councils and Government) sit broadly in line with the national composition. The relative weight of Higher Education in the KZN mix can potentially be attributed to the size of the UKZN, DUT, MUT and UNIZULU research base; the elevated Not-for-Profit share reflects sustained KZN-based NFP R&D activity that is examined in Section 6.6.

Table 6.2: KZN sectoral composition of provincial GERD, 2023/24

PERFORMING SECTOR	R&D EXPENDITURE (R'000, NOMINAL)	SHARE OF KZN PROVINCIAL GERD (%)
Higher Education R&D (HERD, Indicator 22)	1 509 636	34.9
Business R&D (BERD, Indicator 21)	1 385 350	32.0
Science Council R&D (Indicator 25)	706 710	16.3
Not-for-Profit R&D (Indicator 24)	432 727	10.0
Government R&D (Indicator 23)	295 558	6.8
KZN provincial GERD (total)	**4 329 981**	**100.0**

Source: HSRC/CeSTII Statistical Report 2023/24 sector-level provincial tables; KZN SOI Investment workbook FINAL, Indicator 19 Dimension D and Indicators 21 to 25 underlying values. Composition shown for the most recent year only. The five performing-sector indicators (BERD, HERD, Government, NFP and Science Council R&D) are presented in Sections 6.3 to 6.7.

Figure 6.1 traces the KZN GERD trajectory in nominal and real terms over the full 2012/13 to 2023/24 series. The nominal series shows a peak of R4.17 billion in 2017/18, a decline through to a trough of R3.28 billion in 2020/21, and a recovery to a series high of R4.33 billion in 2023/24. The real series, deflated to constant 2015 rand using the GDP deflator from HSRC/CeSTII Table C.2, tells a different story. Real GERD peaked at R3.70 billion in 2017/18, troughed at R2.53 billion in 2020/21, and stood at R2.85 billion in 2023/24, materially below the 2014/15 starting value of R3.36 billion. KZN real R&D expenditure has therefore contracted at a CAGR of −1.8% over the 9-year window, against a national real CAGR of −0.87% over the same window. KZN real R&D spend is contracting at approximately twice the national rate.

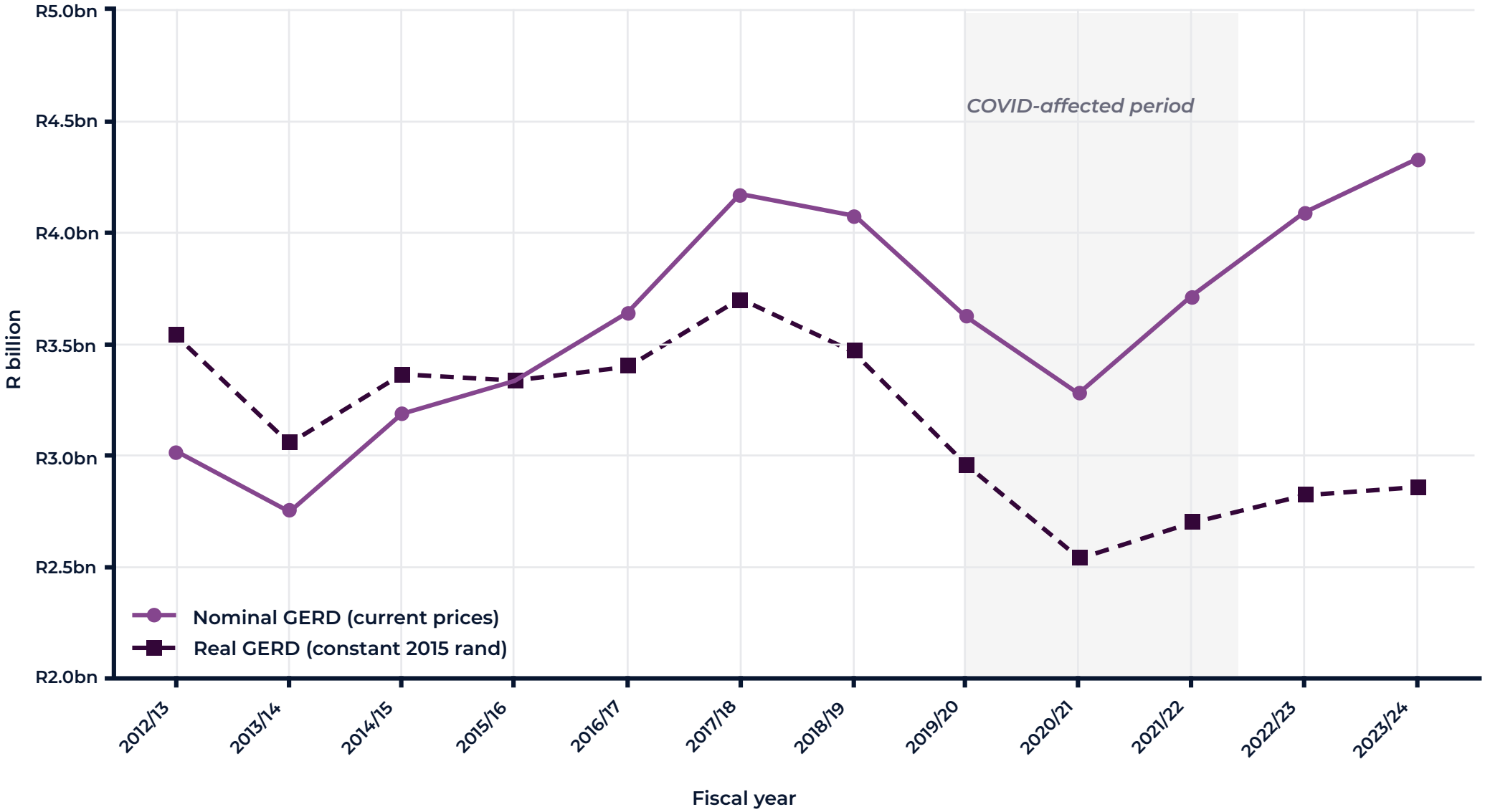

Figure 6.1: KZN Gross Expenditure on R&D, nominal versus real (constant 2015 rand), 2012/13 to 2023/24

Underlying data for Figure 6.1

YEAR	NOMINAL GERD (R'000)	REAL GERD (CONSTANT 2015 R'000)	GDP DEFLATOR INDEX (2015 = 1.000)	YoY REAL GROWTH (%)
2012/13	3 013 372	3 547 009	0.850	–
2013/14	2 752 543	3 061 095	0.899	−13.7
2014/15	3 187 481	3 364 244	0.947	+9.9
2015/16	3 335 141	3 335 141	1.000	−0.9
2016/17	3 639 100	3 402 549	1.070	+2.0
2017/18	4 172 713	3 699 017	1.128	+8.7
2018/19	4 074 154	3 472 961	1.173	−6.1
2019/20	3 629 403	2 957 398	1.227	−14.8
2020/21	3 278 682	2 534 946	1.293	−14.3
2021/22	3 716 120	2 700 120	1.376	+6.5
2022/23	4 090 416	2 824 074	1.448	+4.6
2023/24	4 329 981	2 854 666	1.517	+1.1

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.4 equivalent for 2014/15 onwards) and Statistical Report 2015/16 (for 2012/13 and 2013/14 backfill); GDP deflator from Table C.2; KZN SOI Investment workbook FINAL, Indicator 19 Dimensions C and E. Real values computed by dividing the nominal KZN time series by the GDP deflator index, applying the HSRC methodology to the provincial series. Shaded band on the chart indicates the COVID-affected 2019/20 to 2021/22 fiscal years. Year-on-year real growth column reports the percentage change in real KZN GERD from one year to the next.

The 2023/24 real index against a 2014/15 base of 100 is 84.9, which means the province's real R&D purchasing power is approximately 15% below the level it held nine years earlier. The pattern of year-on-year real growth is sequential rather than uniformly negative: real GERD recorded positive growth in 2016/17 and 2017/18 (+2.0% and +8.7% respectively), then three consecutive years of real contraction across 2018/19 to 2020/21 (−6.1%, −14.8% and −14.3%, the latter two coinciding with the COVID-affected period), and a partial recovery thereafter at +6.5% in 2021/22, +4.6% in 2022/23 and +1.1% in 2023/24. The recovery has been at progressively smaller increments and the 2023/24 real value remains 22.8% below the 2017/18 real peak.

KZN holds 3rd national rank on absolute R&D investment whilst real GERD contracts: the province has retained its position above every province other than Gauteng and the Western Cape across the entire 12-year series, but real GERD in 2023/24 sits 15% below the 2014/15 base and 23% below the 2017/18 real peak, contracting at approximately twice the national rate over the 9-year window. The aggregate trajectory is real-terms decline; the underlying sector-level trajectories are mixed, with Business R&D contracting most acutely (Section 6.3), Science Council R&D contracting modestly (Section 6.7), and Higher Education and Not-for-Profit R&D recording 9-year real growth (Sections 6.4 and 6.6). The aggregate is therefore the net of asymmetric sector-level movements rather than a uniform contraction.

6.2 R&D Intensity (Indicator 20)

R&D Intensity is the ratio of R&D expenditure to economic value added, expressed as a percentage. It is the most widely used international measure of how much of an economy's value generation is being reinvested in knowledge production. The denominator applied here is provincial Gross Value Added (GVA) at constant prices, drawn from Quantec EasyData; this is the same denominator used in the NACI STI Indicators Report 2025 (Figure 7.15), the authoritative published provincial comparison. Previous editions of the SOI used provincial GDP as the denominator. Cross-province ranks hold under the denominator choice, whilst absolute intensity values do not, and figures reported here are therefore not directly comparable with the GDP-based intensity figures in earlier SOI editions.

KwaZulu-Natal's R&D intensity stood at 0.43% of provincial GVA in 2022, the latest year published in the NACI series, against a national average of 0.68% and a Western Cape benchmark of 1.36%. KZN therefore sits 0.25 percentage points below the national average and 0.93 percentage points below the Western Cape. The province ranks 7th of nine on R&D intensity in 2022. Table 6.3 sets out the full provincial comparator. Western Cape leads at 1.36%; Northern Cape ranks second at 0.98%, lifted by SKA and SARAO-related Science Council expenditure; Gauteng ranks third at 0.81%; the lowest performer is Mpumalanga at 0.23%. Four provinces sit above the national average (Western Cape, Northern Cape, Gauteng and Free State), and five sit below. The spread between the leading and lowest provinces is 1.13 percentage points.

Table 6.3: Provincial R&D intensity comparator, 2022 (sorted by rank)

PROVINCE	R&D INTENSITY (GERD/GVA, %)	GAP TO NATIONAL AVERAGE (PP)	GAP TO WESTERN CAPE (PP)	RANK
Western Cape	1.36	+0.68	– (benchmark)	1
Northern Cape	0.98	+0.30	−0.38	2
Gauteng	0.81	+0.13	−0.55	3
Free State	0.69	+0.01	−0.67	4
Eastern Cape	0.47	−0.21	−0.89	5
North West	0.45	−0.23	−0.91	6
KwaZulu-Natal	**0.43**	**−0.25**	**−0.93**	**7**
Limpopo	0.27	−0.41	−1.09	8
Mpumalanga	0.23	−0.45	−1.13	9
South Africa (national)	**0.68**	**– (benchmark)**	**−0.68**	**n/a**

Source: NACI STI Indicators Report 2025, Figure 7.15 (R&D intensity using provincial GVA as denominator); KZN SOI Investment workbook FINAL, Indicator 20 Dimension A. Series ends at calendar year 2022, the latest published year. Ranks computed across the nine provinces; the national row is excluded from the rank column. Gap columns report the percentage-point difference between each province and the national or Western Cape benchmark, with positive values denoting above-benchmark intensity.

Table 6.4 traces KZN R&D intensity against the national average and the two leading provinces (Western Cape and Gauteng) over the 2013 to 2022 series. The KZN trajectory shows a clear weakening over the period. The series peaked at 0.55% in 2017, declined for three consecutive years to a trough of 0.40% in 2020, and recovered modestly to 0.43% in 2022. Over the same 10-year window, the national average also declined, from a peak of 0.84% in 2017 to 0.68% in 2022, so the KZN-to-national gap remained roughly constant in absolute terms, holding between −0.24 and −0.32 percentage points across the window. In proportional terms the gap widened. KZN intensity fell from 65% of the national average in 2017 to 63% in 2022.

Table 6.4: R&D intensity trajectory, KwaZulu-Natal versus national average and benchmark provinces, 2013 to 2022

YEAR	KZN INTENSITY (%)	NATIONAL INTENSITY (%)	WESTERN CAPE INTENSITY (%)	GAUTENG INTENSITY (%)	KZN MINUS NATIONAL (PP)	KZN RANK (OF NINE)
2013	**0.48**	0.73	1.00	1.03	−0.25	6th
2014	**0.52**	0.78	1.11	1.10	−0.26	7th
2015	**0.51**	0.81	1.27	1.10	−0.30	6th
2016	**0.51**	0.83	1.38	1.15	−0.32	6th
2017	**0.55**	0.84	1.45	1.13	−0.29	6th
2018	**0.51**	0.76	1.26	0.97	−0.25	7th
2019	**0.44**	0.68	1.22	0.85	−0.24	7th
2020	**0.40**	0.67	1.21	0.88	−0.27	7th
2021	**0.42**	0.68	1.34	0.85	−0.26	6th
2022	**0.43**	0.68	1.36	0.81	−0.25	7th

Source: NACI STI Indicators Report 2025, Figure 7.15; KZN SOI Investment workbook FINAL, Indicator 20 Dimensions B and C. Calendar-year basis (NACI methodology); GVA denominator at constant prices. KZN minus national column reports the percentage-point difference in each year; positive values indicate KZN above national. Rank computed across the nine provinces in each year.

KZN's intensity rank has oscillated narrowly between 6th and 7th of nine across the full 10-year series. The province ranked 6th in five years (2013, 2015, 2016, 2017 and 2021) and 7th in five years (2014, 2018, 2019, 2020 and 2022). The 2022 ranking of 7th is therefore consistent with the medium-run pattern rather than a recent deterioration. In 2022 specifically, six provinces ranked ahead of KZN: Western Cape (1.36%), Northern Cape (0.98%), Gauteng (0.81%), Free State (0.69%), Eastern Cape (0.47%) and North West (0.45%). The KZN value of 0.43% sat 0.02 percentage points behind North West and 0.16 percentage points ahead of Limpopo, the next-placed province below.

Read together, Indicators 19 and 20 produce the central diagnostic finding for the Investment category. KwaZulu-Natal ranks 3rd nationally on absolute R&D spend but 6th to 7th on R&D as a share of provincial economic activity. The province generates substantial absolute R&D investment, third only to Gauteng and the Western Cape, but reinvests a smaller proportion of its economic value added in R&D than five or six other provinces, including several with much smaller absolute R&D bases. Scale exists; intensity does not. KZN performs more R&D in absolute terms than most provinces whilst performing less R&D relative to its own economic weight than most provinces.

KZN ranks 3rd nationally on absolute R&D and 6th-to-7th on R&D as a share of provincial GVA: the gap between absolute scale and relative intensity is one of several structural patterns that emerge across the Investment category. KZN has held 3rd national rank on absolute R&D throughout the 12-year series whilst sitting 6th to 7th of nine on R&D as a share of provincial GVA across the 10-year intensity series. Provincial intensity has fallen from 0.55% in 2017 to 0.43% in 2022 against a national average that has held at approximately 0.68% since 2019. R&D intensity is also partly a denominator effect: provinces with industrial profiles weighted towards lower-R&D-intensity sectors (mining, agriculture, primary manufacturing) score lower on the intensity ratio than provinces weighted towards finance, ICT or knowledge-economy sectors, independently of provincial R&D policy choices. Sections 6.3 to 6.7 examine the five performing sectors individually, and Section 6.9 reads the seven indicators together to identify the principal patterns at chapter level.

6.3 Business Sector R&D (Indicator 21)

Business R&D (BERD) is the largest performing sector nationally, accounting for 34.8% of national GERD in 2023/24, and is the strongest single signal of private-sector innovation activity within an economy. KwaZulu-Natal ranks 3rd nationally on absolute BERD in every year from 2013/14 onwards; the only year outside this position is 2012/13 when KZN ranked 4th, behind Gauteng, Western Cape and Free State. Provincial BERD stood at R1.39 billion in 2023/24, accounting for 32.0% of KZN provincial GERD and 9.2% of national BERD. KZN has therefore retained 3rd national rank across an 11-year window whilst the absolute and relative position of the sector has deteriorated.

Table 6.5 sets out the full provincial BERD comparator across the 9-year window. The Western Cape recorded the largest gain, with nominal BERD rising from R1.68 billion to R3.71 billion (+120.4%) and a national share gain of 11.9 percentage points. The Western Cape has therefore moved from a position roughly comparable to KZN in 2014/15 to a position approximately 2.7 times KZN's BERD spend in 2023/24. Eastern Cape recorded the largest proportional decline at −52.2%, with BERD falling from R608 million to R291 million. KZN itself recorded a 7.7% nominal decline and lost 2.1 percentage points of national share. Five provinces gained share over the 9-year window (Western Cape, North West, Limpopo, Northern Cape and Free State); four lost share (Gauteng, Eastern Cape, KZN and Mpumalanga). KZN's 2.1 percentage point loss is the third-largest among the four losing provinces, behind Gauteng's 8.6 percentage point loss and Eastern Cape's 2.7 percentage point loss, with Gauteng's loss reflecting the broader reallocation of national BERD growth to the Western Cape.

Table 6.5: Provincial Business R&D, 2014/15 versus 2023/24 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	R&D 2014/15 (R'000)	R&D 2023/24 (R'000)	NOMINAL CHANGE	SHARE 2014/15 (%)	SHARE 2023/24 (%)	SHARE CHANGE (PP)	RANK 2023/24
Eastern Cape	608 398	291 057	−52.2%	4.58	1.93	−2.65	8
Free State	831 575	988 484	+18.9%	6.26	6.54	+0.28	4
Gauteng	7 160 280	6 840 207	−4.5%	53.87	45.27	−8.61	1
KwaZulu-Natal	**1 501 659**	**1 385 350**	**−7.7%**	**11.30**	**9.17**	**−2.13**	**3**
Limpopo	161 331	285 613	+77.0%	1.21	1.89	+0.68	9
Mpumalanga	435 770	465 525	+6.8%	3.28	3.08	−0.20	6
Northern Cape	226 303	296 075	+30.8%	1.70	1.96	+0.26	7
North West	681 634	848 286	+24.4%	5.13	5.61	+0.49	5

PROVINCE	R&D 2014/15 (R'000)	R&D 2023/24 (R'000)	NOMINAL CHANGE	SHARE 2014/15 (%)	SHARE 2023/24 (%)	SHARE CHANGE (PP)	RANK 2023/24
Western Cape	1 684 001	3 710 724	+120.4%	12.67	24.56	+11.89	2
South Africa (national)	**13 290 951**	**15 111 321**	**+13.7%**	**100.00**	**100.00**	**–**	**n/a**

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.48); KZN SOI Investment workbook FINAL, Indicator 21 Dimensions A and B. All values in current prices (nominal). Nominal change = (2023/24 ÷ 2014/15) − 1. Share change reported in percentage points. Ranks computed across the nine provinces on absolute 2023/24 BERD; the national row is excluded from the rank column.

Table 6.6 traces the KZN BERD trajectory over the full 12-year series in nominal and real terms. KZN nominal BERD peaked at R1.68 billion in 2017/18, troughed at R821 million in 2020/21 during the COVID-affected period, and stood at R1.39 billion in 2023/24, approximately 17.5% below the 2017/18 nominal peak. Nominal CAGR over the 9-year window is −0.9%, a nominally flat reading. The R-squared of the linear trend is 0.16, the lowest of any KZN Investment indicator, reflecting a series with very weak directional signal at the nominal level.

Table 6.6: KZN Business R&D longitudinal trajectory, 2012/13 to 2023/24

YEAR	KZN NOMINAL (R'000)	KZN REAL (CONSTANT 2015 R'000)	KZN SHARE OF NATIONAL (%)	KZN RANK (OF NINE)	YOY REAL GROWTH (%)
2012/13	1 237 563	1 456 723	11.71	4th	–
2013/14	1 434 084	1 594 841	12.17	3rd	+9.5
2014/15	1 501 659	1 584 934	11.30	3rd	−0.6
2015/16	1 436 737	1 436 737	10.40	3rd	−9.4
2016/17	1 553 130	1 452 172	10.51	3rd	+1.1
2017/18	1 679 718	1 489 032	10.59	3rd	+2.5
2018/19	1 446 281	1 232 864	10.01	3rd	−17.2
2019/20	1 193 914	972 854	11.15	3rd	−21.1
2020/21	821 492	635 145	8.18	3rd	−34.7
2021/22	1 061 049	770 955	7.84	3rd	+21.4
2022/23	1 252 446	864 704	8.63	3rd	+12.2
2023/24	1 385 350	913 332	9.17	3rd	+5.6

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.48 for 2014/15 onwards) and Statistical Report 2015/16 (for 2012/13 and 2013/14 backfill); GDP deflator from Table C.2 applied to compute real values; KZN SOI Investment workbook FINAL, Indicator 21 Dimensions C, D, E and F. Real values computed by dividing the nominal KZN time series by the GDP deflator index. Year-on-year real growth column reports the percentage change in real KZN BERD from one year to the next.

In real terms the KZN BERD trajectory is materially worse than the nominal trajectory implies. Real BERD peaked at R1.59 billion in 2013/14, troughed at R635 million in 2020/21, and recovered to R913 million in 2023/24. The real index for 2023/24 against a 2014/15 base of 100 is 57.6, which means KwaZulu-Natal has lost approximately 42% of real business R&D purchasing power over the 9-year window. Real CAGR sits at −5.9%, against a national BERD real CAGR of −3.7% over the same window. KZN business R&D is therefore contracting at approximately 1.6 times the national rate, and faster than every other KZN R&D sector across this analytical window.

Two qualifications apply. The 2020/21 trough of R821 million nominal coincides with the COVID-19 pandemic and the immediate post-pandemic period, when business R&D budgets were widely cut across South Africa. The KZN recovery from the trough has been partial, with the 2023/24 nominal value approximately 17.5% below the 2017/18 nominal peak and the 2023/24 real value 42.7% below the 2013/14 real peak. Series volatility is high (CV of 17.6%), high enough that single-year movements should not be over-interpreted, albeit the trajectory is unambiguously downward in real terms across the full 9-year window.

KZN Business R&D is the most contracted single component of the provincial R&D base: the real index has fallen to 57.6 against a 2014/15 base of 100, a real CAGR of −5.9% over the 9-year window against a national BERD real CAGR of −3.7%. The contraction is faster than the national rate and faster than every other KZN R&D sector. The private R&D layer of the KZN innovation system is the layer under most pressure, and warrants direct policy attention. The trajectory's interaction with the COVID-affected window does not account for the full magnitude of contraction; the nominal trajectory peaked in 2017/18, before the pandemic, and the real series has not recovered to the 2014/15 base.

6.4 Higher Education R&D (Indicator 22)

Higher Education R&D (HERD) is the largest single component of the KZN provincial R&D mix, accounting for 34.9% of provincial GERD in 2023/24. The composition reflects the size of the UKZN, DUT, MUT and UNIZULU research base. KwaZulu-Natal ranks 3rd nationally on absolute HERD in 11 of 12 years across the 2012/13 to 2023/24 series; the only year outside this position is 2015/16, when Eastern Cape briefly overtook KZN to take 3rd rank for that year. Nominal HERD rose from R843 million in 2014/15 to R1.51 billion in 2023/24, a nominal CAGR of 6.7% over the 9-year window. The R-squared of the linear trend is 0.62, the third-highest of any KZN Investment indicator after Not-for-Profit R&D (0.88) and Government R&D (0.87).

Table 6.7 sets out the full provincial HERD comparator across the 9-year window. The Western Cape recorded the largest absolute and largest national-share gain, with nominal HERD rising from R2.76 billion to R6.02 billion (+118.5%) and share rising 5.2 percentage points to reach 38.1% of national HERD in 2023/24. Limpopo recorded the largest proportional gain at +138.5% (R216 million to R516 million), albeit from a much smaller base. Gauteng grew from R2.73 billion to R4.73 billion (+73.1%) but lost 2.7 percentage points of national share, the largest national-share loss across the nine provinces. KZN grew from R843 million to R1.51 billion (+79.1%), a faster proportional expansion than Gauteng but a smaller absolute gain. Northern Cape recorded a nominal contraction (−38.8%); its share fell from 1.75% to 0.57%, a decline of 1.2 percentage points and the third-largest share loss across the period after Gauteng (−2.7pp) and Free State (−1.7pp).

Table 6.7: Provincial Higher Education R&D, 2014/15 versus 2023/24 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	R&D 2014/15 (R'000)	R&D 2023/24 (R'000)	NOMINAL CHANGE	SHARE 2014/15 (%)	SHARE 2023/24 (%)	SHARE CHANGE (PP)	RANK 2023/24
Eastern Cape	612 239	1 192 784	+94.8%	7.31	7.55	+0.24	4
Free State	491 203	655 670	+33.5%	5.86	4.15	−1.71	6
Gauteng	2 733 330	4 731 738	+73.1%	32.63	29.96	−2.67	2
KwaZulu-Natal	**843 111**	**1 509 636**	**+79.1%**	**10.06**	**9.56**	**−0.51**	**3**
Mpumalanga	174 657	313 528	+79.5%	2.08	1.99	−0.10	8
Northern Cape	146 769	89 860	−38.8%	1.75	0.57	−1.18	9
North West	404 575	763 690	+88.8%	4.83	4.84	+0.01	5
Western Cape	2 755 339	6 021 690	+118.5%	32.89	38.13	+5.24	1
South Africa (national)	**8 377 575**	**15 794 499**	**+88.5%**	**100.00**	**100.00**	**–**	**n/a**

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.141); KZN SOI Investment workbook FINAL, Indicator 22 Dimensions A and B. All values in current prices (nominal). Nominal change = (2023/24 ÷ 2014/15) − 1. Share change reported in percentage points. Ranks computed across the nine provinces on absolute 2023/24 HERD; the national row is excluded from the rank column.

Table 6.8 traces the KZN HERD trajectory over the full 12-year series. The nominal series shows a 34.0% drop from R1.14 billion in 2012/13 to R750 million in 2013/14, a real-data feature confirmed in HSRC Table C.141 across both the 2015/16 and 2023/24 Statistical Reports and not a transcription artefact. From the 2014/15 trough of R843 million the series recovered through to a nominal peak of R1.65 billion in 2018/19, after which it has settled in a R1.38 billion to R1.51 billion band through to 2023/24. In real terms the KZN HERD series peaked at R1.40 billion (constant 2015) in 2018/19 and has fallen to R995 million in 2023/24, a 29.1% decline from the real peak.

Table 6.8: KZN Higher Education R&D longitudinal trajectory, 2012/13 to 2023/24

YEAR	KZN NOMINAL (R'000)	KZN REAL (CONSTANT 2015 R'000)	KZN SHARE OF NATIONAL (%)	KZN RANK (OF NINE)	YOY REAL GROWTH (%)
2012/13	1 137 258	1 338 655	15.51	3rd	–
2013/14	750 507	834 637	10.29	3rd	−37.6
2014/15	843 111	889 866	10.06	3rd	+6.6
2015/16	903 664	903 664	9.15	4th	+1.6
2016/17	1 157 722	1 082 467	9.93	3rd	+19.8
2017/18	1 428 653	1 266 469	10.98	3rd	+17.0
2018/19	1 646 915	1 403 892	12.49	3rd	+10.9
2019/20	1 514 301	1 233 919	10.68	3rd	−12.1
2020/21	1 377 646	1 065 141	9.99	3rd	−13.7
2021/22	1 471 778	1 069 389	10.34	3rd	+0.4
2022/23	1 496 220	1 033 009	10.04	3rd	−3.4
2023/24	1 509 636	995 272	9.56	3rd	−3.7

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.48 for 2014/15 onwards) and Statistical Report 2015/16 (for 2012/13 and 2013/14 backfill); GDP deflator from Table C.2 applied to compute real values; KZN SOI Investment workbook FINAL, Indicator 21 Dimensions C, D, E and F. Real values computed by dividing the nominal KZN time series by the GDP deflator index. Year-on-year real growth column reports the percentage change in real KZN BERD from one year to the next.

The 9-year real CAGR for KZN HERD is +1.25% from the 2014/15 base, and the real index for 2023/24 stands at 111.8 against that base. The 9-year window therefore shows positive real growth, albeit below the national HERD real CAGR of +1.83% over the same window. The reading changes when the analytical anchor moves. Against the 2018/19 real peak the KZN HERD series has contracted at a CAGR of approximately −6.6% over five years; against the elevated 2012/13 starting value (R1.34 billion in constant 2015 rand) the full-series real CAGR is −2.7%. The post-2018 plateau has therefore developed into a sustained contraction, a pattern that the positive 9-year CAGR partially obscures.

The 12-year national-share trajectory is the more concerning analytical feature, although its interpretation requires care. The KZN share of national HERD has fallen from 15.5% in 2012/13 to 9.6% in 2023/24, a 6.0 percentage point decline. The decline is concentrated in the 2012/13 to 2013/14 transition: KZN's share dropped from 15.5% to 10.3% in a single year, mirroring the 34.0% nominal contraction discussed above. From 2013/14 onwards the KZN HERD share has held in a 9.2% to 12.5% band, with the 9-year window from 2014/15 showing only a 0.5 percentage point share decline. The 6.0 percentage point full-series figure therefore reflects the starting-year transition rather than a sustained 12-year erosion of share. The honest reading is that KZN HERD share fell sharply in one year early in the series and has been broadly stable since, with the post-2018/19 real-terms contraction (real CAGR approximately −6.6% per annum across five years) representing the more recent and active concern. The principal beneficiary of national HERD growth across the period has been the Western Cape, whose share rose from 29.6% in 2012/13 to 38.1% in 2023/24, a gain of 8.5 percentage points; on the 9-year window from 2014/15 the Western Cape gain narrows to 5.2 percentage points.

KZN HERD shows positive 9-year real growth set against a post-2018/19 contraction: real CAGR over the 9-year window is +1.25% and the real index for 2023/24 sits at 111.8 against a 2014/15 base, a positive reading at the level of the 9-year analytical anchor. Real HERD has nevertheless fallen 29.1% from its 2018/19 peak across five years, contracting

at approximately −6.6% per annum across that five-year period. The 12-year share decline of 6.0 percentage points is concentrated almost entirely in the 2012/13 to 2013/14 transition (a 5.2 percentage point drop in one year, mirroring the 34.0% nominal contraction in that year), with the post-2013/14 KZN share holding in a 9.2% to 12.5% band. The post-2018/19 real-terms contraction is therefore the more recent and active analytical concern; the 12-year share number reflects a starting-year transition rather than a sustained share-erosion trend.

6.5 Government Sector R&D (Indicator 23)

Government R&D in KwaZulu-Natal is the smallest of the five performing sectors in the provincial mix, accounting for 6.8% of provincial GERD in 2023/24. KwaZulu-Natal ranks 4th nationally on Government R&D in 11 of 12 years across the 2012/13 to 2023/24 series; the only year outside this position is 2013/14, when KZN briefly held 3rd rank as Eastern Cape Government R&D dipped temporarily below KZN. KZN Government R&D stood at R296 million in 2023/24, accounting for 9.7% of national Government R&D. The series is materially smaller than KZN's BERD, HERD, Science Council or Not-for-Profit R&D sectors.

Table 6.9 sets out the full provincial Government R&D comparator across the 9-year window. The 2023/24 ranking is led by Gauteng (R1.05 billion, 34.4% national share), Western Cape (R747 million, 24.5%) and Eastern Cape (R428 million, 14.0%); KZN sits 4th. Northern Cape recorded the largest proportional gain (+210.0% nominal, +2.6 percentage points of share), and Western Cape the largest absolute gain (+R366 million, +4.4 percentage points of share). North West recorded the largest proportional decline (−31.8% nominal, −1.7 percentage points of share). KZN itself recorded a 66.5% nominal increase but only a 0.3 percentage point share gain over the 9-year window. Other provinces (notably Western Cape, Eastern Cape and Northern Cape) absorbed a larger share of the national Government R&D growth.

Table 6.9: Provincial Government R&D, 2014/15 versus 2023/24 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	R&D 2014/15 (R'000)	R&D 2023/24 (R'000)	NOMINAL CHANGE	SHARE 2014/15 (%)	SHARE 2023/24 (%)	SHARE CHANGE (PP)	RANK 2023/24
Eastern Cape	227 427	428 113	+88.2%	12.01	14.02	+2.01	3
Free State	60 860	83 120	+36.6%	3.21	2.72	−0.49	8
Gauteng	760 199	1 050 429	+38.2%	40.16	34.41	−5.75	1
KwaZulu-Natal	**177 517**	**295 558**	**+66.5%**	**9.38**	**9.68**	**+0.30**	**4**
Limpopo	83 683	138 196	+65.1%	4.42	4.53	+0.11	6
Mpumalanga	93 566	109 051	+16.5%	4.94	3.57	−1.37	7
Northern Cape	52 579	162 987	+210.0%	2.78	5.34	+2.56	5
North West	56 719	38 657	−31.8%	3.00	1.27	−1.73	9
Western Cape	380 461	746 768	+96.3%	20.10	24.46	+4.36	2
South Africa (national)	**1 893 011**	**3 052 879**	**+61.3%**	**100.00**	**100.00**	**–**	**n/a**

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.106); KZN SOI Investment workbook FINAL, Indicator 23 Dimensions A and B. All values in current prices (nominal). Nominal change = (2023/24 ÷ 2014/15) − 1. Share change reported in percentage points. Ranks computed across the nine provinces on absolute 2023/24 Government R&D; the national row is excluded from the rank column.

Table 6.10 traces the KZN Government R&D trajectory over the full 12-year series. Nominal Government R&D rose from R168 million in 2012/13 to R296 million in 2023/24, a nominal CAGR of 5.8% over the 9-year window and 5.3% over the full 11-year window. In real terms the series is essentially flat: real CAGR of +0.4% over the 9-year window, with the real index for 2023/24 standing at 104.0 against a 2014/15 base of 100. Real Government R&D in KZN has therefore just kept pace with inflation across the 9-year window, neither expanding nor contracting in purchasing-power terms.

Table 6.10: KZN Government R&D longitudinal trajectory, 2012/13 to 2023/24

YEAR	KZN NOMINAL (R'000)	KZN REAL (CONSTANT 2015 R'000)	KZN SHARE OF NATIONAL (%)	KZN RANK (OF NINE)	YOY REAL GROWTH (%)
2012/13	168 029	197 785	11.69	4th	–
2013/14	161 962	180 117	9.54	3rd	−8.9
2014/15	177 517	187 361	9.38	4th	+4.0
2015/16	187 088	187 088	9.29	4th	−0.1
2016/17	172 655	161 432	8.23	4th	−13.7
2017/18	206 551	183 103	8.88	4th	+13.4
2018/19	236 602	201 688	10.64	4th	+10.2
2019/20	205 503	167 453	10.85	4th	−17.0
2020/21	284 898	220 272	12.73	4th	+31.5
2021/22	290 063	210 759	11.73	4th	−4.3
2022/23	306 663	211 724	11.27	4th	+0.5
2023/24	295 558	194 855	9.68	4th	−8.0

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.106 for 2014/15 onwards) and Statistical Report 2015/16 (for 2012/13 and 2013/14 backfill); GDP deflator from Table C.2 applied to compute real values; KZN SOI Investment workbook FINAL, Indicator 23 Dimensions C, D, E and F.

The R-squared on the KZN Government R&D linear trend is 0.87, the second-highest of any KZN Investment indicator after Not-for-Profit R&D (0.88) and a marker of relatively low year-on-year volatility. The series has nevertheless moved within a meaningful range in real terms (R161 million to R220 million in constant 2015 rand), with a real peak in 2020/21 followed by gradual decline through 2023/24. Stability around a flat-real baseline is analytically distinct from growth, and the KZN Government R&D base remains small in absolute terms relative to KZN's HERD, BERD and Science Council R&D sectors.

The 12-year share trajectory shows decline. The KZN share of national Government R&D has fallen from 11.7% in 2012/13 to 9.7% in 2023/24, a 2.0 percentage point decline. The 9-year window shows a small share gain of 0.3 percentage points (9.4% in 2014/15 to 9.7% in 2023/24), within which the share dipped to a within-window minimum of 8.2% in 2016/17, climbed to a within-window maximum of 12.7% in 2020/21, and retraced to 9.7% in 2023/24. The full-series direction is consistent with the broader pattern of KZN share erosion across most R&D sectors, albeit at a smaller magnitude than HERD (−5.9pp) or NFP R&D (−7.8pp, examined in Section 6.6).

KZN Government R&D shows the second-highest trajectory stability in the Investment category, but flat in real terms: the R-squared of the linear trend is 0.87, second only to Not-for-Profit R&D at 0.88 and well above the other Investment indicators. Nominal CAGR over the 9-year window is +5.8%, and real CAGR is +0.4%. Real Government

R&D has therefore held its 2014/15 purchasing power across nine years without expanding it, a flat-real reading rather than a growth reading. The 12-year share trajectory shows a 2.0 percentage point decline, smaller than HERD or NFP share losses but consistent in direction with the broader KZN share erosion across the period.

6.6 Not-for-Profit Sector R&D (Indicator 24)

Not-for-Profit (NFP) R&D accounts for 10.0% of KZN provincial GERD in 2023/24, against approximately 4.0% nationally. KZN's NFP share of its own provincial GERD is therefore approximately 2.5 times the national norm, the most pronounced sector-share divergence between the province and the national composition. KwaZulu-Natal ranks 2nd nationally on absolute NFP R&D in 2023/24, behind Gauteng and ahead of every other province; the province has held a top-three rank in every year of the 12-year series, ranking 1st in 2012/13, 2nd in seven years and 3rd in four years. Nominal NFP R&D rose from R181 million in 2014/15 to R433 million in 2023/24, a nominal CAGR of 10.2% over the 9-year window, the highest of any KZN R&D sector. The R-squared of the linear trend is 0.88, the highest of any KZN Investment indicator.

Table 6.11 sets out the full provincial NFP R&D comparator across the 9-year window. The Western Cape recorded the largest gain, with nominal NFP R&D rising from R80 million to R400 million (+396.9%) and a national share gain of 12.4 percentage points, the largest share gain across the nine provinces. KZN itself recorded a 139.0% nominal increase and a share gain of 1.4 percentage points. Six provinces lost share over the 9-year window; Gauteng's loss of 6.1 percentage points was the largest, reflecting the redistribution of national NFP R&D growth principally towards the Western Cape. Free State recorded the largest proportional decline at −49.3% (R14 million to R7 million), albeit from a small base. The 2023/24 ranking is led by Gauteng (R543 million, 30.9% national share), KZN (R433 million, 24.6%) and Western Cape (R400 million, 22.8%); these three provinces together account for 78.2% of national NFP R&D.

Table 6.11: Provincial Not-for-Profit R&D, 2014/15 versus 2023/24 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	R&D 2014/15 (R'000)	R&D 2023/24 (R'000)	NOMINAL CHANGE	SHARE 2014/15 (%)	SHARE 2023/24 (%)	SHARE CHANGE (PP)	RANK 2023/24
Eastern Cape	27 219	36 802	+35.2%	3.50	2.09	−1.40	6
Free State	14 214	7 209	−49.3%	1.83	0.41	−1.42	8
Gauteng	287 783	542 518	+88.5%	36.95	30.87	−6.09	1
KwaZulu-Natal	**181 052**	**432 727**	**+139.0%**	**23.25**	**24.62**	**+1.37**	**2**
Limpopo	49 971	97 440	+95.0%	6.42	5.54	−0.87	5
Mpumalanga	30 594	25 976	−15.1%	3.93	1.48	−2.45	7
Northern Cape	1 546	3 362	+117.5%	0.20	0.19	−0.01	9
North West	105 904	211 656	+99.9%	13.60	12.04	−1.56	4
Western Cape	80 489	399 910	+396.9%	10.34	22.75	+12.42	3
South Africa (national)	**778 772**	**1 757 600**	**+125.7%**	**100.00**	**100.00**	**–**	**n/a**

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.106); KZN SOI Investment workbook FINAL, Indicator 23 Dimensions A and B. All values in current prices (nominal). Nominal change = (2023/24 ÷ 2014/15) − 1. Share change reported in percentage points. Ranks computed across the nine provinces on absolute 2023/24 Government R&D; the national row is excluded from the rank column.

Table 6.12 traces the KZN NFP R&D trajectory over the full 12-year series. The nominal series rose from R163 million in 2012/13 to R433 million in 2023/24, with the 2023/24 value the highest in the series. The COVID-affected pattern of the KZN NFP series mirrors that of Government R&D (Section 6.5) in showing recovery and growth through and after the COVID-affected years rather than a 2020/21 trough. KZN nominal NFP R&D recorded a brief 2019/20 dip to R268 million followed by a sharp 2020/21 rebound to R357 million, the highest reading recorded up to that point in the series. The series then retraced through 2021/22 and 2022/23 before rising to a 12-year high of R433 million in 2023/24, a 24.2% year-on-year nominal increase. This contrasts directly with BERD (Section 6.3), which troughed at R821 million nominal and R635 million real in 2020/21 and has not recovered to its pre-COVID base.

Table 6.12: KZN Not-for-Profit R&D longitudinal trajectory, 2012/13 to 2023/24

YEAR	KZN NOMINAL (R'000)	KZN REAL (CONSTANT 2015 R'000)	KZN SHARE OF NATIONAL (%)	KZN RANK (OF NINE)	YOY REAL GROWTH (%)
2012/13	163 221	192 126	32.40	1st	–
2013/14	166 603	185 279	28.57	2nd	−3.6
2014/15	181 052	191 092	23.25	2nd	+3.1
2015/16	232 636	232 636	26.11	2nd	+21.7
2016/17	277 770	259 714	27.30	2nd	+11.6
2017/18	317 706	281 639	26.12	2nd	+8.4
2018/19	316 771	270 027	21.32	3rd	−4.1
2019/20	267 615	218 065	17.73	3rd	−19.2
2020/21	357 192	276 167	22.78	2nd	+26.6
2021/22	334 603	243 121	20.92	3rd	−12.0
2022/23	348 433	240 562	19.68	3rd	−1.1
2023/24	432 727	285 288	24.62	2nd	+18.6

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.190 for 2014/15 onwards) and Statistical Report 2015/16 (for 2012/13 and 2013/14 backfill); GDP deflator from Table C.2 applied to compute real values; KZN SOI Investment workbook FINAL, Indicator 24 Dimensions C, D, E and F.

Real NFP R&D rose from R191 million (constant 2015) in 2014/15 to R285 million in 2023/24, a real CAGR of +4.55% over the 9-year window. The real index for 2023/24 against a 2014/15 base of 100 stands at 149.3, the highest reading across the seven Investment indicators in this category. The national NFP R&D real CAGR over the same 9-year window is +3.89% (rising from R822 million to R1.16 billion in constant 2015 rand), so KZN NFP R&D is also expanding faster in real terms than the national NFP R&D base. The 2023/24 real value is the highest single-year reading in the entire 12-year series.

The 12-year share trajectory shows a different pattern. The KZN share of national NFP R&D has fallen from 32.4% in 2012/13 to 24.6% in 2023/24, a 7.8 percentage point decline and the largest full-series share loss recorded by any KZN R&D sector. The share fall was concentrated in the early years of the series: 32.4% in 2012/13 → 23.2% in 2014/15 (a 9.1 percentage point drop in two years), with the share subsequently oscillating between 17.7% and 27.3% across the 2015/16 to 2023/24 window. The 9-year window shows a small share gain of 1.4 percentage points (23.2% → 24.6%). KZN therefore retains a large absolute and relative position in NFP R&D whilst no longer holding the national-share dominance recorded at the start of the series.

KZN Not-for-Profit R&D is the strongest single growth signal in the Investment category: real CAGR of +4.55% over the 9-year window, a real index of 149.3 against a 2014/15 base, growth faster than the national NFP R&D base (+3.89%), and the highest R-squared of any KZN Investment indicator (0.88). The pattern is countervailing to the BERD contraction and the post-2018/19 HERD decline. The full-series share decline from 32.4% in 2012/13 to 24.6% in 2023/24 is the largest national-share loss recorded by any KZN R&D sector across the 12-year series, but the post-2014/15 trajectory has been one of expansion in absolute, share and real terms.

6.7 Science Council R&D (Indicator 25)

Science Council R&D in KwaZulu-Natal stood at R707 million in 2023/24, accounting for 16.3% of KZN provincial GERD and 9.2% of national Science Council R&D. KwaZulu-Natal ranked 3rd nationally on absolute Science Council R&D in every year from 2012/13 to 2017/18 inclusive; from 2018/19 onwards the province has ranked 4th in every year, displaced by Northern Cape (which rose from 6th in 2014/15 to 3rd in 2023/24, principally driven by SKA and SARAO-related expenditure). The KZN ranking is therefore stable but at a lower position than the first half of the series. Nominal Science Council R&D grew at a CAGR of 4.3% over the 9-year window and 7.9% over the full 11-year window from 2012/13.

Table 6.13 sets out the full provincial Science Council R&D comparator across the 9-year window. The 2023/24 ranking is led by Gauteng (R4.28 billion, 55.6% national share), Western Cape (R1.22 billion, 15.9%), Northern Cape (R814 million, 10.6%) and KZN (R707 million, 9.2%). Northern Cape recorded the largest proportional gain at +448.9% (R148 million to R814 million) and the largest national share gain at +7.6 percentage points. North West recorded the largest proportional decline at −61.5% (R154 million to R59 million); the Western Cape recorded the largest national-share loss at −2.4 percentage points despite a +33.6% nominal gain, reflecting Northern Cape's faster expansion. KZN itself recorded a 46.0% nominal increase and a small share loss of 0.5 percentage points over the 9-year window.

Table 6.13: Provincial Science Council R&D, 2014/15 versus 2023/24 (sorted alphabetically; ranks computed across the nine provinces)

PROVINCE	R&D 2014/15 (R'000)	R&D 2023/24 (R'000)	NOMINAL CHANGE	SHARE 2014/15 (%)	SHARE 2023/24 (%)	SHARE CHANGE (PP)	RANK 2023/24
Eastern Cape	259 128	266 760	+2.9%	5.18	3.47	−1.71	5
Free State	58 608	69 078	+17.9%	1.17	0.90	−0.27	8
Gauteng	2 745 142	4 281 279	+56.0%	54.85	55.63	+0.78	1
KwaZulu-Natal	**484 142**	**706 710**	**+46.0%**	**9.67**	**9.18**	**−0.49**	**4**
Limpopo	117 270	119 192	+1.6%	2.34	1.55	−0.79	7
Mpumalanga	124 613	159 026	+27.6%	2.49	2.07	−0.42	6
Northern Cape	148 387	814 467	+448.9%	2.96	10.58	+7.62	3
North West	153 911	59 216	−61.5%	3.08	0.77	−2.31	9
Western Cape	913 468	1 220 592	+33.6%	18.25	15.86	−2.39	2
South Africa (national)	**5 004 669**	**7 696 320**	**+53.8%**	**100.00**	**100.00**	**–**	**n/a**

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.221); KZN SOI Investment workbook FINAL, Indicator 25 Dimensions A and B. All values in current prices (nominal). Nominal change = (2023/24 ÷ 2014/15) − 1. Share change reported in percentage points. Ranks computed across the nine provinces on absolute 2023/24 Science Council R&D; the national row is excluded from the rank column.

Table 6.14 traces the KZN Science Council R&D trajectory over the full 12-year series. Nominal Science Council R&D rose from R307 million in 2012/13 to R707 million in 2023/24, the series high. The trajectory has been volatile (CV of 27.8%) with two intermediate troughs at R428 million in 2018/19 and R437 million in 2020/21. The R-squared of the linear trend is 0.55, broadly comparable to the GERD overall (0.57) and lower than the trajectories of HERD (0.62), Government R&D (0.87) and NFP R&D (0.88).

Table 6.14: KZN Science Council R&D longitudinal trajectory, 2012/13 to 2023/24

YEAR	KZN NOMINAL (R'000)	KZN REAL (CONSTANT 2015 R'000)	KZN SHARE OF NATIONAL (%)	KZN RANK (OF NINE)	YOY REAL GROWTH (%)
2012/13	307 302	361 722	7.63	3rd	–
2013/14	239 387	266 222	5.56	3rd	−26.4
2014/15	484 142	510 990	9.67	3rd	+91.9
2015/16	575 016	575 016	10.02	3rd	+12.5
2016/17	477 823	446 763	7.79	3rd	−22.3
2017/18	540 084	478 772	8.55	3rd	+7.2
2018/19	427 585	364 489	7.85	4th	−23.9
2019/20	448 070	365 107	7.23	4th	+0.2
2020/21	437 452	338 220	7.41	4th	−7.4
2021/22	558 627	405 896	8.79	4th	+20.0
2022/23	686 654	474 074	9.78	4th	+16.8
2023/24	706 710	465 919	9.18	4th	−1.7

Source: HSRC/CeSTII Statistical Report 2023/24 (Table C.221 for 2014/15 onwards) and Statistical Report 2015/16 (for 2012/13 and 2013/14 backfill); GDP deflator from Table C.2 applied to compute real values; KZN SOI Investment workbook FINAL, Indicator 25 Dimensions C, D, E and F.

In real terms the KZN Science Council R&D trajectory tells a different story than the nominal trajectory implies. Real Science Council R&D peaked at R575 million (constant 2015) in 2015/16 and stood at R466 million in 2023/24, materially below the real peak. Real CAGR over the 9-year window is −1.0%, against a national Science Council R&D real CAGR of −0.45% over the same window. The KZN Science Council R&D base is therefore contracting in real terms at approximately twice the national rate, albeit at a much smaller magnitude than the BERD contraction. The real index for 2023/24 against a 2014/15 base of 100 stands at 91.2, an 8.8% real contraction over the 9-year window.

The 2018/19 rank break warrants particular note. Two simultaneous movements drove the displacement. Northern Cape Science Council R&D rose 154% from R237 million in 2017/18 to R602 million in 2018/19, principally attributable to SKA (Square Kilometre Array) and SARAO (South African Radio Astronomy Observatory) operational expenditure entering full ramp-up; KZN itself recorded a 20.8% nominal contraction in the same year, from R540 million to R428 million. The combined effect moved Northern Cape from 5th to 3rd nationally and KZN from 3rd to 4th. Northern Cape has held 3rd rank in every subsequent year through 2023/24, with KZN holding 4th. The KZN 2018/19 contraction is one of two large single-year drops in the series (the other being the 22% drop from 2012/13 to 2013/14), and is consistent with the high coefficient of variation (27.8%) of the KZN trajectory.

KZN Science Council R&D is broadly stable in nominal terms but contracting in real terms: nominal CAGR of +4.3% over the 9-year window (positive but below national NFP and HERD comparators), real CAGR of −1.0% (against national −0.45%), and a real index of 91.2 against a 2014/15 base. The 2018/19 rank break from 3rd to 4th reflects two simultaneous movements: a 20.8% KZN nominal contraction in that year, and a 154% Northern Cape surge driven by SKA/SARAO operational expenditure ramping up. The KZN Science Council base ranks 4th nationally in 2023/24 and is contracting at approximately twice the national rate in real terms.

6.8 Identified Data Gaps

Three indicator-level data extensions have been deferred from the 2025/26 edition of the Investment category. Each is documented here so that the deferral is transparent rather than implicit, and so that the 2026/27 cycle can plan for inclusion where data become available.

R&D Personnel Full-Time Equivalents. R&D personnel data measure the human-capital dimension of the Investment category through Full-Time Equivalent (FTE) personnel counts engaged in R&D activity at the provincial level. This indicator is the standard companion measure to GERD in international R&D measurement (OECD Frascati Manual paragraphs 5.20–5.41) and was provisionally included in earlier drafts of the Architecture v7.0. The HSRC/CeSTII Statistical Report 2023/24 reports total national R&D personnel headcounts (44,257 total FTE; 27,561 researchers FTE; 2.6 FTE per 1,000 employed) but does not publish provincial-level FTE breakdowns at the resolution required for the SOI's nine-province comparator. The indicator is therefore deferred until provincial FTE data become available. Pathway: liaison with HSRC/CeSTII to access tabulated provincial FTE data, or commissioning equivalent estimates at the four KZN universities and KZN-headquartered Science Councils.

Higher Education R&D institutional split. KZN HERD is currently reported as a provincial aggregate (R1.51 billion in 2023/24, Section 6.4). The provincial total combines R&D performed at UKZN, DUT, MUT and UNIZULU, but the HSRC tabulations do not separate the four institutions. An institutional split would allow the SOI to track which KZN universities are driving HERD growth and which are flat or contracting. Pathway: direct request to each institution's research office for annual R&D expenditure data on a comparable methodology, or commissioning a one-off institutional split via DHET HEMIS data tabulations.

Business R&D by industry. KZN BERD is currently reported at the provincial total level (R1.39 billion in 2023/24, Section 6.3). The provincial total combines R&D activity across manufacturing, financial services, mining, agriculture and other industries. An industry split would be of substantive analytical value given KZN's industrial profile (automotive components, paper and pulp, sugar and agro-processing, heavy engineering, port-related logistics). The HSRC/CeSTII Business R&D survey collects industry-level data nationally but does not publish a provincial-by-industry tabulation. Pathway: bespoke tabulation request to HSRC/CeSTII for the provincial-by-industry breakdown.

These three extensions are not data errors in the current Investment category. The seven indicators reported in Sections 6.1 to 6.7 are complete and verifiable against the workbook. The deferred items represent additional resolution that would deepen the analysis at the next cycle.

6.9 Key Observations of the Investment Category

The following highlights key observations from the seven active indicators in the Investment category. The dominant Investment diagnostic is absolute scale held against weak real-terms momentum, low intensity and an acute Business R&D contraction. KwaZulu-Natal ranks 3rd nationally on absolute GERD throughout the 12-year series, real aggregate GERD is contracting at approximately twice the national rate, R&D intensity has held at 6th to 7th of nine across the 10-year intensity series, and Business R&D has lost 42% of its real value over the 9-year window. The five patterns set out below decompose and support this central finding: a divergence between absolute R&D scale and R&D intensity at the aggregate level (Indicators 19 and 20); sector-asymmetric real-terms trajectories, with BERD as the deepest contraction and NFP R&D as the strongest expansion (Indicators 21, 22, 24, 25); a real-terms aggregate decline at approximately twice the national rate (Indicator 19); the consistent directional pattern of KZN national-share movements with the Western Cape as the largest single recipient across the three largest performing sectors (Indicators 21, 22, 24); and a marked divergence in trajectory stability across sectors, with R-squared values ranging from 0.16 (BERD) to 0.88 (NFP R&D).

Table 6.15 sets out the cross-indicator summary. Two sectors have KZN real CAGR exceeding the national real CAGR over the 9-year window: NFP R&D (+4.55% versus national +3.89%) and Government R&D (+0.44% versus national +0.08%). NFP R&D is the only sector where the KZN real index sits well above 100 (149.3); Government R&D sits at 104.0, broadly flat. HERD, Science Council R&D and BERD all sit at or below their national real CAGRs. BERD is the outlier on the contraction side: KZN real CAGR is −5.94% against a national real CAGR of −3.73%, and the real index has fallen to 57.6, the lowest reading across the seven indicators. KZN is therefore broadly tracking national real R&D trajectories sector-by-sector, with two departures running ahead (NFP and Government R&D, both at modest magnitudes) and one running materially behind (BERD).

Table 6.15: Cross-sector summary of KZN R&D investment trajectories, 2014/15 to 2023/24

INDICATOR	KZN NOMINAL CAGR 9YR	KZN REAL CAGR 9YR	REAL INDEX 2023/24 (2014/15 = 100)	NATIONAL REAL CAGR 9YR	KZN RANK 2023/24	9-YR SHARE CHANGE (PP)
Gross Expenditure on R&D (Indicator 19)	**+3.46%**	**−1.81%**	**84.9**	**−0.87%**	**3rd**	**−0.89**
Business R&D (Indicator 21)	−0.89%	−5.94%	57.6	−3.73%	3rd	−2.13
Higher Education R&D (Indicator 22)	+6.69%	+1.25%	111.8	+1.83%	3rd	−0.51
Government R&D (Indicator 23)	+5.83%	+0.44%	104.0	+0.08%	4th	+0.30
Not-for-Profit R&D (Indicator 24)	+10.17%	+4.55%	149.3	+3.89%	2nd	+1.37
Science Council R&D (Indicator 25)	+4.29%	−1.02%	91.2	−0.45%	4th	−0.49

Source: HSRC/CeSTII Statistical Report 2023/24 (Tables C.2, C.4, C.48, C.106, C.141, C.190, C.221) and Statistical Report 2015/16 (for 2012/13 and 2013/14 backfill); KZN SOI Investment workbook FINAL, Indicators 19 to 25 derived metrics. All real values computed using the GDP deflator from HSRC/CeSTII Table C.2 (constant 2015 R'000). The GERD row is bold because it is the apex indicator; the five sector rows aggregate to the GERD value.

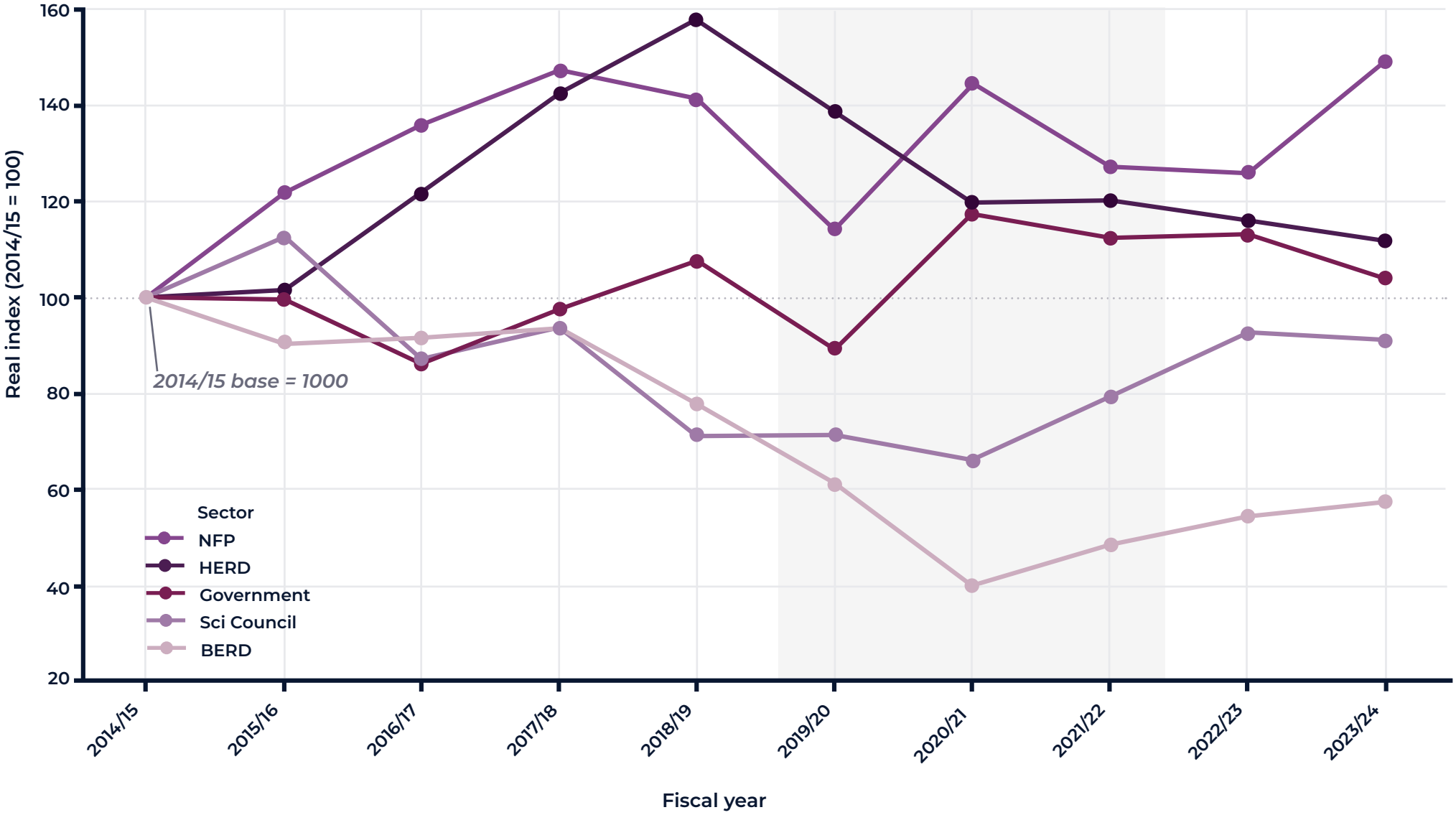

Figure 6.2: Real R&D index by sector, KwaZulu-Natal, 2014/15 to 2023/24 (constant 2015 rand, 2014/15 = 100)

Source: KZN SOI Investment workbook FINAL, Indicators 21, 22, 23, 24 and 25 real-terms series indexed to 2014/15 = 100. Real values computed from the nominal KZN time series in each indicator divided by the GDP deflator index from HSRC/CeSTII Table C.2. The shaded band indicates the COVID-affected 2019/20 to 2021/22 fiscal years. The reference line at 100 represents the 2014/15 base level.

Scale and intensity

- KwaZulu-Natal ranked 3rd nationally on absolute Gross Expenditure on R&D in every year of the 2012/13 to 2023/24 series, third only to Gauteng and the Western Cape. Provincial GERD rose from R3.01 billion in 2012/13 to R4.33 billion in 2023/24 in nominal terms, a nominal CAGR of 3.5% over the 9-year window from 2014/15.
- KZN ranked 7th of nine on R&D intensity (GERD as a share of provincial GVA) in 2022, having oscillated between 6th and 7th of nine across the full 10-year intensity series (six years at 6th, four years at 7th). Provincial intensity has fallen from 0.55% in 2017 to 0.43% in 2022 against a national average that has held at approximately 0.68% since 2019.
- The KZN share of national GERD has fallen from 12.6% in 2012/13 to 10.0% in 2023/24, a 2.6 percentage point decline over the full series, and from 10.9% in 2014/15, a 0.9 percentage point decline over the 9-year window. National GERD grew at a nominal CAGR of 5.6% over the full series whilst KZN GERD grew at 3.4%, the source of the share erosion.

Real-terms trajectory and sector divergence

- KZN real GERD contracted at a CAGR of −1.81% over the 9-year window against a national real CAGR of −0.87%, a contraction approximately twice the national rate. The real index for 2023/24 against a 2014/15 base of 100 stands at 84.9, indicating approximately 15% loss of real R&D purchasing power over the 9-year window.
- Real BERD has contracted by 42% over the 9-year window (real index 57.6 against a 2014/15 base of 100; real CAGR −5.94%), the deepest single-sector contraction in the Investment category. The KZN BERD contraction rate is approximately 1.6 times the equivalent national BERD real CAGR of −3.73%.
- Real NFP R&D has expanded by 49.3% over the 9-year window (real index 149.3 against a 2014/15 base of 100; real CAGR +4.55%), the strongest single-sector expansion in the Investment category. The KZN NFP real CAGR exceeds the national NFP real CAGR of +3.89% over the same window.
- The sectoral real-index spread at 2023/24 is 91.7 points, between BERD at 57.6 and NFP at 149.3. The category-level real CAGR of −1.81% therefore conceals very different underlying sectoral trajectories. HERD shows positive 9-year real growth (real index 111.8) but has contracted at approximately −6.6% per annum from its 2018/19 real peak across the subsequent five years.

Trajectory stability

- The R-squared of the linear trend on the KZN nominal series ranks NFP R&D first (0.88), Government R&D second (0.87), HERD third (0.62), GERD overall fourth (0.57), Science Council R&D fifth (0.55) and BERD lowest (0.16). The two highest-R-squared sectors are also the two smallest by absolute size; the two lowest-R-squared sectors are the GERD aggregate and BERD.
- The coefficient of variation across the KZN time series is highest for Science Council R&D (27.8%), followed by HERD (23.8%) and Government R&D (24.8%), and lowest for GERD overall (13.9%) and BERD (17.6%). Aggregate-level smoothing is therefore not visible at the sector level, where individual indicators show substantial year-on-year variation.

National-share trajectory

- KZN national-share movements over the 9-year window were: GERD overall −0.89pp, BERD −2.13pp, HERD −0.51pp, Government R&D +0.30pp, NFP R&D +1.37pp, Science Council R&D −0.49pp. Four of the six indicators showed declining KZN share (GERD, BERD, HERD and Science Council); two recorded positive share gains (Government R&D and NFP R&D), both at small magnitudes.
- The full-series 12-year share movements show larger declines for HERD (−5.95pp) and NFP R&D (−7.78pp), reflecting the very high KZN share recorded at the 2012/13 starting point and the concentration of the share fall in the early years of the series. NFP R&D's full-series loss is the largest national-share loss recorded by any KZN R&D sector across the 12-year series.
- The Western Cape has been the principal recipient of KZN national-share losses across the period, gaining national share in HERD (+5.2pp 9-year), BERD (+11.9pp 9-year) and NFP R&D (+12.4pp 9-year). The Western Cape has therefore moved decisively past KZN's relative position in the three largest performing sectors and is the largest single national-share-gaining province across the Investment category.

6.10 Implications for Innovation in KwaZulu-Natal

The Investment category indicators describe a provincial R&D base that is large in absolute terms, contracting in real aggregate terms, and reallocating internally between sectors with structurally different growth trajectories. The implications below trace the patterns identified in Section 6.9 to their consequences for the regional innovation system. They are presented in parallel rather than in priority order: each addresses a distinct pattern in the data and corresponds to a distinct policy question. No single implication frames the others, and the chapter does not aggregate the seven indicators into a single diagnostic.

Scale and intensity: two findings, both empirically supported

KwaZulu-Natal's 3rd national rank on absolute R&D investment, held throughout the 12-year series, sits alongside a 6th-to-7th rank on R&D intensity that has held throughout the 10-year intensity series. The province generates substantial absolute R&D investment whilst reinvesting a smaller proportion of its economic value added in R&D than five or six other provinces, including several with much smaller absolute R&D bases. The implication for the provincial innovation strategy is that scale-based framings ('KZN has substantial R&D investment') and intensity-based framings ('KZN under-invests relative to its economic activity') are both empirically supported, and both are necessary for an accurate diagnostic. Strategy responses that emphasise either framing alone will mis-state the underlying position. Two qualifications matter for forward-looking strategy. First, the intensity gap is partly a denominator effect: KZN's industrial composition, drawn from Stats SA Provincial GDP P0441.2 and KZN provincial economic profiles rather than from the R&D workbook, is dominated by sugar, agro-processing, automotive components, port-related logistics and primary manufacturing. These industries are structurally lower in R&D intensity than financial services or ICT, which compresses the GVA-denominator R&D ratio relative to provinces with different industrial mixes. Second, the policy levers available at provincial level operate principally on the numerator (provincial R&D activity) rather than on the GVA composition

The Business R&D contraction is the most acute single-sector signal

The 42% real loss in KZN Business R&D over the 9-year window, against a 29% national real loss, is the deepest single-sector contraction in the Investment category and the area requiring most direct policy attention. The contraction predates the COVID-19 pandemic: the nominal trajectory peaked in 2017/18, and the real series has not recovered to its 2014/15 base. The implication is that the contraction reflects structural rather than cyclical factors, and that provincial-level response cannot rely on post-pandemic recovery to close the gap. The provincial innovation strategy is therefore better positioned to treat KZN BERD as a sustained-attention concern than as a transitory feature of the post-COVID landscape. The deferred Business R&D-by-industry indicator (Section 6.8) would identify which industry sectors within KZN BERD are driving the contraction; in the interim, the provincial response cannot disaggregate the signal further than the sector aggregate.

The Not-for-Profit and Higher Education sectors are the offsetting growth signals

The KZN Not-for-Profit R&D base is the strongest single growth signal in the Investment category, expanding at +4.55% real CAGR over the 9-year window and reaching a real index of 149.3 against a 2014/15 base. The KZN HERD base shows positive 9-year real growth (+1.25% real CAGR, real index 111.8) although the real series has contracted from the 2018/19 peak across the five subsequent years. NFP R&D ranks 2nd nationally (behind Gauteng only); HERD ranks 3rd nationally for eleven of twelve years (behind Gauteng and the Western Cape). The implication is that the policy response to the BERD contraction should not be configured at the expense of the two offsetting growth signals: the four-institution KZN higher education base and KZN's NFP R&D position both represent strategic assets for the province's research base, and the provincial innovation strategy is better positioned to consolidate these positions whilst addressing the BERD signal separately than to treat the Investment category as a single undifferentiated diagnostic.

The reallocation pattern favours the Western Cape across multiple sectors

The Western Cape has gained national share in HERD (+5.2pp 9-year), BERD (+11.9pp 9-year) and NFP R&D (+12.4pp 9-year), the three sectors in which KZN itself either lost share or gained less than the Western Cape. The pattern is consistent across structurally distinct sectors and time windows, which strengthens the finding: a single-sector reallocation could be attributable to sector-specific factors, whilst a pattern that reappears across the business, higher education and not-for-profit performing sectors suggests a province-level dynamic rather than a sector-specific feature. The data does not identify what is driving the Western Cape's expansion, and an analytical study designed to do so sits outside the scope of this chapter. The implication for KZN innovation policy is therefore narrower than a causal attribution would warrant: the relative-share trajectory is consistent across sectors and is unlikely to be addressed by interventions that target individual sectors in isolation. Identifying the underlying drivers – and their exposure to provincial-level policy levers – is a prerequisite for a coordinated provincial response and is flagged here as a question for separate work rather than a finding of this chapter.

Real-terms aggregate decline at twice the national rate

The KZN real GERD contraction of −1.81% per annum over the 9-year window is the most fundamental single number in the Investment category. Set against a national real GERD CAGR of −0.87%, KZN is contracting at approximately twice the national rate. The 'approximately twice' shorthand is also applied to KZN Science Council R&D in Section 6.7. The two precise multipliers are 2.1× (KZN GERD against national GERD) and 2.3× (KZN Science Council R&D against national Science Council R&D); both fall within the same shorthand whilst differing by approximately 0.2× in their underlying arithmetic. The implication is twofold. First, the nominal CAGR figures (+3.5% over the 9-year window) substantially overstate the underlying trajectory and should not be reported in isolation; real-terms framing is necessary to capture the position accurately. Second, the gap between KZN's contraction rate and the national rate is the immediate concern. Closing that gap would arrest KZN's relative position decline; reversing the contraction altogether is a different and larger ambition. Provincial-level R&D targets are more usefully expressed as real-terms growth ambitions against a defined real base year than as nominal R&D growth, which can mask continued real decline. The deferred R&D Personnel FTE indicator (Section 6.8) would test whether the human-capital component of the R&D base is following the same real-terms trajectory as the financial input; in the interim, the financial input is the only variable available for direct measurement.

NFP R&D as a national-anchored sector with unmeasured concentration risk

The KZN Not-for-Profit R&D base is positioned to anchor a province-distinctive research strength. KZN ranks 2nd nationally on absolute NFP R&D in 2023/24 and accounts for 24.6% of national NFP R&D, second only to Gauteng. The 9-year window shows expansion in absolute, share and real terms, with a high R-squared of 0.88 indicating low year-on-year volatility around a positive trend. A material caveat applies. The chapter does not decompose KZN NFP R&D by performing institution or by funder, and the published HSRC/CeSTII tabulations do not provide that resolution. The position visible at the sector aggregate level may be concentrated in a small number of NFP research institutions and funder relationships; if so, the strategic value of the position is contingent on the continued operation of those underlying entities and funder commitments. An institutional and funder-side decomposition of KZN NFP R&D is a candidate addition for the 2026/27 cycle. Subject to that caveat, the implication for the provincial innovation strategy is that the NFP R&D base represents a maturity asset rather than a development priority: the 2014/15-onwards trajectory has produced a position that is over-represented relative to the national mix and resilient through the COVID-affected window. Treating this as a position to consolidate rather than to restructure preserves the strongest single growth signal the chapter identifies, against a backdrop in which most other Investment indicators show share decline or real-terms contraction. The strategic risk is that the underlying institutional/funder concentration, currently unmeasured, exceeds prudent limits – an open question that the next analytical cycle should answer.

7. ECOSYSTEM

The Ecosystem category measures the institutional infrastructure through which innovation support is provided in KwaZulu-Natal. It counts and characterises the organisations, facilities and mechanisms that exist to support innovators, rather than the people, money or outcomes that flow through them. The category is therefore distinct from People, Investment, Infrastructure and Impact in three respects: it measures stocks rather than flows; the data are point-in-time as of December 2025 rather than longitudinal; and a single facility entering or leaving the register is a structural event rather than a statistical fluctuation.

The 2025/26 edition is built around four indicators. Indicator 26 reports a register-based count of innovation support facilities operating in South Africa, with detailed analysis of the KZN position, type profile, geographic spread and governance structure. Indicator 27 maps university-anchored innovation infrastructure and reports for the first time on the technology-transfer orientation of KZN universities, using patent data drawn from the CIPC register and cross-referenced with DHET research output. Indicator 28 profiles the three KZN Living Labs in count, location and anchor terms only; the qualitative dimensions originally envisaged on domain focus and maturity classification have been formally removed for 2025/26 because the verification questionnaire did not return usable values within the publication window. Indicator 29 measures the structure of the funding-support directory accessible to KZN innovators, promoted from supplementary status in v7 of the workbook on the basis that it captures the access-side configuration of the funding-support environment, which Indicators 26 to 28 do not.

The 2025/26 figures are not directly comparable to those reported in 2024/25. The underlying register has been substantially reconstructed, with the headline KZN count rising from nine organisations in the 2024/25 edition to 18 facility entries in the v16.3 register following systematic correction, reclassification and enrichment. The change is methodological rather than ecosystemic, and subsequent editions will be in a position to track ecosystem change against the v16.3 baseline with greater confidence.

7.1 Innovation Support Organisations (Indicator 26)

INDICATOR 26

Innovation Support Organisations

Four analytical dimensions presented in this section.

DIMENSION A

Provincial scale and rank

All nine provinces benchmarked on facility entries by type, total entries, rank and entry-to-GDP ratio.

SHOWN AS
Table 7.1 / Figure 7.1

DIMENSION B

KZN type profile

Representation index of nine facility types within KZN against the national protfolio mix.

SHOWN AS
Figure 7.2

DIMENSION C

District distribution

KZN facility entries by district, with a particular focus on the eThekwini concentration.

SHOWN AS
Inline narrative

DIMENSION D

Governance mix

Three-way breakdown of KZN entries by public, university-linked and non-profit / private governance.

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Inline narrative

KwaZulu-Natal holds 18 facility entries in the v16.3 Innovate Durban register and ranks fourth among the nine provinces. The province sits below Gauteng (51 entries), the Eastern Cape (22) and the Western Cape (21), and ahead of Limpopo (12), the Free State (10), Mpumalanga (9) and the joint-bottom Northern Cape and North West at 8 each. KZN therefore accounts for 11.3% of the 159 facility entries in the national register. Of the 18 KZN entries, 11 are confirmed active through primary-source verification and 7 are classified as 'appears active' on secondary-source evidence only; the defensible reporting convention is therefore 11 confirmed active, with up to 18 in the register.

Table 7.1: Innovation Support Facility Entries by Province and Type, 2025/26

PROVINCE	TECH STATION	INCUBATOR	SCIENCE PARK	FAB LAB	LIVING LAB	EKASI LAB	INNOV. COLLAB	UNIV. INCUB.	MLAB	TOTAL	RANK (OF 9)
Eastern Cape	3	13	1	0	3	0	0	2	0	22	2
Free State	1	5	1	1	1	0	0	1	0	10	6
Gauteng	6	20	2	5	2	10	0	5	1	51	1
KwaZulu-Natal	**2**	**8**	**2**	**0**	**3**	**0**	**0**	**2**	**1**	**18**	**4**
Limpopo	1	6	1	1	1	0	0	1	1	12	5
Mpumalanga	0	7	0	0	1	0	0	1	0	9	7
Northern Cape	1	3	0	1	0	0	1	1	1	8	8
North West	0	5	0	1	1	0	0	1	0	8	8
Western Cape	4	10	1	1	1	0	1	2	1	21	3
NATIONAL TOTAL	**18**	**77**	**8**	**10**	**13**	**10**	**2**	**16**	**5**	**159**	**–**

Source: Innovate Durban Innovation Support Facility Register v16.3, December 2025. KZN row highlighted. Provinces ranked by total entries; ties at rank 8 between Northern Cape and North West.

The KZN type profile is moderately diversified, with six of the nine recognised facility types represented. This matches the Free State and Northern Cape but trails Gauteng and the Western Cape, with eight types each, and Limpopo with seven. Three areas of relative strength stand out. KZN ties first nationally on Living Labs (3 entries, alongside the Eastern Cape) and on Science Parks (2 entries, alongside Gauteng), and ties second on University Incubators (2 entries, alongside the Eastern Cape and Western Cape, behind Gauteng at five). The representation index, computed as KZN portfolio share divided by national portfolio share, places Science Parks at 2.21× and Living Labs at 2.04× the national mix.

Table 7.2: KZN Representation Index by Facility Type, 2025/26

FACILITY TYPE	KZN ENTRIES	NATIONAL TOTAL	KZN PORTFOLIO SHARE	NAT. PORTFOLIO SHARE	REPRESENTATION INDEX	KZN RANK	READING
Technology Station	2	18	11.1%	11.3%	0.98×	4	Near national mix
Incubator	8	77	44.4%	48.4%	0.92×	4	Near national mix
Science Park	2	8	11.1%	5.0%	2.21×	1=	Over-represented
Fab Lab	**0**	**10**	**0.0%**	**6.3%**	**0.00×**	**–**	**Absent from register**
Living Lab	3	13	16.7%	8.2%	2.04×	1=	Over-represented
eKasi Lab	0	10	0.0%	6.3%	0.00×	–	Absent from register
Innovation Collaboration	0	2	0.0%	1.3%	0.00×	–	Absent from register
University Incubator	2	16	11.1%	10.1%	1.10×	2=	Near national mix
MLab	1	5	5.6%	3.1%	1.77×	1=	Over-represented

Source: Innovate Durban Innovation Support Facility Register v16.3, December 2025. Representation index = KZN portfolio share / national portfolio share. Above 1.5 = over-represented; below 0.7 = under-represented; 0.7 to 1.5 = near national mix. Over-represented rows shaded light; the Fabrication Lab gap shaded amber for emphasis.

The Fab Lab absence is the most analytically significant finding in the type profile. KZN is the only province in the top four by total entries with no Fabrication Lab in the register. Gauteng holds five, and Limpopo, the Northern Cape, North West, the Free State and the Western Cape each hold one. The gap is consistent across multiple editions of this publication and warrants sustained attention given the province's industrial base, manufacturing sector and three university anchors, all of which would be expected to support hardware prototyping infrastructure. Two qualifications apply. The register counts entries against a recognised national taxonomy, and it does not follow that no prototyping capacity of any kind exists in the province; universities, TVET colleges and private workshops will host equipment relevant to prototyping that is not constituted as a Fab Lab in the national taxonomy. Even with that qualification, the absence of a formally classified Fab Lab is consistent across editions and is a structural feature of the KZN ecosystem rather than an artefact of the register.

Whilst KZN sits in the upper half of the national distribution on the absolute scale measure, the position falls back when entries are normalised against economic weight. KwaZulu-Natal contributes approximately 16.1% of national GDP (Stats SA, 2025b) whilst holding 11.3% of the national total of facility entries. The entry-to-GDP ratio is 0.70×, meaning the KZN ecosystem footprint is approximately 70% of what would be expected if facility entries were distributed in proportion to provincial economic scale. KZN ranks ninth of nine provinces on this measure. It is a recurring pattern in the framework: the province sits near the top on absolute scale measures and falls back on intensity and relative-weight measures.

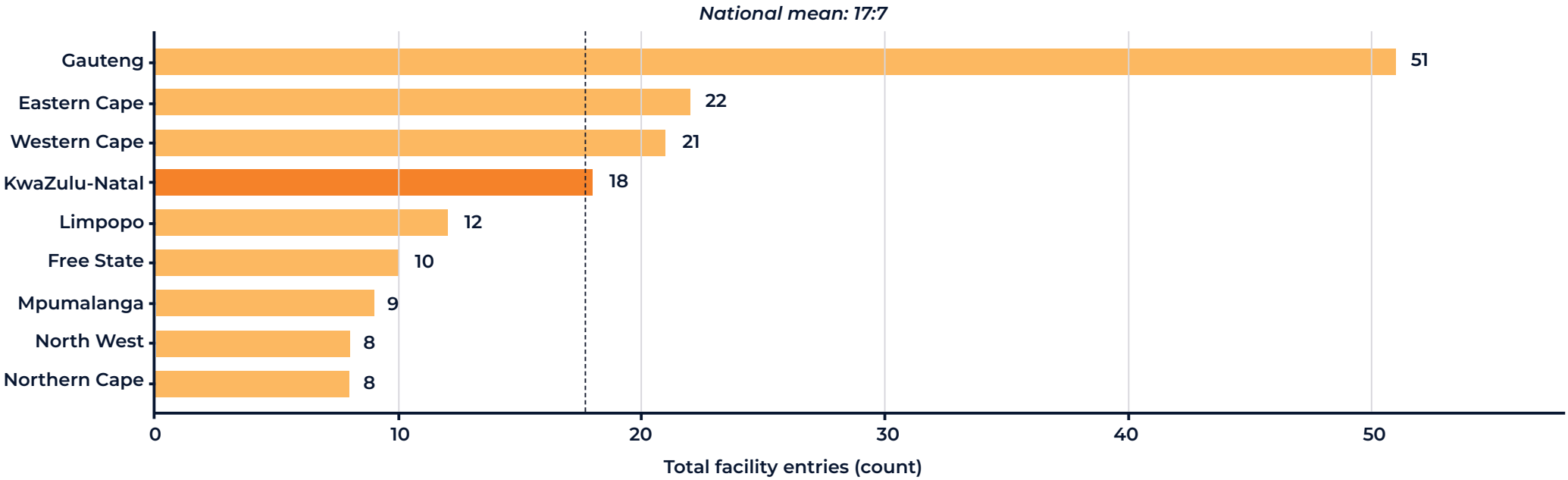

Figure 7.1: Total Innovation Support Facility entries by province, 2025/26 (national mean reference line at 17.7 entries per province)

Source: Innovate Durban Innovation Support Facility Register v16.3, December 2025. Bar values are total facility entries per province; reference line at national mean (17.7 entries per province).

Within the province, the distribution of facility entries is heavily concentrated in eThekwini Metro. Thirteen of the 18 KZN facility entries have at least one eThekwini site, approximately 72% of the provincial total. King Cetshwayo holds two entries, Ugu two, Harry Gwala three, uMgungundlovu one and Umzinyathi one. Five of the eleven KZN districts have no confirmed facility-entry presence in the v16.3 register: uThukela, iLembe, uMkhanyakude, Zululand and Amajuba. For innovators in those five districts, and in the more rural parts of the four districts that do have a presence, the practical accessibility of innovation support is materially lower than the headline KZN count of 18 implies.

The 18 KZN entries divide approximately equally between three governance families. Public and public-programme facilities account for around 39% of KZN entries, funded through national programmes including the Technology Innovation Agency (TIA) Technology Station Programme, the Automotive Industry Development Centre (AIDC), the Department of Science and Innovation (DSI), the DHET-funded Centre for Entrepreneurship and Rapid Incubation (CFERI) initiative and the Small Enterprise Development Agency (SEDA) / Small Enterprise Development and Finance Agency (SEDFA) incubation network. University-linked facilities account for 22% and include the UKZN Science and Technology Innovation Park (STIP), UKZN Inqubate, DUT CFERI and DUT INVOTECH. Non-profit, private and hybrid facilities account for the remaining 39%. KZN is therefore neither predominantly state-built nor predominantly private-led; it is a mixed ecosystem with meaningful contributions from both sides. Overall, the Indicator 26 picture is a province with substantial absolute scale on facility entries, distinctive strength in Living Labs and Science Parks, a structural absence at the hardware-translation end of the type taxonomy, an entry footprint below its economic weight, and a spatial reach concentrated in eThekwini that excludes nearly half of the province's districts. The Fab Lab absence in particular is the first of three facility-side, university-side and funding-side observations that together describe a commercialisation-pipeline gap rather than a continental infrastructure deficit; the second and third are taken up in Sections 7.2 and 7.4, and the three are read together in Section 7.5.

7.2 University Innovation Infrastructure (Indicator 27)

INDICATOR 27

University Innovation Infrastructure

Four analytical dimensions presented in this section.

DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D
KZN university anchors	**Patent-to-publication ratios**	**National comparator**	**Technology domain profile**
Five university-anchored facility entries across UKZN, DUT and MUT, and the host-vs-governance distinction.	Applications and grants per 100 DHET output units across the four KZN universities, 2015 to 2023.	All 23 SA public universities ranked on patent applications per 100 output units; KZN four highlighted.	KZN university patents classified by IPC section, with the strongest concentrations identified.
SHOWN AS **Table 7.3**	SHOWN AS **Inline narrative**	SHOWN AS **Inline narrative**	SHOWN AS **Inline narrative**

Three KwaZulu-Natal universities anchor entries in the Innovate Durban facility register: the University of KwaZulu-Natal (UKZN), the Durban University of Technology (DUT) and the Mangosuthu University of Technology (MUT). UKZN anchors UKZN STIP and UKZN Inqubate; DUT anchors DUT CFERI and DUT INVOTECH; MUT anchors the Technology Station in Chemicals (TSC). The province therefore matches the Eastern Cape and the Western Cape on three university anchors each, behind Gauteng at seven, and sits at the upper end of the second tier nationally. A distinction in the data is worth maintaining. Five entries are counted on the basis of host institution (D11), but only four carry a 'university-linked' governance classification (D12); MUT TSC is hosted at MUT but funded through the TIA Technology Station Programme, and therefore carries a public-programme governance classification rather than a university-linked one.

Table 7.3: KZN University-Anchored Facilities, 2025/26

UNIVERSITY	FACILITY TYPE	ENTRY NAME	OPERATIONAL STATUS	REGISTER GOVERNANCE
UKZN	Science Park	UKZN Science and Technology Innovation Park (STIP)	Confirmed active	University-linked
UKZN	University Incubator	UKZN Inqubate	Confirmed active	University-linked
DUT	Incubator (CFERI)	Durban University of Technology CFERI	Confirmed active	University-linked
DUT	University Incubator	DUT INVOTECH Business Incubator	Appears active	University-linked
MUT	Technology Station	Technology Station in Chemicals (TSC)	Confirmed active	**Public / public programme**

Source: Innovate Durban Innovation Support Facility Register v16.3, December 2025. MUT TSC (highlighted amber) is hosted at MUT but classified as Public / public programme governance because it is funded through the TIA Technology Station Programme. Counted in D11 (university-anchored, 5 entries) but not in D12 (university-linked governance, 4 entries).

The 2025/26 edition reports for the first time on the technology-transfer orientation of KZN universities, using patent applications drawn from the CIPC register and cross-referenced against DHET research output units. Two ratios are computed at institutional level: patent applications per 100 DHET output units (D13), and granted or accepted patents per 100 output units (D14). Estimated 2023 DHET output units are used as the standardised denominator for cross-institutional comparability, and all ratios reported in this section use that basis. An interpretive caveat applies before reading the figures. A low ratio does not indicate poor institutional performance: universities with a strong open-science or basic-research orientation file few patents relative to their publication volume by design, and the ratio captures commercialisation orientation rather than research quality. The distribution across institutions can potentially be attributed to genuine differences in disciplinary profile and institutional strategy.

Across the 2015 to 2023 period, the four KZN universities collectively filed 36 patent applications, of which 18 reached granted or accepted status, a 50.0% conversion rate. UKZN filed 16 of those 36 applications and recorded 9 grants, the largest absolute portfolio of the four. UKZN's ratio of 0.68 applications per 100 output units is the lowest of the four KZN institutions despite the largest absolute portfolio, a result consistent with a research profile weighted towards open academic publication. DUT records 1.04 per 100 units. The University of Zululand sits at 3.24 per 100 units, slightly above the national median of approximately 3.1. MUT records the highest headline ratio at 5.73, albeit it must be read alongside a small publication denominator of approximately 105 output units in 2023; the small denominator amplifies the apparent ratio relative to institutions with larger publication bases. Aggregating across the four KZN institutions, the province-level ratio is 1.10 applications per 100 output units on combined output of approximately 3,278 units.

To position the KZN ratios in national context, the same measure has been computed for all 23 South African public universities. The cross-section places each institution on a spectrum from open-science orientation at the low end to applied-commercialisation orientation at the high end, with a national median of 3.12 applications per 100 output units. The Tshwane University of Technology leads nationally at 19.49, consistent with its applied technology mandate. The University of Pretoria (8.79) and the University of Cape Town (6.38) are noteworthy among major research universities, both producing high publication volumes whilst still filing patents at a meaningful rate; UCT is the national leader in absolute granted patents at 75 across the 2015 to 2023 period and records the highest grant conversion rate nationally at 72.8%, indicating a deliberate technology transfer strategy operating alongside an active research base. Among KZN institutions, MUT ranks 6th nationally (5.73, subject to the small-denominator caveat), the University of Zululand 10th (3.24), DUT 16th (1.04) and UKZN 19th of 23 (0.68).

Table 7.4: Patent applications per 100 DHET output units, all 23 South African public universities, 2015–2023 (sorted by national rank)

RANK (OF 23)	INSTITUTION	PROVINCE	APPS 2015–2023	GRANTED 2015–2023	APPS PER 100 UNITS	GRANTED PER 100 UNITS	GRANTED CONV. (%)
1	Tshwane University of Technology	Gauteng	90	40	19.49	8.66	44.4
2	Vaal University of Technology	Gauteng	17	1	8.85	0.52	5.9
3	University of Pretoria	Gauteng	130	52	8.79	3.52	40.0
4	University of Venda	Limpopo	18	6	7.00	2.33	33.3
5	University of Cape Town	Western Cape	103	75	6.38	4.65	72.8
6	**Mangosuthu University of Technology**	**KwaZulu-Natal**	**6**	**3**	**5.73**	**2.87**	**50.0**

RANK (OF 23)	INSTITUTION	PROVINCE	APPS 2015–2023	GRANTED 2015–2023	APPS PER 100 UNITS	GRANTED PER 100 UNITS	GRANTED CONV. (%)
7	Cape Peninsula University of Technology	Western Cape	14	8	4.47	2.55	57.1
8	University of South Africa	Gauteng	66	27	3.66	1.50	40.9
9	University of the Western Cape	Western Cape	23	13	3.32	1.88	56.5
10	**University of Zululand**	**KwaZulu-Natal**	**8**	**4**	**3.24**	**1.62**	**50.0**
11	Rhodes University	Eastern Cape	16	7	3.14	1.38	43.8
12	Nelson Mandela University	Eastern Cape	16	7	3.12	1.36	43.8
13	Walter Sisulu University	Eastern Cape	8	2	2.46	0.62	25.0
14	University of Johannesburg	Gauteng	75	26	2.33	0.81	34.7
15	University of Limpopo	Limpopo	9	3	1.53	0.51	33.3
16	**Durban University of Technology**	**KwaZulu-Natal**	**6**	**2**	**1.04**	**0.35**	**33.3**
17	University of the Free State	Free State	14	8	1.03	0.59	57.1
18	University of Fort Hare	Eastern Cape	2	1	0.74	0.37	50.0
19	**University of KwaZulu-Natal**	**KwaZulu-Natal**	**16**	**9**	**0.68**	**0.38**	**56.2**
20	Stellenbosch University	Western Cape	5	2	0.25	0.10	40.0
21	*University of the Witwatersrand †*	*Gauteng*	*2*	*0*	*0.10*	*0.00*	*0.0*
22	*Sefako Makgatho Health Sciences University †*	*Gauteng*	*0*	*0*	*0.00*	*0.00*	–
23	*North-West University †*	*North West*	*0*	*0*	*0.00*	*0.00*	–

Source: CIPC Patent Register; DHET Research Output Evaluations 2015–2023; KZN SOI Ecosystem workbook FINAL, Indicator 27 Dimensions D13–D14; KZN SOI Patents workbook v5, Sheet IND32_D13_D15_AllUni (sheet name retained from pre-renumbering workbook version). Apps per 100 units and Grants per 100 units use estimated 2023 DHET output units as the standardised denominator. KZN universities highlighted; MUT row shaded amber to flag the small publication denominator (approximately 105 output units in 2023). † Three institutions flagged as data quality issues (Wits, Sefako Makgatho, North-West): patent counts are abnormally low relative to institutional size and are treated as lower-bound estimates rather than substantive findings. Grant conversion shown as – where applications = 0. Universe: the 23-institution comparator covers all South African public universities; the Impact chapter Section 8.5 references a 26-institution universe of DHET-reporting universities for the 2023 publication year, reflecting different reporting bases for the two analyses. UNISA is included in the comparator and in the national median (3.12 applications per 100), consistent with the People Section 4 Indicator 10 convention of including UNISA in national share calculations.

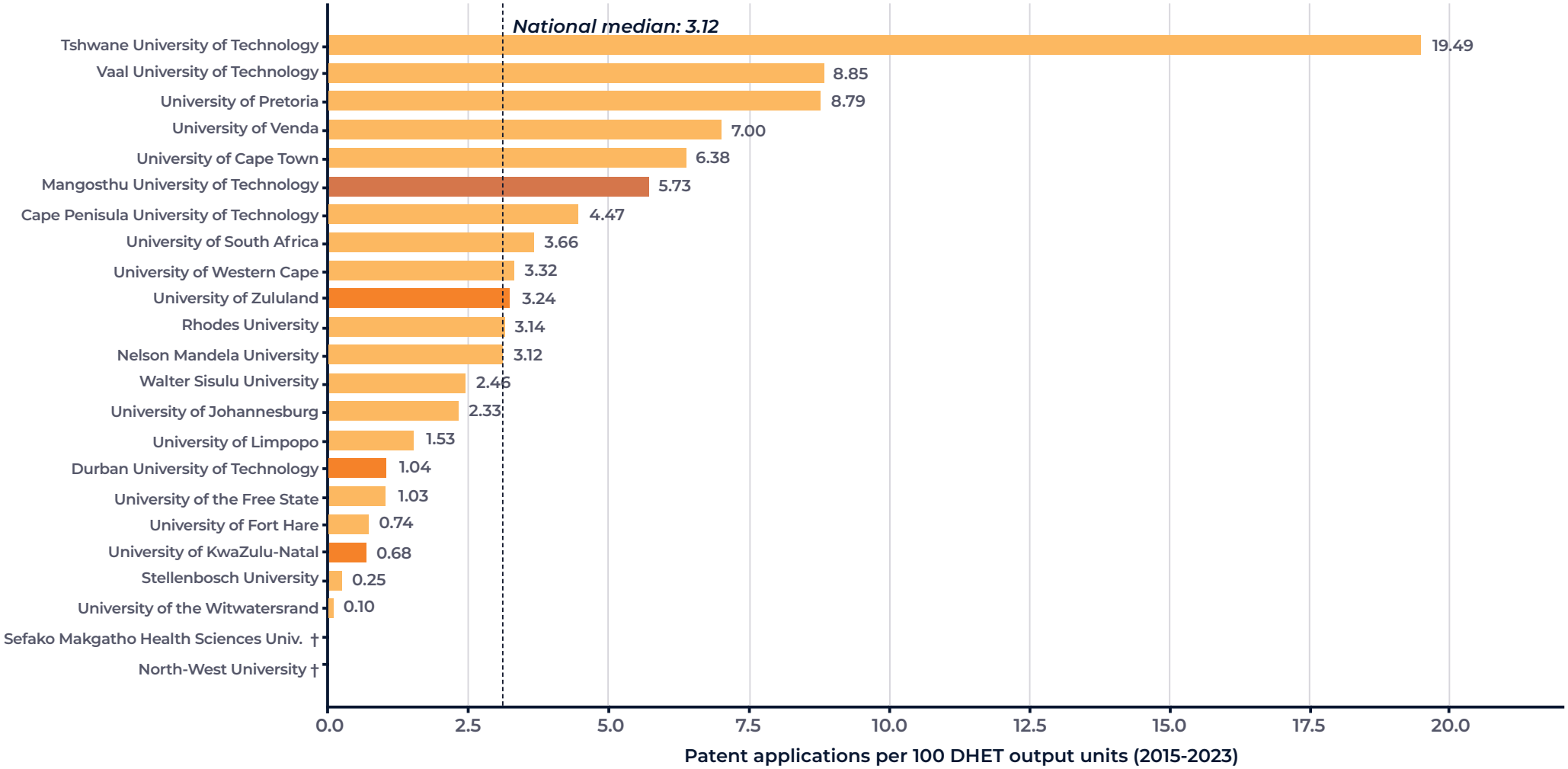

Figure 7.2: Patent applications per 100 DHET output units, all 23 South African public universities, 2015 to 2023 (KZN universities shown in orange; national median reference line at 3.12)

Source: CIPC Patent Register; DHET Research Output Evaluations 2015–2023; KZN SOI Patents workbook v5, Sheet IND32_D13_D15_AllUni. Bar values are applications per 100 estimated 2023 DHET output units. KZN universities (MUT, UniZulu, DUT, UKZN) shown in orange.

The KZN distribution across the 23-institution ranking is not concentrated at any single end of the national spectrum. UKZN, the province's dominant research producer, sits in the bottom quartile at rank 19 with 0.68 applications per 100 output units. The position is analytically noteworthy precisely because it coexists with a strong national rank on per-capita publication output, second nationally in 2023 on Indicator 40; the pattern is coherent with the institution's doctoral research intensity, albeit it leaves a gap in the province's technology commercialisation pipeline relative to the research volume being produced. DUT, the second-largest KZN research producer, sits in the third quartile at rank 16, also below the national median. The two institutions that account for the bulk of KZN university research output are therefore both in the lower half of the national patent-filing distribution. The University of Zululand at rank 10 sits just above the national median, and MUT's top-quartile position at rank 6 is a small-base reading rather than a substantive applied-commercialisation orientation.

The technology domain profile of KZN university patents spans all eight International Patent Classification (IPC) sections, with the strongest concentrations in four. Of the 94 KZN patent records on file in the CIPC register across all years, 40 carry IPC class codes; the remaining 54 are uncoded, predominantly provisional applications, which carry no class code by CIPC convention. The 40 coded patents map to 60 section-level entries, since multi-class patents are counted in each section in which they appear. Within those entries, the strongest concentrations are Section A (Human Necessities, primarily pharmaceuticals and medical devices, 14 entries), Section C (Chemistry and Metallurgy, 14 entries), Section B (Performing Operations, 10 entries) and Section H (Electricity, 9 entries); together these four sections account for 47 of the 60 section-level entries, approximately 78% of the coded portfolio. Section H is the most analytically noteworthy of the four. UKZN's H04 (telecommunications) and H02 (power engineering) activity reflects applied research in connectivity and energy technology that aligns directly with KZN's infrastructure development priorities, and positions the province in the same technology domain as Gauteng's strongest ICT cluster, albeit at materially smaller scale.

The position of UKZN and DUT, which between them account for the bulk of KZN university research output, in the lower half of the national patent-filing distribution is the second of three observations that together describe the chapter's commercialisation-pipeline gap; the first was the Fab Lab absence in Section 7.1, and the third, on the advisory weighting of KZN-anchored funding mechanisms, is taken up in Section 7.4. Section 7.5 reads the three observations together. The structural reading offered there is that the gap is specific to the research-output-to-commercialisation transition rather than a continental under-provision of innovation infrastructure.

7.3 Living Labs (Indicator 28)

INDICATOR 28

Living Labs

Three analytical dimensions presented in this section.

DIMENSION A

Count and national rank

KZN Living Labs entries, national share and representation index relative to other provinces.

A

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Inline narrative

DIMENSION B

Geographic spread

Each KZN Living Lab placed by district, metro / non-metro status and locality, including the only rural Living Lab nationally.

B

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Table 7.5

DIMENSION C

Anchor institutions

Anchoring organisations behind each KZN Living Lab and the governance class of each anchor.

C

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Inline narrative

Indicator 28 reports on Living Labs in KwaZulu-Natal, drawing on three publication-facing dimensions: count and national rank, geographic spread, and anchor institutions. The 2025/26 edition narrows the indicator title from 'Living Labs and Innovation Testbeds' in earlier architecture revisions to 'Living Labs' only. Two factors drive the change. First, the operative South African definition from the Technology Innovation Agency treats Living Labs as community-facing, co-creation-anchored physical spaces, which is a distinct concept from the sectoral testbed framework operated by the Water Research Commission and DSI under the WADER initiative. Conflating the two in a single indicator measures neither well. Second, two qualitative dimensions originally envisaged in the architecture, on domain focus and maturity classification, were formally removed from the 2025/26 edition because the verification questionnaire issued to KwaMashu Digital Hub and Bhongweni Hub did not return usable values within the publication window. The same verification standard would need to be applied to any testbed-class facilities included in the indicator, which has not been completed. Innovation testbed infrastructure in KwaZulu-Natal is accordingly scoped as a separate workstream for the 2026/27 edition, addressed at the close of this section.

Within the v16.3 register, KwaZulu-Natal holds three Living Lab entries. The count places the province tied first nationally with the Eastern Cape, ahead of all other provinces including Gauteng at two. KZN accounts for 23.1% of the 13 Living Lab entries in the national register. The representation index, computed as KZN Living Lab share of KZN portfolio divided by national Living Lab share of national portfolio, is 2.04. Living Labs are therefore over-represented in the KZN ecosystem mix relative to the national mix; it is one of the two strongest relative positions KZN holds in the entire facility register, alongside Science Parks at 2.21.

Table 7.5: KZN Living Labs (D18 and D19), 2025/26

LIVING LAB	ANCHOR INSTITUTION	DISTRICT	METRO / NON-METRO	LOCALITY AND NOTE
Innovation Co-Lab	Innovate Durban (primary)	eThekwini	Metro	Umkhumbane / Cato Manor: confirmed active
KwaMashu Digital Hub	SmartXchange (primary)	eThekwini	Metro	KwaMashu: appears active
Bhongweni Rural Incubation Hub	SmartXchange / Innovate Durban (co-anchored)	Harry Gwala	Non-metro	Kokstad: confirmed active. Only rural Living Lab in the national register.

Source: Innovate Durban Innovation Support Facility Register v16.3, December 2025.

Two of the three KZN Living Labs sit in eThekwini Metro, with the third, the Bhongweni Rural Incubation Hub in Harry Gwala (Kokstad), the only rural Living Lab in the national register. The Bhongweni entry is significant for spatial equity in KwaZulu-Natal: it is the only confirmed-active formal innovation support facility of any type in Harry Gwala District that is not a sectoral or construction incubator. It is therefore the only example in the KZN register of a non-metro innovation facility with cross-sectoral support intent.

Both KZN Living Lab anchors carry non-profit and hybrid governance. Innovate Durban anchors the Innovation Co-Lab in Cato Manor and co-anchors Bhongweni; SmartXchange anchors KwaMashu Digital Hub and co-anchors Bhongweni. The absence of a public-programme or university-linked Living Lab in the KZN portfolio is itself a noteworthy feature given the three university anchors documented in Section 7.2.

Innovation testbed infrastructure in KwaZulu-Natal sits outside the Living Lab definition used here and is scoped for the 2026/27 edition. Initial scoping work has identified candidate facilities across at least three sectoral domains: energy and engineering testbeds anchored at the UKZN Science and Technology Innovation Park (Westville), genomic and clinical-research platforms anchored at the KwaZulu-Natal Research Innovation and Sequencing Platform, and water-and-sanitation demonstration sites operated by eThekwini Municipality and the UKZN Water, Sanitation and Hygiene (WASH) R&D Centre. Several of these facilities are already counted under other indicators in this chapter, including UKZN STIP under Section 7.1 and Section 7.2; the 2026/27 workstream will require a testbed taxonomy, an evidence hierarchy and an explicit anti-double-counting protocol before any facility is admitted to a counted testbed indicator. Until that work is completed, testbed infrastructure is not measured in the published 2025/26 metric.

7.4 Funding-Support Mechanisms Accessible to KZN Innovators (Indicator 29)

INDICATOR 29

Funding-Support Mechanisms

Four analytical dimensions presented in this section.

DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D
Headline access KPIs	**Provincial comparison**	**Type composition**	**Spatial concentration**
KZN-anchored and KZN-accessible mechanism counts, KZN national rank on the anchored basis.	All nine provinces benchmarked on anchored mechanism counts and shares of the national identified total.	KZN-anchored mechanisms broken down by support type, share and advisory / capital / other nature class.	KZN-anchored mechanisms by hub or city within the province, with shares of the 95-entry KZN total.
SHOWN AS **Inline narrative**	SHOWN AS **Table 7.6**	SHOWN AS **Table 7.7**	SHOWN AS **Table 7.3**

Indicator 29 measures the structure of the funding-support directory accessible to KZN innovators. It was promoted from supplementary status in v7 of the Ecosystem workbook (April 2026) on the basis that it captures something Indicators 26 to 28 do not, namely the access-side configuration of the funding-support environment, rather than the facility-side infrastructure. The data are drawn from the Innovate Durban Funding Map (December 2025 refresh). The indicator provides a directory-based access measure rather than a finance-flow measure: it counts the structure and reach of the funding-support environment, not actual disbursements or capital flows. Two distinct counts are reported throughout. 'KZN-anchored' refers to mechanisms based in KwaZulu-Natal, 95 entries. 'KZN-accessible' refers to those plus mechanisms whose geographic coverage is explicitly stated as 'South Africa', 450 entries in total. Provincial comparisons use the anchored basis only, to avoid inflating all provinces equally with national mechanisms.

KwaZulu-Natal innovators have access to 450 funding-support mechanisms in the directory: 95 KZN-anchored and 355 nationally available South African instruments accessible to KZN. The KZN-anchored figure of 95 places the province third nationally on this measure, behind Gauteng at 515 anchored mechanisms and the Western Cape at 164, and well ahead of the Eastern Cape (20), Mpumalanga (10) and the lower-tier provinces. It is a stronger absolute-rank position than on Indicator 26, where KZN ranks fourth on facility entries, and the largest at-scale relative position the province holds in the Ecosystem category, alongside the higher-rank but smaller-base ties on Living Labs and Science Parks documented in Section 7.1.

Table 7.6: Province-Anchored Funding-Support Mechanisms (D23), 2025/26

PROVINCE	ANCHORED MECHANISMS	SHARE	NATIONAL RANK	READING
Gauteng	515	63.0%	1	Dominant: Johannesburg and Pretoria nodes
Western Cape	164	20.1%	2	Strong second: Cape Town ecosystem depth
KwaZulu-Natal	**95**	**11.6%**	**3**	**Third nationally: Durban-concentrated; advisory-weighted mix**
Eastern Cape	20	2.4%	4	Gqeberha and East London nodes
Mpumalanga	10	1.2%	5	Lower tier
Free State	6	0.7%	6	Lower tier
Northern Cape	3	0.4%	7=	Minimal presence
Limpopo	3	0.4%	7=	Minimal presence
North West	1	0.1%	9	Minimal presence
IDENTIFIED TOTAL	**817**	**100.0%**	**–**	**420 of 1,237 entries could not be province-attributed and are excluded**

Source: Innovate Durban Funding Map, December 2025 refresh. Anchored basis: city or geographic coverage explicitly in the named province. Nationally available South African mechanisms equally accessible to all provinces are excluded from the provincial comparison.

The 95 KZN-anchored mechanisms divide into three broad nature classes: advisory mechanisms at 54.7% of the directory, capital instruments at 33.7%, and other mechanisms covering bursaries, internships, training and procurement at 11.6%. The advisory-weighted profile is the headline finding. KZN innovators are well-served by support-navigation infrastructure, whilst the locally anchored capital base is comparatively thin. Nationally available capital instruments do flow to KwaZulu-Natal, sitting in the 355-entry SA-coverage pool rather than the 95-entry anchored pool; the point measured here is therefore not an absence of capital access in KZN, but the composition of the locally anchored support architecture, which leans heavily towards navigation and advisory functions rather than capital deployment functions. Strengthening the locally anchored capital instrument layer, particularly impact investment and patient capital accessible to early-stage innovators, would address the visible imbalance in the current directory.

Table 7.7: KZN-Anchored Funding-Support Mechanisms by Type (D24), 2025/26

SUPPORT TYPE	KZN COUNT	SHARE	NATURE	DESCRIPTION
Funding advice	33	34.7%	Advisory	Support navigation and access advice
Other innovation resources	19	20.0%	Advisory	Accelerators, networks, general support
Impact investment	12	12.6%	Capital	Social / environmental return vehicles
Commercial funding	11	11.6%	Capital	Debt, equity, grant instruments
Bursaries, internships, training	7	7.4%	Other	Human capital development
CSI funding	6	6.3%	Capital	Corporate social investment
Procurement	4	4.2%	Other	Market access and supply chain

SUPPORT TYPE	KZN COUNT	SHARE	NATURE	DESCRIPTION
Invoice financing	2	2.1%	Capital	Working capital tools
Crowdfunding	1	1.1%	Capital	Crowd-based capital raising
Advisory subtotal	**52**	**54.7%**	**–**	**Funding advice + Other innovation resources**
Capital subtotal	**32**	**33.7%**	**–**	**Impact investment + Commercial + CSI + Invoice + Crowdfunding**
Other subtotal	**11**	**11.6%**	**–**	**Bursaries + Procurement**

Source: Innovate Durban Funding Map, December 2025 refresh. Subtotals shaded. Some entries appear under multiple programme names; deduplication has not been applied as each entry may represent a distinct programme. Nature classification at directory-entry level: Advisory = funding advice and other innovation resources; Capital = impact investment, commercial funding, CSI funding, invoice financing and crowdfunding; Other = bursaries, internships, training and procurement.

The 95 KZN-anchored mechanisms are concentrated heavily in the Durban Metro area, with 78 of the 95 entries (82.1%) anchored there. Pietermaritzburg is the only meaningful secondary node, with 10 entries (10.5%); the remaining seven mechanisms are distributed across Howick (3), Port Shepstone (2), Richards Bay (1) and Tongaat (1). The Durban Metro node is the primary financial, commercial and NGO hub in the province, and the dominant location for impact investment and private-sector innovation services; Pietermaritzburg functions as a secondary node weighted towards government, education and SME services.

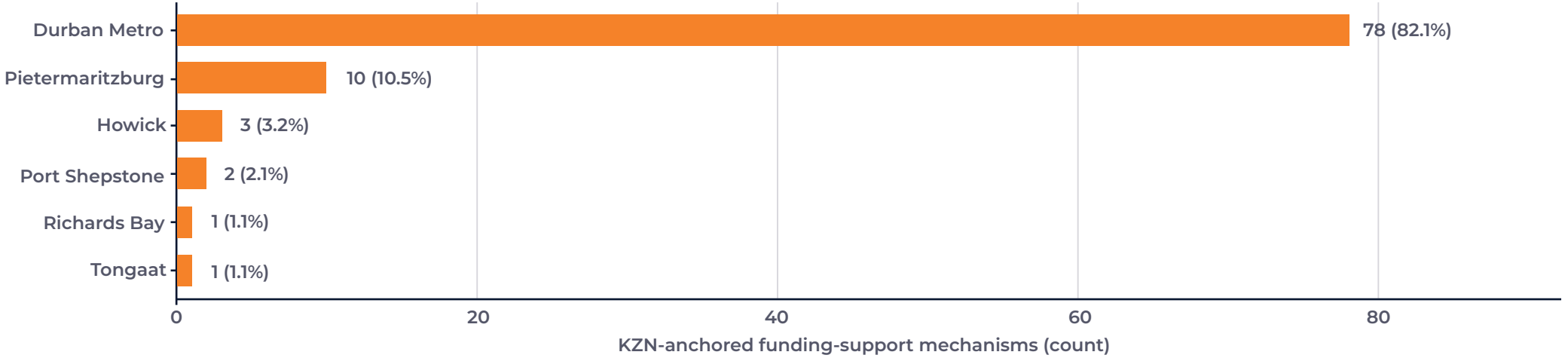

Figure 7.3: Geographic distribution of KZN-anchored funding-support mechanisms, 2025/26 (n = 95 mechanisms)

Source: Innovate Durban Funding Map, December 2025 refresh. Durban Metro groups Durban and nearby eThekwini-area entries per source methodology. Bars sorted by count. Shares as percentage of the 95 KZN-anchored entries.

The advisory weighting of the KZN-anchored funding-support directory is the third strand of the commercialisation-pipeline gap introduced at the chapter opening, joining the Fab Lab absence in Section 7.1 and the UKZN and DUT open-science orientation in Section 7.2. Patient capital and technology-transfer-facing finance are the instruments most directly associated with moving research output through to commercial application, and the locally anchored KZN funding mix is structurally lighter in these instrument categories than in the advisory mechanisms that account for 54.7% of the directory. The Durban Metro concentration of the funding directory, when read alongside the eThekwini concentration of facility entries documented in Section 7.1, also confirms spatial concentration as the most consistent structural finding across the Ecosystem indicators. Section 7.5 sets out the chapter's key observations.

7.5 Key Observations for the Ecosystem Category

The following highlights key observations from the four indicators in the Ecosystem category. The observations are organised around two structural findings that emerge from the indicator data, alongside a summary of where KZN sits in the national distribution. The first structural finding is a commercialisation-pipeline gap that runs sequentially across three of the four indicators. The second is a spatial concentration pattern that re-appears across structurally distinct indicators. The positional summary captures distinctive relative strengths in the national distribution alongside offsetting intensity and governance gaps. The organising pattern across the four indicators is therefore one of structural rather than aggregate weakness: KwaZulu-Natal holds substantial scale across most ecosystem dimensions, but the configuration of that scale shows specific gaps. The implications of these gaps are taken up in Section 7.6.

The commercialisation-pipeline gap

- KwaZulu-Natal is the only province in the top four by total facility entries with no Fabrication Lab in the v16.3 register. Gauteng holds five Fabrication Labs; the Western Cape, Limpopo, the Northern Cape, North West and the Free State each hold one. The absence is consistent across multiple editions of this publication and is a structural feature of the KZN ecosystem rather than an artefact of the register.

- The two universities that account for the bulk of KZN university research output sit in the lower half of the national patent-filing distribution. UKZN ranks 19th of 23 SA public universities at 0.68 patent applications per 100 DHET output units, and DUT ranks 16th at 1.04, both below the national median of 3.12. The KZN province-level patent ratio is 1.10 applications per 100 output units across the four KZN universities, on combined output of approximately 3,278 units.

- The locally anchored funding-support directory in KwaZulu-Natal is advisory-weighted. Of the 95 KZN-anchored mechanisms, 54.7% are advisory in nature (funding advice and other innovation resources), 33.7% are capital instruments (commercial funding, impact investment, CSI funding, invoice financing and crowdfunding), and 11.6% sit in other categories (bursaries, internships, training and procurement). Patient capital and technology-transfer-facing finance, the instruments most directly associated with moving research output through to commercial application, sit within the smaller capital subset.

Spatial concentration across structurally distinct indicators

- Thirteen of the 18 KZN facility entries have at least one eThekwini Metro site, approximately 72% of the provincial facility-entry total. Five of the eleven KZN districts hold zero facility-entry presence in the v16.3 register: uThukela, iLembe, uMkhanyakude, Zululand and Amajuba.

- Of the 95 KZN-anchored funding-support mechanisms, 78 are anchored in Durban Metro (82.1%). Pietermaritzburg is the only meaningful secondary node at 10 mechanisms (10.5%), with the remaining seven mechanisms distributed across Howick (3), Port Shepstone (2), Richards Bay (1) and Tongaat (1).

- The Bhongweni Rural Incubation Hub in Kokstad (Harry Gwala District) is the only rural Living Lab in the national register and the only confirmed-active formal innovation support facility of any type in Harry Gwala District that is not a sectoral or construction incubator.

Position in the national distribution

- KwaZulu-Natal ties first nationally on Living Labs (3 entries, alongside the Eastern Cape) and on Science Parks (2 entries, alongside Gauteng). The representation index, computed as KZN portfolio share divided by national portfolio share, places Science Parks at 2.21× and Living Labs at 2.04× the national mix.

- KwaZulu-Natal ranks third nationally on the count of province-anchored funding-support mechanisms at 95 entries (11.6% of the 817-entry identified provincial total), behind Gauteng at 515 and the Western Cape at 164. The third-place position is at scale rather than by representation index, given Gauteng's anchored share of 63.0%.

- KZN ties second nationally on University Incubators (2 entries, alongside the Eastern Cape and Western Cape, behind Gauteng at five). All three KZN universities (UKZN, DUT, MUT) are represented in the facility register, matching the Eastern Cape and Western Cape on three university anchors each, behind Gauteng at seven.

- Within the patent-to-publication cross-section, MUT ranks 6th of 23 SA public universities at 5.73 applications per 100 output units, subject to the small-denominator caveat (approximately 105 output units in 2023). UCT records the highest absolute granted-patent count nationally at 75 across 2015 to 2023 and the highest grant conversion rate at 72.8%. UKZN holds the largest absolute KZN patent portfolio at 16 applications and 9 grants over the period.

- KwaZulu-Natal contributes approximately 16.1% of national GDP (Stats SA, 2025b) whilst holding 11.3% of the national total of facility entries. The entry-to-GDP ratio is 0.70×, meaning the KZN ecosystem footprint is approximately 70% of what would be expected if facility entries were distributed in proportion to provincial economic scale. KZN ranks ninth of nine provinces on this measure, the offsetting intensity finding to the absolute scale positions reported above.

- The Living Lab category in KwaZulu-Natal is run entirely by non-profit and hybrid civil-society anchors. Innovate Durban anchors the Innovation Co-Lab and co-anchors Bhongweni; SmartXchange anchors KwaMashu Digital Hub and co-anchors Bhongweni. No public-programme or university-linked Living Lab exists in the KZN portfolio in the current register, despite the three university anchors documented in Section 7.2: a governance-side gap that sits alongside the relative-strength position on Living Lab count.

7.6 Implications for Innovation in KwaZulu-Natal

The Ecosystem category indicators describe a provincial innovation support architecture that is well-scaled in absolute terms but structurally configured in ways that constrain specific innovation outcomes. The implications below trace the structural findings to their consequences for the regional innovation system, distinguishing positive signals that an innovation policy response should consolidate from configuration features where the response should target the specific gaps identified in the indicator data.

The commercialisation-pipeline gap is sequential, not categorical

The three observations grouped above as the commercialisation-pipeline gap sit at three structurally distinct points on a single pipeline. The Fab Lab absence affects the hardware-translation stage where research outputs are prototyped into testable artefacts. The UKZN and DUT positioning in the lower half of the national patent-filing distribution affects how research transitions to intellectual property (IP), the point at which research outputs are formalised as commercialisable assets. The advisory-weighting of the locally anchored funding-support directory affects the capital-deployment stage, where formalised assets are matched to patient capital. The three observations therefore describe a sequential pattern across the pipeline rather than a categorical deficit at any single point. The implication is that intervention at any one stage in isolation carries lower expected return than coordinated intervention across the pipeline; for example, expanding patent filing without the hardware-prototyping infrastructure to test the underlying inventions, or without the patient capital instruments to fund commercialisation, would address one pipeline stage whilst leaving the bottleneck at the others. The KZN provincial innovation strategy is therefore better positioned to treat the three observations as an integrated diagnostic than as three separate interventions.

Spatial concentration is the most consistent structural finding

The eThekwini concentration of facility entries (approximately 72% of the KZN portfolio) and the Durban Metro concentration of funding-support mechanisms (82.1%) reproduce the same spatial pattern across two structurally distinct indicators measuring different aspects of the ecosystem. The cross-indicator consistency strengthens the finding: a single-indicator concentration could be attributable to indicator-specific factors, whilst a pattern that reappears across the facility-side and the funding-side suggests a feature of the underlying support architecture rather than of the measurement framework. Five of eleven KZN districts hold zero facility-entry presence, and the Bhongweni Living Lab is the only rural example of a non-sectoral innovation facility in the KZN register. The implication is that the geographic catchment from which KZN draws its innovators, and within which the support architecture is operationally accessible, is materially smaller than the headline KZN counts imply. Provincial-scale interventions that do not include explicit non-metro placement or non-metro accessibility components are likely to reproduce rather than address the spatial concentration documented across these indicators.

UKZN technology transfer is a strategy question, not a volume question

UKZN holds the largest absolute KZN patent portfolio at 16 applications and 9 grants across the 2015 to 2023 period, but the lowest patent-to-publication ratio of the four KZN universities at 0.68 applications per 100 output units, and ranks 19th of 23 SA public universities on this measure. The position is consistent with a research profile weighted towards open academic publication and is coherent with UKZN's second-place national rank on per-capita publication output in 2023 (Indicator 40). The data are not consistent with a finding of poor institutional performance; they are consistent with a deliberate institutional orientation. The implication is that the relevant policy lever is not increased patent-filing volume in isolation, which could displace open-science research without addressing the underlying transfer mechanism, but the technology-transfer support infrastructure that converts research outputs into commercial application where the underlying research warrants it. UCT's national leadership at 75 absolute grants and 72.8% grant conversion rate, alongside an active research base, indicates that the two orientations can co-exist where the supporting infrastructure is in place. Strengthening UKZN's technology-transfer office capacity, intellectual-property advisory services, and post-grant commercialisation pathways therefore carries higher expected return than benchmarking interventions targeted at filing volume alone.

Public-programme absence in Living Labs constrains scalability

Both KZN Living Lab anchors carry non-profit and hybrid governance: Innovate Durban and SmartXchange. There is no public-programme or university-linked Living Lab in the KZN portfolio in the current register. The implication is twofold. First, the three KZN Living Labs sit on civil-society organisational platforms rather than on public-funding institutional platforms, which makes scaling the Living Lab footprint

to underserved districts dependent on the operational and funding capacity of those specific civil-society anchors rather than on the replication of a public-programme template. Second, the Bhongweni precedent in Harry Gwala demonstrates that non-metro Living Lab placement is achievable on the current governance configuration, but the absence of a public-programme template means the next non-metro Living Lab is not a roll-out of an existing programme model: it is a bespoke arrangement requiring the same anchor-side capacity that produced the first three. The KZN provincial innovation strategy can either work with the current governance configuration by strengthening the operational and funding base of the existing anchors, or develop a new public-programme Living Lab template that does not currently exist in the national taxonomy.

The funding directory is well-scaled but compositionally lopsided

The KZN-anchored funding directory at 95 mechanisms places the province third nationally on this measure, and the wider KZN-accessible total of 450 mechanisms (95 KZN-anchored plus 355 nationally available South African instruments accessible to KZN) means that absolute access to funding-support instruments is not the structural problem. The structural problem is the compositional weight within the locally anchored portfolio: 54.7% advisory and 33.7% capital. Nationally available capital instruments do flow to KwaZulu-Natal through the SA-coverage pool, so the implication is not that KZN innovators cannot access capital, but that the locally anchored architecture is configured towards navigation and advisory functions rather than towards capital deployment functions. The resulting implication for the provincial innovation strategy is that strengthening the locally anchored capital instrument layer, particularly impact investment, patient capital and technology-transfer-facing finance accessible to early-stage innovators, would address the compositional imbalance documented in the directory whilst preserving the advisory infrastructure that the current configuration delivers well.

Living Labs and Science Parks are positions to consolidate, not redesign

KZN's representation indices on Living Labs (2.04×) and Science Parks (2.21×) are the strongest relative positions held by the province in the entire facility register. The 2.04× figure is the joint-top representation index across all KZN facility-type positions; the Science Park 2.21× figure exceeds it. These are positive structural signals: the KZN ecosystem mix is differentially weighted towards the facility types most associated with collaborative, applied and university-anchored innovation activity. The implication is that the policy response to the facility-side findings is asymmetric: the Fab Lab gap warrants new infrastructure development, but the Living Lab and Science Park footprint warrants consolidation of the existing assets and protection against displacement. The Bhongweni Hub, the Innovation Co-Lab, the KwaMashu Digital Hub, and UKZN STIP collectively represent a configuration that is over-represented relative to national norms and that places KZN ahead of larger-economy provinces on these specific facility types. Treating these as completed assets rather than as candidates for replacement or restructuring preserves the strongest positions the chapter identifies.

8. IMPACT

The Impact category measures outcomes of the KwaZulu-Natal innovation system. It draws on the National Treasury's Spatial Economic Activity Data (SEAD) platform for sector employment, wage and youth indicators, and on the Department of Higher Education and Training (DHET) Research Outputs database for knowledge production. Eleven indicators are active for 2025/26, organised across five sub-categories: technology-intensive sector employment (Ind30 to Ind33); sectoral employment and net job creation (Ind34 and Ind35); wage structure (Ind36 to Ind38); youth employment (Ind39); and knowledge production (Ind40).

Whilst the People, Investment, Infrastructure and Ecosystem categories describe the inputs and enabling conditions of the innovation system, the Impact category asks what those inputs have produced. It captures the realised economic and knowledge outcomes associated with innovation activity in the province: the structure of formal employment in innovation-relevant sectors, the wage levels attached to that employment, the extent to which young people are absorbed into it, and the volume of formally accredited research output produced by the province's universities.

Methodology note: Two scope conditions apply throughout. Firstly, all employment, wage and youth indicators in this category draw on SEAD platform data, which covers formal-sector employment captured through tax and UIF administrative records. Informal-sector employment, household production and unregistered enterprise activity are not captured. The figures below should therefore be read as conservative estimates of the total economic activity associated with innovation in KwaZulu-Natal. Secondly, no composite Impact score is presented. The indicators measure distinct outcome domains in different units and cannot be meaningfully aggregated. The synthesis at the end of this section is interpretive rather than numerical.

QC pointer: Indicator-level data limitations, anomalies and reconciliation issues are documented in the QC_Audit sheet within the companion Impact workbook. Where any conflict exists between a data note in this section and the QC_Audit entry, the QC_Audit entry takes precedence. Severity classifications (CRITICAL, HIGH, MODERATE, LOW) and corresponding interpretive caveats are recorded there.

8.1 Employment in High-, Medium- and Low-Technology Sectors

The Impact category measures the formal-employment outcomes of the innovation system, classified by technological intensity using the OECD/NACI 2025 framework. Section 8.1 covers the four manufacturing-and-services indicators that anchor the conversion test: high-technology manufacturing employment (Indicator 30), medium-technology manufacturing employment (Indicator 31), low-technology manufacturing employment (Indicator 32), and Knowledge-Intensive Services employment (Indicator 33). The 'low-technology' designation refers to formal R&D intensity rather than to the absence of innovation; process improvements, quality control and supply-chain optimisation are all forms of innovation that occur within these industries.

Total formal manufacturing employment in KwaZulu-Natal moved from 213,133 FTE in 2014 to 207,710 in 2025, a net loss of 5,423 jobs at -2.5%. The headline aggregate conceals material composition shifts. Manufacturing peaked at 223,669 FTE in 2020, retreated to 214,819 in 2021, recovered to 219,513 by 2023, held essentially flat at 219,394 in 2024, and then fell sharply to 207,710 in 2025. The entire 11,684-job decline of the post-pandemic period is therefore concentrated in a single year, 2024 to 2025. The composition of manufacturing employment has remained structurally stable across the period, with low-technology sub-sectors accounting for between 53 and 56% of the total, medium-technology between 43 and 46%, and high-technology between 1.2 and 1.7%. Overall, the KZN manufacturing base remains overwhelmingly concentrated in lower-technology activities.

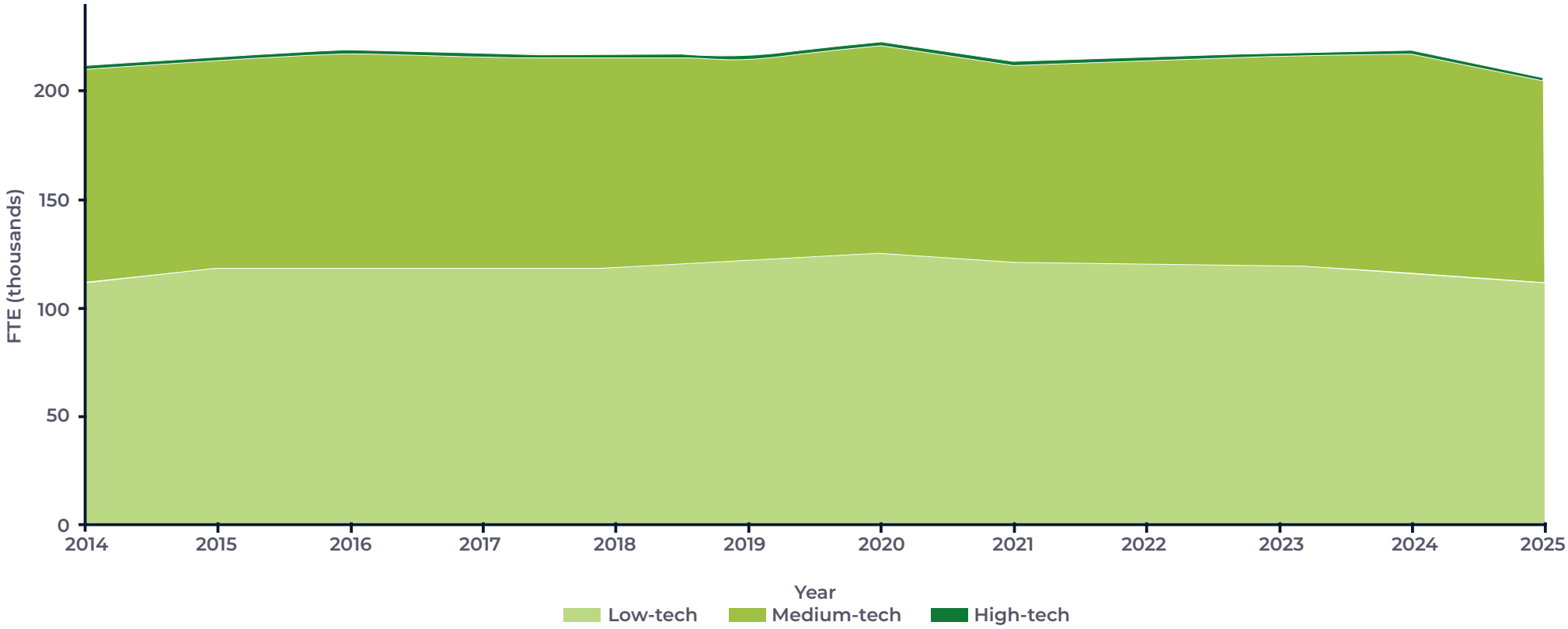

Figure 8.1: KZN manufacturing employment by technology tier, 2014 to 2025 (stacked area chart, FTE thousands; tiers: low-tech, medium-tech, high-tech).

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicators 34, 35 and 36. Classification follows OECD/NACI 2025 technology-intensity tiers. Coverage: KwaZulu-Natal formal sector only; informal-sector and own-account work not captured.

The four sub-sections that follow examine each tier separately. Knowledge-Intensive Services, the services-sector equivalent of high-technology manufacturing, follows in 8.1.4.

8.1.1 Funding-Support Mechanisms Accessible to KZN Innovators (Indicator 29)

INDICATOR 30

High-Technology Manufacturing Employment

Two analytical dimensions presented in this section.

DIMENSION A

FTE by High-Tech Sun-Sector

KZN formal-sector employment in Pharmaceutical (SIC 21) and Computer, Electronic & Optical Products (SIC 26), 2014 to 2025

A

SHOWN AS
Table 8.2

DIMENSION B

Share of Total KZN Formal Employment

High-tech manufacturing FTE expressed as a share of all formal KZN employment, traced annually 2014 to 2015.

B

SHOWN AS
Table 8.2

High-technology manufacturing in KwaZulu-Natal comprises Pharmaceuticals (SIC 21) and Computer, Electronic and Optical Products (SIC 26) under the OECD/NACI 2025 classification. Collectively these sub-sectors employed 3,386 FTE in 2014 and 2,607 in 2025, a contraction of 779 jobs at -23.0%. It is the most severe percentage decline of any manufacturing tier in the province over the measurement period, and it is concentrated almost entirely in the Computer, Electronic and Optical sub-sector.

The Computer, Electronic and Optical sub-sector contracted from 2,144 FTE in 2014 to 1,422 in 2025, a fall of 33.7%. The decline was sharpest between 2021 and 2024, when employment fell from 1,956 to 1,437 FTE, a loss of 519 jobs over the period. The Pharmaceuticals sub-sector has been comparatively resilient, declining by a more modest 4.6% from 1,242 to 1,185 FTE. Pharmaceuticals dipped to 1,042 FTE in 2023 and recovered to 1,185 by 2025, which can potentially be attributed to the strategic positioning of domestic pharmaceutical production following the COVID-19 supply-chain disruption.

The high-technology share of total KZN formal employment has consequently fallen from 0.23% in 2014 to 0.17% in 2025. Whilst small in absolute terms, the trajectory is the structurally significant feature: the share fell sharply from 2020 to 2023, declining from 0.22% to 0.15%, with the steepest single-year fall occurring between 2022 and 2023. The share has recovered modestly over 2024 and 2025, but remains well below the 2014 to 2017 plateau.

Table 8.1: High-Technology Manufacturing FTE by Sub-Sector, KwaZulu-Natal, 2014, 2020 and 2025

SUB-SECTOR (SIC 2-DIGIT)	2014	2020	2025	CHANGE 2014 TO 2025	% CHANGE
Pharmaceuticals (SIC 21)	1,242	1,314	1,185	-57	-4.6%
Computer, Electronic & Optical Products (SIC 26)	2,144	2,180	1,422	-722	-33.7%
Total High-Technology Manufacturing	**3,386**	**3,494**	**2,607**	**-779**	**-23.0%**

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 30 Dimension A. Classification: OECD/NACI 2025 high-tech = SIC7 2-digit codes 21 (Pharmaceuticals) and 26 (Computer, Electronic and Optical Products). Coverage: KwaZulu-Natal formal sector; informal-sector and own-account work not captured. Small absolute size means percentage changes can be volatile year on year (see Impact workbook FINAL QC_Audit).

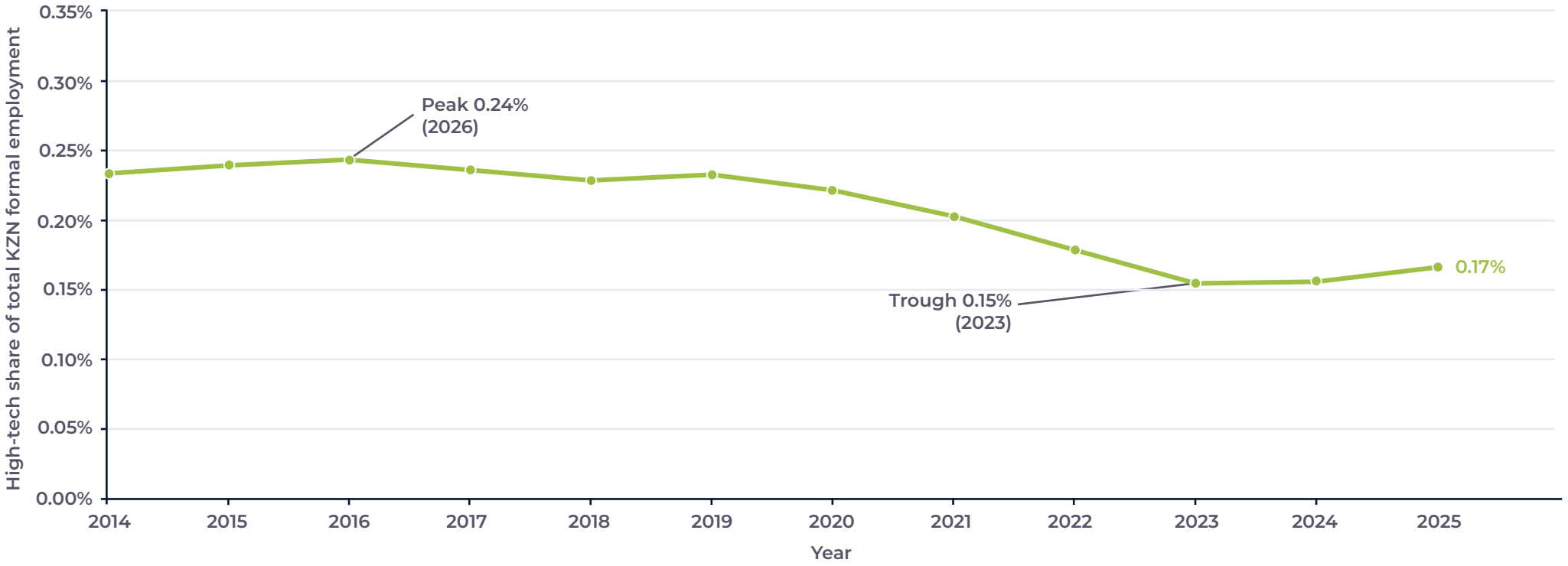

Figure 8.2: High-technology manufacturing share of total KZN formal employment, 2014 to 2025 (line chart, %; series shows high-tech FTE divided by total KZN formal FTE in each year).

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 30 Dimension B. Total KZN FTE denominator drawn from RAW02_TotalEmployment_KZN.

A scope note on the high-technology definition is necessary. The OECD/NACI 2025 inclusive definition adopted here covers Pharmaceuticals and Computer, Electronic and Optical Products. The NACI 2023 STI Indicators Report applied a narrower Quantec-derived scope that excluded Pharmaceuticals and Medical, Precision and Optical instruments. The two definitions produce different provincial totals for the same underlying activity, and the data sources also differ: the SEAD platform draws on administrative tax records at five-digit SIC7, whilst NACI 2023 used Quantec sectoral aggregations. Direct comparison with NACI 2023 KZN high-technology figures is therefore not advised.

The conversion failure shows here as: the formal high-technology footprint has contracted by 23.0% in absolute terms, with the share of total KZN formal employment falling from 0.23% to a low of 0.15% in 2023 before partial recovery to 0.17% by 2025. The recovery is modest and remains well below the 2014 to 2017 plateau.

Medium-technology manufacturing comprises medium-high-tech sub-sectors (SIC 20 Chemicals, 27 Electrical Equipment, 28 Machinery and Equipment, 29 Motor Vehicles and Trailers, 30 Other Transport Equipment) and medium-low-tech sub-sectors (SIC 19 Petroleum Refining, 22 Rubber and Plastics, 23 Non-metallic Minerals, 24 Basic Metals, 25 Fabricated Metal Products). Total medium-technology employment declined from 97,452 FTE in 2014 to 93,363 in 2025, a fall of 4,089 jobs at -4.2%. The aggregate conceals two sharply divergent sub-tier trajectories, and the divergence is the analytically significant feature.

Medium-high-tech employment grew by 6.4%, from 47,866 to 50,910 FTE, driven almost entirely by Motor Vehicles and Trailers (SIC 29), consistent with the province's automotive anchor around Prospecton. Motor Vehicles employment rose from 19,684 in 2014 to 27,950 in 2025, an increase of 8,266 jobs at +42.0%. Expansion was particularly rapid between 2022 and 2024, from 21,831 to 29,136 FTE, with a modest pullback in 2025 to 27,950. Other Transport Equipment (SIC 30) grew from 400 to 1,500 FTE; the figure includes a structural step-change between 2020 and 2022 that is flagged in the workbook QC_Audit and should not be read as organic growth. Stripped of Motor Vehicles, the remaining four medium-high sub-sectors recorded a net loss of 5,222 jobs over the period, with broad-based contraction in Chemicals (-24.7%), Electrical Equipment (-37.2%) and Machinery and Equipment (-5.5%).

Medium-low-tech employment fell by 14.4%, from 49,586 to 42,453 FTE. Basic Metals (SIC 24) recorded the largest proportional decline at -34.6%, which can potentially be attributed to global overcapacity in steel, import competition and rising domestic energy costs. Non-metallic Minerals (SIC 23) and Petroleum Refining (SIC 19) contracted by 25.8% and 28.5% respectively. Fabricated Metals (SIC 25) and Rubber and Plastics (SIC 22) proved more resilient, recording modest declines of 3.9% and 2.1% respectively, consistent with continued downstream demand from the automotive sector.

8.1.2 Medium-Technology Manufacturing Employment (Indicator 31)

INDICATOR 31

Medium-Technology Manufacturing Employment

Three analytical dimensions presented in this section.

DIMENSION A

Medium-High-Tech Sub-Sectors

Five sub-sectors covering Chemicals (20), Electrical Equipment (27), Machinery (28), Motor Vehicles (29), and Other Transport Equipment (30).

A

SHOWN AS
Table 8.2

DIMENSION B

Medium-Low-Tech Sub-Sectors

Five sub-sectors covering Petroleum Refining (19), Rubber & Plastics (22), Non-metallic Minerals (23), Basic Metals (24), and Fabricated Metals (25).

B

SHOWN AS
Table 8.2

DIMENSION C

Total Medium-Tech Manufacturing

Aggregate of the medium-high and medium-low sub-tiers, indexed and traced 2014 to 2025 to expose the divergent tier trajectories.

C

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Figure 8.3

Table 8.2: Medium-Technology Manufacturing Sub-sector Employment (FTE), KwaZulu-Natal, 2014 and 2025

SUB-SECTOR (SIC 2-DIGIT)	TIER	2014 FTE	2025 FTE	CHANGE	% CHANGE	RANK BY NET CHANGE
Motor Vehicles & Trailers (29)	Med-High	19,684	27,950	+8,266	+42.0%	1
Other Transport Equipment (30)	Med-High	400	1,500	+1,100	+275.0%	2
Chemicals & Chemical Products (20)	Med-High	15,569	11,728	-3,841	-24.7%	9
Machinery & Equipment (28)	Med-High	6,491	6,136	-355	-5.5%	5
Electrical Equipment (27)	Med-High	5,722	3,596	-2,126	-37.2%	8
Fabricated Metal Products (25)	Med-Low	17,485	16,809	-676	-3.9%	6
Rubber & Plastics (22)	Med-Low	12,386	12,124	-262	-2.1%	4
Basic Metals (24)	Med-Low	11,755	7,685	-4,070	-34.6%	10
Non-metallic Minerals (23)	Med-Low	5,355	3,972	-1,383	-25.8%	7
Petroleum Refining (19)	Med-Low	2,605	1,863	-742	-28.5%	n/a
Total Medium-Technology Manufacturing		**97,452**	**93,363**	**-4,089**	**-4.2%**	

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 31 Dimensions A and B. SIC 30 (Other Transport Equipment) shows a structural step-change between 2020 and 2022 (from approximately 480 to 1,894 FTE); this is flagged in QC_Audit and should not be read as organic growth. Rank by net change computed across the ten sub-sectors with confirmed series; Petroleum Refining excluded from rank to avoid distortion from its small absolute base.

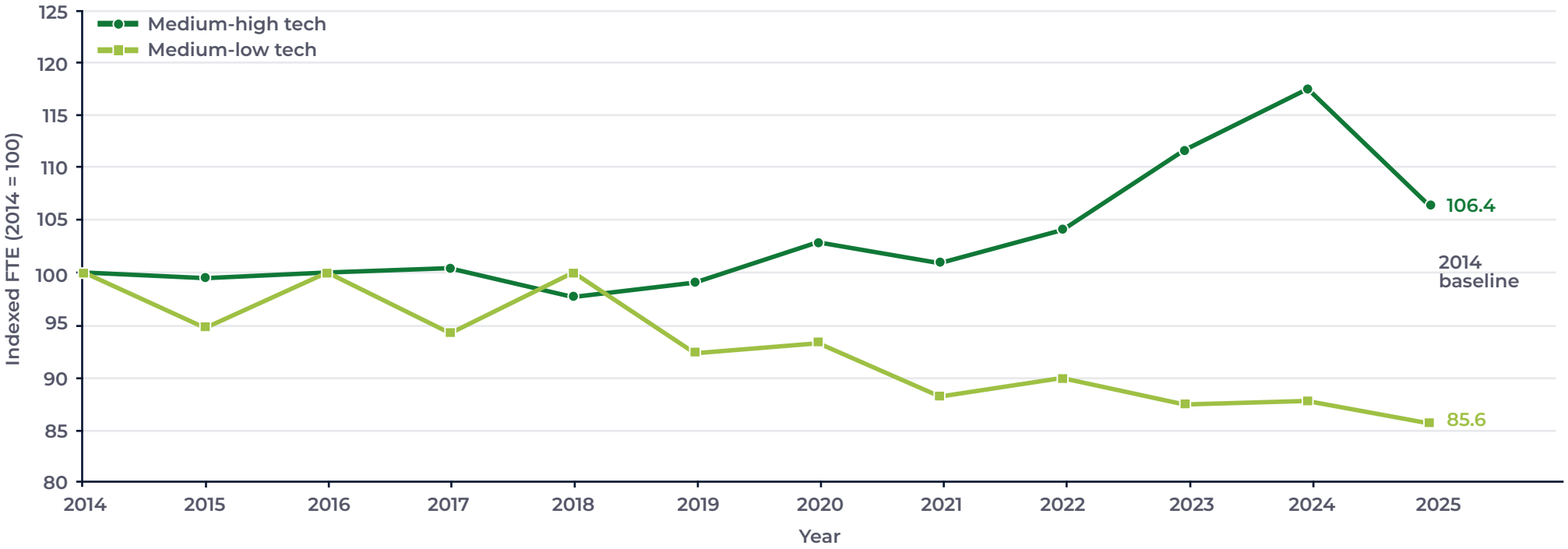

Figure 8.3: Medium-tech bifurcation: indexed FTE for medium-high and medium-low sub-tiers, KwaZulu-Natal, 2014 to 2025 (line chart, 2014 = 100; two series showing the divergent trajectory).

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 31 Dimension C. Indexed series computed by dividing each year's tier total by the 2014 tier total and multiplying by 100.

The conversion failure shows here as bifurcation: a medium-tech aggregate decline of 4.2% conceals a single-sector growth story (Motor Vehicles +42.0%, +8,266 jobs) offsetting a net loss of 12,355 jobs across the remaining nine sub-sectors, with eight of those nine recording declines. The provincial medium-technology base is therefore becoming more concentrated, rather than more diversified.

8.1.3 Low-Technology Manufacturing Employment (Indicator 32)

INDICATOR 32

Low-Technology Manufacturing Employment

One analytical dimensions presented in this section.

DIMENSION A

FTE by Low-Tech Sub-Sector

Twelve sub-sectors covering SIC 10 to 18 plus SIC 31 to 33: Food, Beverages, Tobacco, Textiles, Apparel, Leather and Footwear, Wood, Paper, Printing, Furniture, Other Manufacturing, and Repair and Installation.

A

SHOWN AS
Table 8.2

Low-technology manufacturing comprises SIC 10 to 18 (food, beverages, tobacco, textiles, apparel, leather, wood, paper, printing) plus SIC 31 to 33 (furniture, other manufacturing, repair and installation). It remains the single largest manufacturing tier in KwaZulu-Natal, accounting for 53.8% of total manufacturing employment in 2025. Total low-tech employment declined marginally from 112,295 FTE in 2014 to 111,740 in 2025, a fall of 555 jobs at -0.5%, which makes it the most stable tier in percentage terms. The aggregate stability conceals varied sub-sector trajectories. Employment peaked at 124,673 in 2020 before declining by 10.4% over the subsequent five years, which indicates a substantial post-pandemic correction concentrated in the latter part of the series.

Food Products (SIC 10) is by far the largest sub-sector, employing 29,004 FTE in 2025 and accounting for 26.0% of all low-technology manufacturing employment. Despite a decline from its 2023 peak of 32,702, the sub-sector recorded overall growth of 14.6% over the full period, which reflects KZN's substantial agro-processing capability. Textiles (SIC 13) is the second-largest sub-sector at 18,443 FTE, having grown by 20.4% from 2014. Furniture (SIC 31) recorded the strongest growth at +36.9%, expanding from 4,089 to 5,597 FTE.

The largest losses occurred in Apparel (SIC 14, -31.0%), Wood Products (SIC 16, -26.7%) and Printing and Recorded Media (SIC 18, -24.1%). The Apparel decline is consistent with sustained import competition, particularly from low-cost Asian producers. Wood Products and Printing reflect contractions consistent with broader sectoral declines observed nationally, including digital substitution in printing and downstream construction-sector weakness in wood products. Tobacco (SIC 12) also fell sharply at -53.8%, albeit from a small absolute base of 279 FTE in 2014.

Table 8.3: Low-Technology Manufacturing Sub-sector Employment (FTE), KwaZulu-Natal, 2014 and 2025

SUB-SECTOR (SIC 2-DIGIT)	SIC	2014 FTE	2025 FTE	CHANGE	% CHANGE
Food Products	10	25,301	29,004	+3,703	+14.6%
Textiles	13	15,323	18,443	+3,120	+20.4%
Furniture	31	4,089	5,597	+1,508	+36.9%
Other Manufacturing	32	4,451	5,386	+935	+21.0%

SUB-SECTOR (SIC 2-DIGIT)	SIC	2014 FTE	2025 FTE	CHANGE	% CHANGE
Leather & Footwear	15	6,401	7,295	+894	+14.0%
Beverages	11	3,094	3,537	+443	+14.3%
Repair & Installation	33	6,129	6,370	+241	+3.9%
Paper & Paper Products	17	9,006	8,442	-564	-6.3%
Tobacco	12	279	129	-150	-53.8%
Printing & Recorded Media	18	9,604	7,292	-2,312	-24.1%
Wood Products	16	11,632	8,526	-3,106	-26.7%
Apparel	14	16,986	11,719	-5,267	-31.0%
Total Low-Technology Manufacturing		**112,295**	**111,740**	**-555**	**-0.5%**

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 32 Dimension A. Sub-sectors sorted by net change (largest gains to largest losses). Coverage: KwaZulu-Natal formal sector only.

The conversion failure shows here as compositional shift without aggregate movement: the low-tech tier total fell by only 0.5% over eleven years, whilst Food Products and Textiles together added 6,823 jobs against losses of 5,267 in Apparel, 3,106 in Wood Products and 2,312 in Printing. Stability at the tier level coexists with significant churn beneath it, with the post-2020 trajectory turning down at 10.4% over five years.

8.1.4 KNOWLEDGE-INTENSIVE SERVICES EMPLOYMENT (INDICATOR 33)

INDICATOR 33

Knowledge-Intensive Services Employment

Two analytical dimensions presented in this section.

DIMENSION A

KZN Province KIS FTE

Provincial total covering Information & Communication, Finance & Insurance, and Professional, Scientific & Technical activities, traced 2014 to 2025.

SHOWN AS
Table 8.4

A

DIMENSION B

eThekwini Metro KIS FTE

The same three sub-sectors at metro level, used to expose the spatial concentration of KIS employment within KwaZulu-Natal.

SHOWN AS
Table 8.4 + Figure 8.4

B

Indicator 33 measures employment in Knowledge-Intensive Services (KIS), the services-sector equivalent of technology-intensive manufacturing. Under the OECD/Eurostat classification, KIS are service sectors where intellectual and analytical work is the primary value-creation mechanism. Three sub-sectors constitute the core KIS grouping for innovation measurement: Information and Communication; Finance and Insurance; and Professional, Scientific and Technical Activities. These are reported by name in line with NACI convention. Education and Health, classified as 'Other KIS' by the OECD, are excluded here because their employment levels in KwaZulu-Natal are predominantly driven by public-sector staffing rather than by innovation activity.

Total KIS employment in KwaZulu-Natal grew from 92,963 FTE in 2014 to 110,890 in 2025, an increase of 17,927 jobs at +19.3%. The KIS growth rate substantially outperforms the manufacturing sector, which contracted by 2.5% over the same period. Total KIS employment exceeded total medium-technology manufacturing employment in 2015 and has remained above it in every year since, reaching 110,890 against medium-tech's 93,363 in 2025. The structural shift in KZN's economic composition toward knowledge-intensive services therefore occurred in the early part of the measurement period; the 2025 figures reflect continuation of an established pattern rather than inflection. All three sub-sectors contributed to the period growth: Finance and Insurance added 8,802 FTE (+22.5%) to reach 47,974; Professional, Scientific and Technical added 5,997 FTE (+17.8%) to reach 39,701; and Information and Communication added 3,128 FTE (+15.6%) to reach 23,215, the highest level recorded in the series.

A distinctive feature of KIS employment in KwaZulu-Natal is its concentration in the eThekwini metropolitan area. In 2025, eThekwini accounted for 76.0% of all KIS employment in the province, at 84,263 of 110,890 FTE. The concentration is most pronounced in Information and Communication, where 88.1% of provincial employment is located within the metro. Finance and Insurance stands at 76.0% and Professional, Scientific and Technical at 68.9%. The remaining ten districts collectively account for 24.0% of KIS employment. KIS growth in KwaZulu-Natal is, in practical terms, an eThekwini story; the benefits of knowledge-intensive services growth have not diffused meaningfully beyond the metro boundary over the eleven-year period.

Table 8.4: Knowledge-Intensive Services Employment (FTE), KZN Province and eThekwini Metro, 2014 and 2025

SUB-SECTOR	KZN 2014 FTE	KZN 2025 FTE	KZN % CHANGE	ETHEKWINI 2025 FTE	ETHEKWINI SHARE OF KZN 2025	REST-OF-PROVINCE 2025 SHARE
Information & Communication (SIC 10)	20,087	23,215	+15.6%	20,463	88.1%	11.9%
Finance & Insurance (SIC 11)	39,172	47,974	+22.5%	36,448	76.0%	24.0%
Professional, Scientific & Technical (SIC 13)	33,704	39,701	+17.8%	27,352	68.9%	31.1%
Total KIS	**92,963**	**110,890**	**+19.3%**	**84,263**	**76.0%**	**24.0%**

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 33 Dimensions A (KZN Province) and B (eThekwini Metro). KZN provincial series drawn from Province_MedianIncome_Industry5d.csv; eThekwini metro series drawn from District_MedianIncome_Industry5d.csv. eThekwini share computed as eThekwini FTE divided by KZN FTE for the same year. Rest-of-province share = 100 minus eThekwini share. Note: Finance and Insurance shows a structural composition shift post-2017 (rising FTE partly explained by growth in lower-wage financial intermediaries); the FTE figures are reliable but the corresponding median-income series for that sub-sector requires careful interpretation.

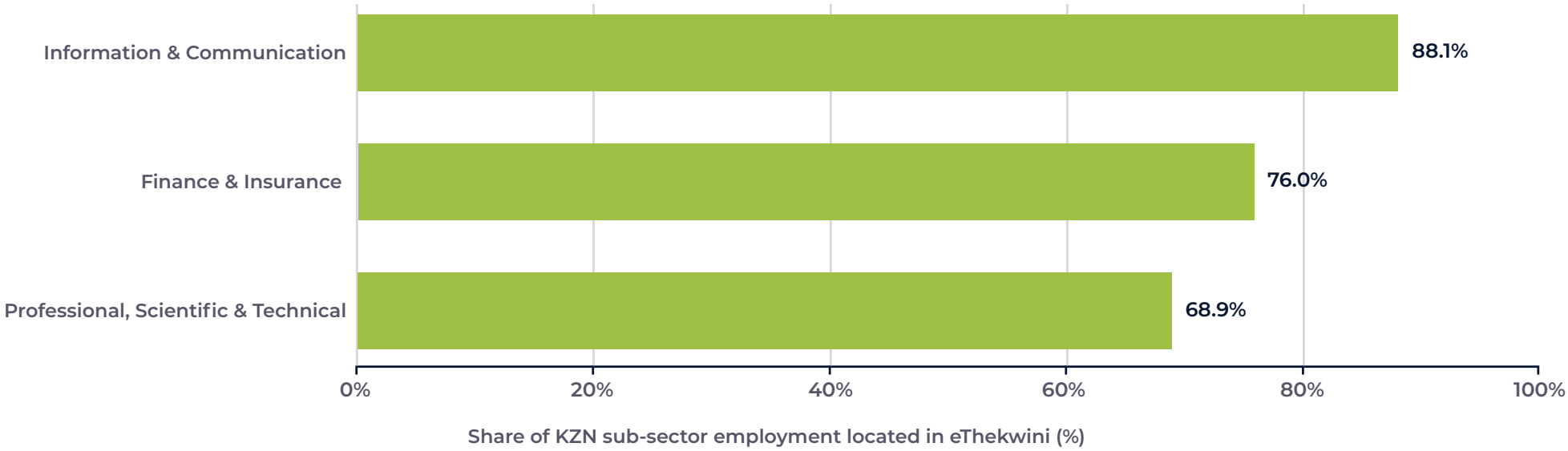

Figure 8.4: eThekwini share of KZN Knowledge-Intensive Services employment by sub-sector, 2025 (horizontal bar chart, %; sub-sectors: Information & Communication 88.1%, Finance & Insurance 76.0%, Professional/Scientific/Technical 68.9%; KZN average reference line at 76.0%).

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 33 Dimensions A and B. Reference line indicates the all-KIS provincial average eThekwini share of 76.0% in 2025.

The conversion failure shows here as spatial concentration: KIS employment grew by 19.3% over the period, but 84.1% of the FTE additions sit inside eThekwini, with Information and Communication concentrated at 88.1% within eThekwini. Provincial KIS growth is functionally an eThekwini story, with the remaining ten districts retaining 24.0% of total KIS employment.

8.2 Innovation-Relevant Sector Employment

Section 8.2 examines employment levels and net job creation across seven innovation-relevant strategic sectors: Logistics & Transport, Agriculture (primary), Agro-Processing, Arts/Entertainment/Recreation, Information & Communication, Finance & Insurance, and Professional/Scientific/Technical. Together these sectors employed 287,088 KZN formal workers in 2014 and 316,421 in 2025, a net addition of 29,333 jobs at +10.2% over the period. Indicator 34 traces the level of employment in each sector and the share of total formal employment held by each. Indicator 35 measures net jobs created and benchmarks KZN's growth rate against the corresponding national series for each sector.

The seven strategic sectors collectively account for between 19.78% and 20.11% of total KZN formal employment across the eleven-year series. The strategic-sector share is therefore essentially flat. Whilst the absolute headcount has risen by 29,333 jobs, the strategic sectors have grown at approximately the same pace as the broader formal economy, rather than outpacing it. The composition of jobs added is heavily weighted toward services rather than primary or processing activity.

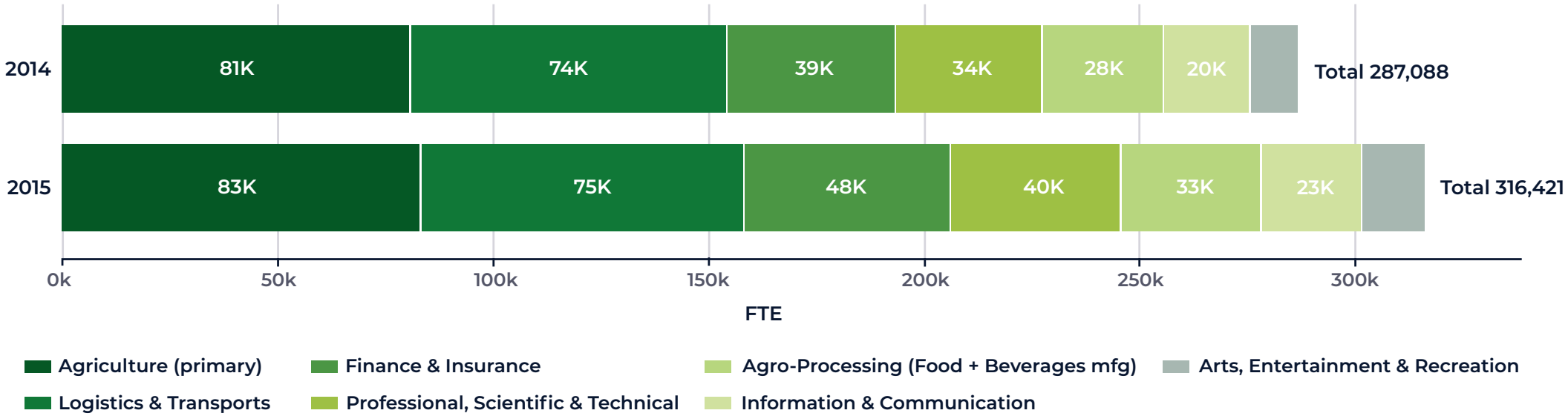

Figure 8.5: KZN strategic-sector employment composition, 2014 and 2025 (stacked horizontal bar, FTE; seven sectors comparing baseline and end-period composition).

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 34. Total KZN formal employment denominator drawn from RAW02_TotalEmployment_KZN.

8.2.1 SECTORAL EMPLOYMENT IN INNOVATION-RELEVANT SECTORS (INDICATOR 34)

INDICATOR 34

Sectoral Employment in Innovation-Relevant Sectors

Two analytical dimensions presented in this section.

DIMENSION A

FTE by Strategic Sector

Annual formal-sector employment for the seven innovation-relevant strategic sectors, KwaZulu-Natal, 2014 to 2025.

A

SHOWN AS
Table 8.5

DIMENSION B

Sector Share of Total KZN Formal Employment

Each strategic sector expressed as a percentage of total KZN formal employment, traced across the same period.

B

SHOWN AS
Table 8.5

Agriculture is the largest of the seven strategic sectors by headcount, employing 83,003 FTE in 2025, followed by Logistics & Transport at 75,121 and Finance & Insurance at 47,974. Professional/Scientific/Technical at 39,701 and Agro-Processing at 32,541 form the middle tier. Information & Communication at 23,215 and Arts/Entertainment/Recreation at 14,866 are the smaller sectors by absolute headcount. Sector ranking by size has been stable across the period: the top three positions held by Agriculture, Logistics, and Finance & Insurance have not changed since 2014.

Sector shares of total KZN formal employment have moved only modestly. Logistics & Transport has declined from 5.08% to 4.78% of formal employment, the largest share decline among the seven. Finance & Insurance has risen from 2.70% to 3.05%, the largest share gain. Professional/Scientific/Technical has risen from 2.32% to 2.52%; Information & Communication from 1.38% to 1.48%; Arts/Entertainment/Recreation from 0.79% to 0.94%; Agro-Processing from 1.96% to 2.07%; and Agriculture has eased marginally from 5.55% to 5.28%. The sector share landscape is structurally stable. Whilst services-oriented sectors are gaining ground, the magnitude of the shift is small over an eleven-year horizon.

Table 8.5: Innovation-Relevant Sector Employment, KwaZulu-Natal, 2014 and 2025

SECTOR	SIC	2014 FTE	2025 FTE	CHANGE	% CHANGE	2014 SHARE	2025 SHARE
Agriculture (primary)	1	80,562	83,003	+2,441	+3.0%	5.55%	5.28%
Logistics & Transport	8	73,755	75,121	+1,366	+1.9%	5.08%	4.78%
Finance & Insurance	11	39,172	47,974	+8,802	+22.5%	2.70%	3.05%
Professional, Scientific & Technical	13	33,704	39,701	+5,997	+17.8%	2.32%	2.52%
Agro-Processing (Food + Beverages)	10+11	28,395	32,541	+4,146	+14.6%	1.96%	2.07%
Information & Communication	10	20,087	23,215	+3,128	+15.6%	1.38%	1.48%
Arts, Entertainment & Recreation	18	11,413	14,866	+3,453	+30.3%	0.79%	0.94%
Total, seven strategic sectors		**287,088**	**316,421**	**+29,333**	**+10.2%**	**19.78%**	**20.11%**

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 34 Dimensions A and B. Sectors sorted by 2025 FTE. Coverage: KwaZulu-Natal formal sector only. Total KZN formal-sector denominator (used for share computation): 1,451,070 in 2014 and 1,573,140 in 2025, drawn from RAW02_TotalEmployment_KZN.

The conversion failure shows here as composition stability without scale rebalancing: the seven strategic sectors collectively employed 287,088 workers in 2014 and 316,421 in 2025, but their share of total KZN formal employment moved by only 0.33 percentage points from 19.78% to 20.11%. Strategic-sector growth has tracked rather than outpaced the broader employment base.

8.2.2 NET JOB CREATION IN INNOVATION-RELEVANT SECTORS (INDICATOR 35)

INDICATOR 35

Net Job Creation in Innovation-Relevant Sectors

Two analytical dimensions presented in this section.

DIMENSION A

Net Job Creation by Sector 2014 to 2025

Net change in formal-sector FTE for each of the seven strategic sectors, with rank by absolute jobs added.

A

SHOWN AS
Table 8.6

DIMENSION B

KZN versus South Africa Indexed Growth

Each KZN sector indexed to 2014 = 100 and benchmarked against the corresponding national (South Africa) series, exposing growth-rate gaps.

B

SHOWN AS
Fugure 8.6

All seven strategic sectors recorded positive net job creation between 2014 and 2025. Finance & Insurance added the most jobs in absolute terms at 8,802 FTE (+22.5%), followed by Professional/Scientific/Technical at 5,997 FTE (+17.8%) and Agro-Processing at 4,146 FTE (+14.6%). Arts/Entertainment/Recreation recorded the highest percentage growth at +30.3%, albeit from the smallest 2014 base of 11,413 FTE. Agriculture and Logistics & Transport added the fewest jobs in proportional terms, at +3.0% and +1.9% respectively, despite being the two largest sectors by absolute headcount.

The KZN versus South Africa benchmark exposes a sector-by-sector growth-rate gap. KZN outperformed the national series in three sectors at 2025: Information & Communication (KZN indexed at 115.57 against SA 111.51, a gap of +4.06 percentage points), Finance & Insurance (KZN 122.47 against SA 119.42, +3.05pp), and Logistics & Transport (KZN 101.85 against SA 100.93, +0.92pp). KZN underperformed the national series in four sectors: Agro-Processing (KZN 114.60 against SA 116.97, -2.37pp), Professional/Scientific/Technical (KZN 117.79 against SA 129.05, -11.26pp), Arts/Entertainment/Recreation (KZN 130.26 against SA 145.33, -15.07pp), and Agriculture (KZN 103.03 against SA 132.77, -29.74pp).

The Agriculture gap is structurally significant. Whilst KZN Agriculture employment grew by 3.0% from 80,562 to 83,003 FTE over the period, South African Agriculture employment grew by 32.8%. The 29.74-percentage-point performance gap is the largest divergence from the national trajectory across all seven strategic sectors, and it cannot be explained by base effects, since both KZN and SA started at index 100. The gap can potentially be attributed to land-use composition differences, sub-sector mix, and provincial labour-market dynamics within primary agriculture; isolating the explanatory drivers is beyond the scope of this report.

Table 8.6: Net Job Creation in Innovation-Relevant Sectors and KZN vs SA Growth Gap, 2014 to 2025

SECTOR	SIC	2014 FTE	2025 FTE	NET JOBS	% CHANGE	KZN VS SA GAP (PP)	DIRECTION
Finance & Insurance	11	39,172	47,974	+8,802	+22.5%	+3.05	KZN ahead
Professional, Scientific & Technical	13	33,704	39,701	+5,997	+17.8%	-11.26	KZN behind
Agro-Processing (Food + Beverages)	10+11	28,395	32,541	+4,146	+14.6%	-2.37	KZN behind
Arts, Entertainment & Recreation	18	11,413	14,866	+3,453	+30.3%	-15.07	KZN behind
Information & Communication	10	20,087	23,215	+3,128	+15.6%	+4.06	KZN ahead
Agriculture (primary)	1	80,562	83,003	+2,441	+3.0%	-29.74	KZN behind
Logistics & Transport	8	73,755	75,121	+1,366	+1.9%	+0.92	KZN ahead
Total / aggregate		**287,088**	**316,421**	**+29,333**	**+10.2%**		

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 35 Dimensions A and B. KZN vs SA gap = (KZN indexed value at 2025) minus (SA indexed value at 2025), with both series indexed to 2014 = 100. Positive value indicates KZN outperformed the national trajectory; negative value indicates KZN lagged. Sectors sorted by absolute net jobs added.

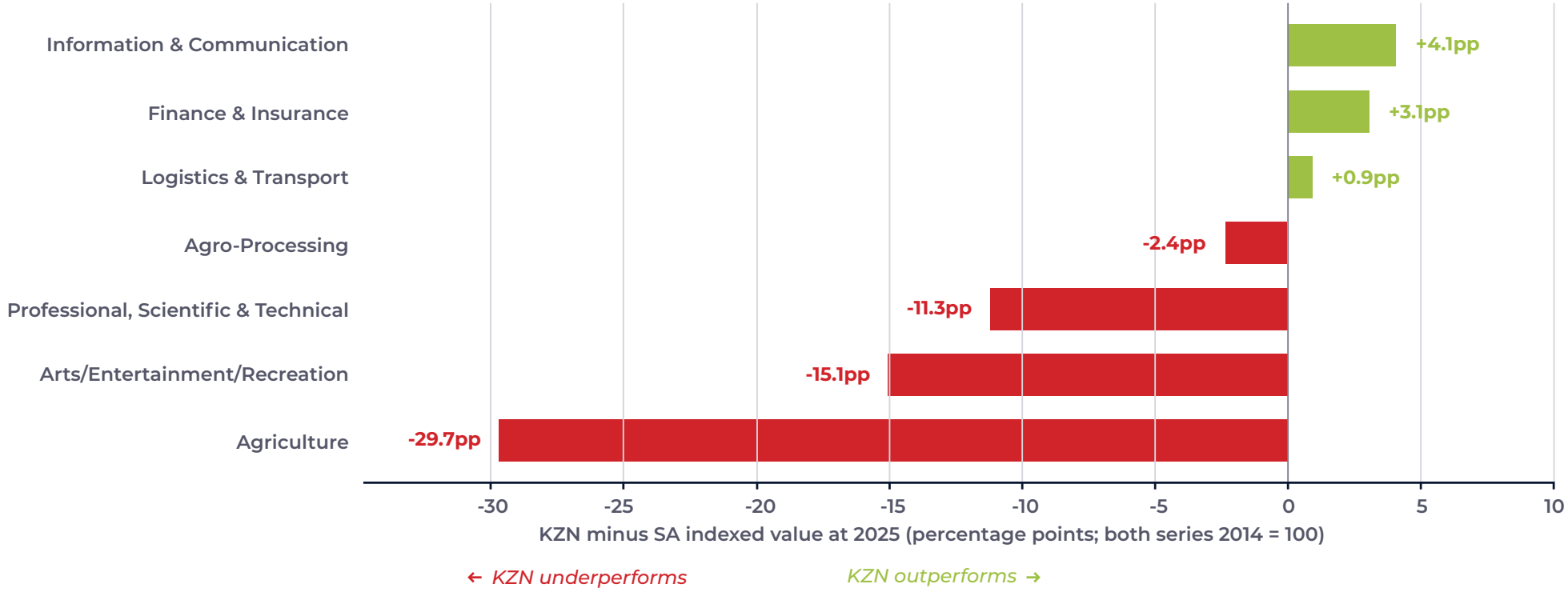

Figure 8.6: KZN versus South Africa indexed growth gap by strategic sector at 2025 (horizontal bar chart, percentage points; sectors with positive values indicate KZN outperformance, negative values indicate underperformance against the corresponding national series indexed to 2014 = 100).

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 35 Dimension B. South Africa national index series sourced from RAW07_SA_NationalIndex within the workbook.

The conversion failure shows here as growth-rate underperformance: KZN added jobs in all seven strategic sectors but lagged South Africa in four. The Agriculture gap is the most pronounced: SA Agriculture employment grew by 32.8% over the period whilst KZN Agriculture grew by only 3.0%, leaving a 29.74-percentage-point performance gap. The Professional/Scientific/Technical and Arts/Entertainment/Recreation gaps of -11.26 and -15.07 percentage points are also material.

8.3 Wage Structuret

Section 8.3 examines the wage structure of KZN's formal economy through three indicators. Indicator 36 measures sector-level wage levels and the wage premium of innovation-relevant sectors over an Agriculture baseline. Indicator 37 measures wage inequality through the Gini coefficient of inter-sector wages and the wage band distribution. Indicator 38 traces real wage growth in the creative economy. All wage figures are real (2015 ZAR base) and FTE-weighted median monthly income, drawn from the National Treasury SEAD platform v5. The analytical frame is KwaZulu-Natal formal sector throughout; provincial cross-section comparisons available in the workbook are not reported here.

8.3.1 SECTOR WAGE LEVELS AND THE INNOVATION WAGE PREMIUM (INDICATOR 36)

INDICATOR 36

Sector Wage Levels and the Innovation Wage Premium

Four analytical dimensions presented in this section.

DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D
FTE-Weighted Median Monthly Income by Sector	**Innovation Wage Premium**	**KZN Gender Wage Gap**	**Youth Sector Wage Proxy**
Real (2015 ZAR base) FTE-weighted median monthly income for thirteen sectors of the KZN formal economy, 2014 to 2025.	Each innovation-relevant sector's median wage expressed as a multiple of the Agriculture baseline (the lowest-wage formal sector in KZN).	Female and male median monthly income across the period, with the gap expressed in absolute terms and as a percentage of male median.	FTE-weighted median monthly income for ages 15 to 34 across innovation-relevant sectors at 2025, used to size the youth wage profile.
SHOWN AS **Table 8.7**	SHOWN AS **Table 8.7 + Figure 8.7**	SHOWN AS **Table 8.8**	SHOWN AS **Inline narrative**

Sector wage levels in the KZN formal economy show divergent trajectories across the period. Six sectors recorded real wage gains: Logistics & Transport (+14.8%, from R21,456 to R24,640 per month), Agriculture (+22.6%, from R4,412 to R5,408), Accommodation & Food Services (+13.9%, from R6,528 to R7,434), Construction (+9.6%, from R7,835 to R8,584), Government & Public Administration (+8.4%, from R23,395 to R25,366), and Health & Social Work (+5.9%, from R13,011 to R13,779). Three sectors recorded substantial real wage losses: Education (-21.9%, from R15,968 to R12,479), Finance & Insurance (-21.6%, from R17,887 to R14,028), and Information & Communication (-7.3%, from R19,545 to R18,112). Manufacturing and Wholesale & Retail Trade were essentially flat at +0.5% and +0.2% respectively.

The combination of declining real wages in Information & Communication and Finance & Insurance with rising employment in those sectors (+15.6% and +22.5% per Indicator 35) is a structurally significant pattern. The v5 workbook data note records that Finance & Insurance shows a composition shift post-2017 attributable to growth in lower-wage financial intermediaries rather than uniform sector expansion. The Education and Government wage declines warrant separate interpretation: both reflect public-sector compensation dynamics rather than innovation-system features, and the Government series shows an anomalous trough in 2023 (R20,852) that recovers to R25,366 in 2025. The same anomaly is flagged in the Indicator 39 data note.

The Innovation Wage Premium measures each innovation-relevant sector's median wage as a multiple of the Agriculture baseline, the lowest-wage formal sector in KZN. The premium has compressed sharply across all three core innovation sectors. Information & Communication has fallen from 4.43 times the Agriculture median in 2014 to 3.35 times in 2025, a decline of 1.08 multiples. Finance & Insurance has fallen from 4.05 to 2.59 times, a decline of 1.46 multiples, the largest premium compression of any innovation sector. Professional/Scientific/Technical has fallen from 3.30 to 2.72 times, a decline of 0.59 multiples.

Premium compression has been driven from both ends in Finance & Insurance and Information & Communication: Agriculture wages rose by 22.6% in real terms whilst Finance & Insurance and Information & Communication wages fell by 21.6% and 7.3% respectively. Compression in Professional/Scientific/Technical reflects only the Agriculture rise, since PST wages were essentially flat at +0.8% over the period. The wage premium that has historically distinguished innovation-sector employment from baseline formal work has been substantially eroded over the eleven-year period.

Table 8.7: Sector Wage Levels and the Innovation Wage Premium, KwaZulu-Natal, 2014 and 2025

SECTOR	2014 WAGE (R/MO)	2025 WAGE (R/MO)	CHANGE (R)	% CHANGE	2014 PREMIUM (× AGRI)	2025 PREMIUM (× AGRI)	PREMIUM CHANGE
Government & Public Admin	23,395	25,366	+1,971	+8.4%	5.30×	4.69×	-0.61
Logistics & Transport	21,456	24,640	+3,184	+14.8%	4.86×	4.56×	-0.30
Information & Communication	19,545	18,112	-1,433	-7.3%	4.43×	3.35×	-1.08
Professional, Scientific & Technical	14,569	14,687	+118	+0.8%	3.30×	2.72×	-0.59
Finance & Insurance	17,887	14,028	-3,859	-21.6%	4.05×	2.59×	-1.46
Manufacturing (all sub-tiers)	13,861	13,927	+66	+0.5%	3.14×	2.58×	-0.57
Health & Social Work	13,011	13,779	+768	+5.9%	2.95×	2.55×	-0.40
Education	15,968	12,479	-3,489	-21.9%	3.62×	2.31×	-1.31
Construction	7,835	8,584	+749	+9.6%	1.78×	1.59×	-0.19
Arts, Entertainment & Recreation	8,890	8,396	-494	-5.6%	2.01×	1.55×	-0.46
Wholesale & Retail Trade	8,261	8,281	+20	+0.2%	1.87×	1.53×	-0.34
Accommodation & Food Services	6,528	7,434	+906	+13.9%	1.48×	1.37×	-0.11
Agriculture (primary)	4,412	5,408	+996	+22.6%	1.00× (baseline)	1.00× (baseline)	n/a

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 36 Dimensions A and B. Wages are FTE-weighted median monthly income in real ZAR (2015 base). Premium = sector wage divided by Agriculture wage in the same year. Sectors sorted by 2025 wage level.

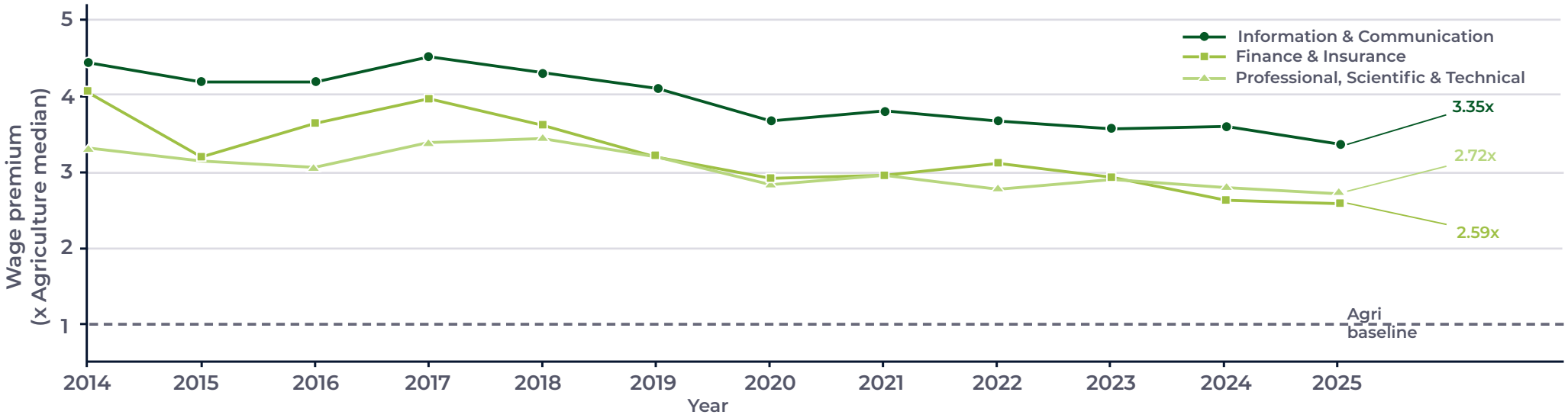

Figure 8.7: Innovation wage premium decline, KwaZulu-Natal, 2014 to 2025 (line chart, multiple of Agriculture baseline; three series: Information & Communication, Finance & Insurance, Professional/Scientific/Technical).

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 36 Dimension B. Premium = sector median wage divided by Agriculture median wage in the same year, computed annually.

The KZN gender wage gap has been broadly stable across the period. The female median monthly income stood at R8,968 in 2014 and R8,609 in 2025, against male median income of R11,676 in 2014 and R11,174 in 2025. The absolute gap was R2,707 in 2014 and R2,564 in 2025. As a percentage of the male median, the gap was 23.2% in 2014 and 22.95% in 2025, a narrowing of 0.25 percentage points. Whilst the gap widened to a peak of 27.55% in 2020, the trajectory since 2020 has been one of gradual compression. The 2025 figure of 22.95% is the lowest reading since 2018, although it remains marginally above the 2017 low of 22.46%. Both male and female real wages declined modestly across the period, with the gap narrowing more in absolute than in proportional terms.

Table 8.8: KZN Gender Wage Gap, Selected Years, 2014 to 2025

YEAR	FEMALE MEDIAN (R/MO)	MALE MEDIAN (R/MO)	GAP (R/MO)	GAP % OF MALE MEDIAN	CHANGE VS 2014
2014	8,968	11,676	2,707	23.19%	baseline
2018	9,036	12,082	3,046	25.21%	+2.02pp
2020	8,784	12,125	3,341	27.55%	+4.36pp
2022	8,359	11,211	2,852	25.44%	+2.25pp
2024	7,995	10,810	2,815	26.04%	+2.85pp
2025	**8,609**	**11,174**	**2,564**	**22.95%**	**-0.25pp**

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Sex.csv); KZN SOI Impact workbook FINAL, Indicator 36 Dimension C. Wages are FTE-weighted median monthly income in real ZAR (2015 base). Selected years shown to expose the 2020 peak and 2025 compression; full annual series available in the workbook.

Youth wage levels at 2025 (ages 15 to 34) place the youth median substantially below sector-aggregate medians for the core innovation sectors. The youth median in Information & Communication stands at R12,998 per month against the sector-aggregate median of R18,112; in Finance & Insurance at R10,101 against R14,028. Agro-Processing youth wages stand at R10,018, although a directly comparable sector-aggregate figure is not available in Indicator 36 (Manufacturing is reported in aggregate rather than by tier in that table). The youth wage in Logistics & Transport at R16,148 is the highest among the seven strategic sectors; Agriculture youth wage at R5,018 is the lowest. The 2025 youth profile indicates that youth participation in innovation-relevant sectors is associated with lower wage levels than the sector aggregates would suggest, although a portion of this gap is attributable to age-experience effects on remuneration that would be expected in any sector.

The conversion failure shows here as wage-premium erosion: the Finance & Insurance sector added 8,802 FTE (+22.5%) but its wage premium relative to Agriculture has fallen from 4.05× to 2.59× over the period. The Information & Communication and Professional/Scientific/Technical premiums have compressed by 1.08 and 0.59 multiples respectively. The data is consistent with employment expansion in these three sectors having occurred at wage points below the existing wage frontier, although the indicator system cannot itself rule out alternative compositional explanations such as shifting role-mix within sectors.

8.3.2 Wage Inequality Between Sectors (Indicator 37)

INDICATOR 37

Wage Inequality Between Sectors

Three analytical dimensions presented in this section.

DIMENSION A

KZN Gini Coefficient Trend

Inter-sector wage Gini coefficient for the KZN formal economy, 2014 to 2024. Note: the 2025 Gini value is pending in the workbook.

A

SHOWN AS
Figure 8.8

DIMENSION B

Wage Band Distribution

Share of total KZN formal employment falling into each of nine wage bands, traced annually 2014 to 2025.

B

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Table 8.9

DIMENSION C

Distribution Snapshot 2014, 2019 and 2025

Three-point comparison of the wage distribution to expose structural shifts at the lower and upper ends.

C

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Table 8.9

The KZN inter-sector wage Gini coefficient stood at 0.610 in 2014, rose to a peak of 0.669 in 2018, and has subsequently declined to 0.612 by 2023, with a small uptick to 0.618 in 2024. The 2025 Gini value is pending in the workbook and is expected when the SEAD platform refreshes the Province_Gini.csv source. The Gini measure used here captures dispersion of median wages across formal sectors, not full income inequality across the population, and cannot be compared directly with household income Gini figures published by Stats SA.

The Gini trajectory indicates that inter-sector wage dispersion peaked in 2018, consistent with the divergence between the wage gains in Logistics & Transport and the wage compressions in Finance & Insurance and Education observed in Indicator 36. Dispersion has eased since 2018 toward the 2014 baseline. The 2024 figure of 0.618 is closer to the 2014 starting point than to the 2018 peak, indicating compression rather than reversal of the inequality-reduction trend. The data note in the workbook explicitly cautions against over-interpreting the small 2024 uptick as a structural reversal.

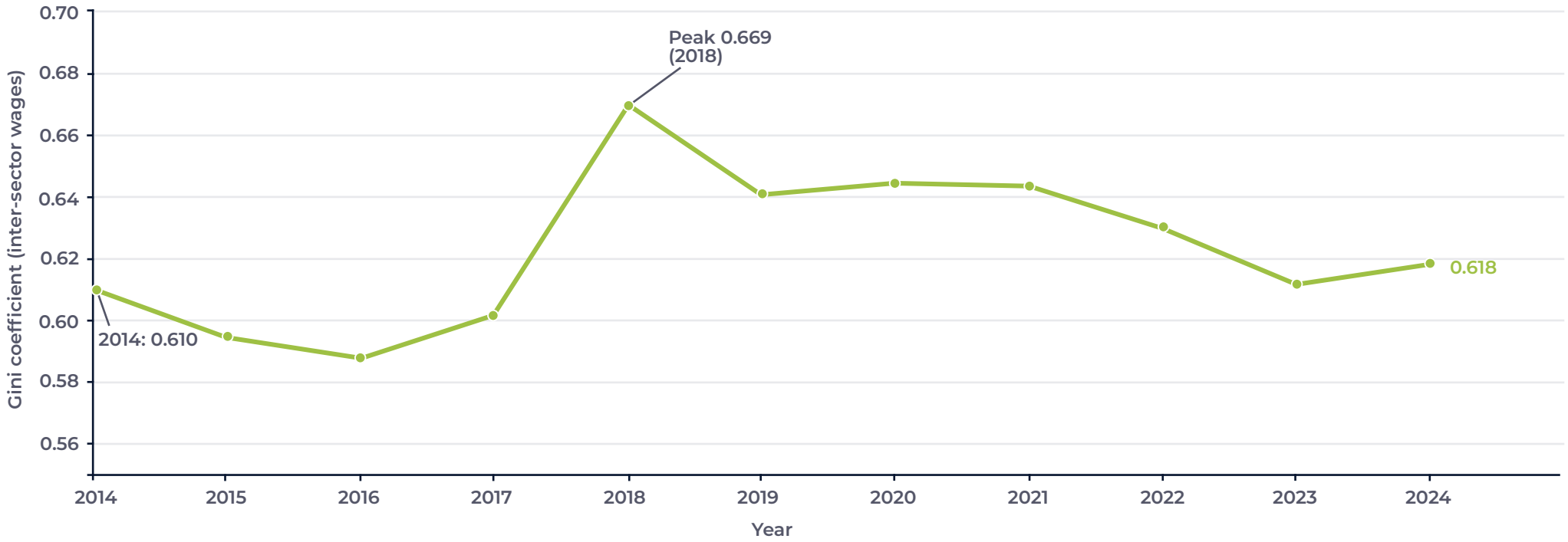


Figure 8.8: KZN inter-sector wage Gini coefficient trajectory, 2014 to 2024 (line chart; reference markers at 2014 baseline of 0.610 and 2018 peak of 0.669; 2025 value pending).

Source: National Treasury SEAD Platform v5 (Province_Gini.csv); KZN SOI Impact workbook FINAL, Indicator 37 Dimension A. Coverage: KwaZulu-Natal formal sector. The Gini measure here is the dispersion of FTE-weighted median wages across formal sectors and should not be interpreted as a full household-income inequality measure. The 2025 Gini value is data-pending in the source file.

The wage band distribution shows a shift in formal-sector employment toward the lower-middle bands over the eleven-year period. The share of workers earning between R6,400 and R12,800 per month rose from 20.06% in 2014 to 24.31% in 2025, a gain of 4.25 percentage points and the largest band-share increase. The share of workers earning between R12,800 and R25,600 fell from 18.95% in 2014 to 15.45% in 2025, a loss of 3.50 percentage points and the largest band-share decline. The lowest band shares (below R3,200 per month) have eased modestly: the R0 to R1,600 share fell from 6.52% to 5.77%, and the R1,600 to R3,200 share fell from 7.70% to 5.90%.

The pattern is one of distributional compression toward the lower-middle, not bifurcation. Whilst a polarisation hypothesis would predict simultaneous gains at both ends and losses in the middle, the KZN data show the largest gain in the R6,400 to R12,800 band, immediately above the lowest poverty bands. The combined share earning below R3,200 per month declined from 14.22% in 2014 to 11.67% in 2025, indicating modest improvement at the very low-wage end. Movement at the upper end has been smaller: the share earning above R51,200 per month rose from 7.63% in 2014 to 8.12% in 2025, a gain of 0.49 percentage points.

Table 8.9: KZN Wage Band Distribution Share of Total Formal Employment, 2014, 2019 and 2025

WAGE BAND (R/MONTH, REAL)	BAND TYPE	2014 SHARE	2019 SHARE	2025 SHARE	CHANGE 2014–25 (PP)	DIRECTION
R0 to R1,600	Below poverty	6.52%	6.00%	5.77%	-0.75	↓
R1,600 to R3,200	Below poverty	7.70%	5.35%	5.90%	-1.80	↓
R3,200 to R6,400	Low wage	20.19%	21.69%	21.09%	+0.90	↑
R6,400 to R12,800	Lower middle	20.06%	21.43%	24.31%	+4.25	↑↑
R12,800 to R25,600	Upper middle	18.95%	16.98%	15.45%	-3.50	↓↓
R25,600 to R51,200	Upper	18.95%	19.68%	19.37%	+0.42	≈
R51,200 to R102,400	High	6.27%	7.33%	6.53%	+0.26	≈
R102,400 to R204,800	Very high	1.17%	1.35%	1.35%	+0.18	≈
Above R204,800	Top end	0.19%	0.20%	0.24%	+0.05	≈

Source: National Treasury SEAD Platform v5 (Province_WageDistribution); KZN SOI Impact workbook FINAL, Indicator 37 Dimensions B and C. Wages are real (2015 ZAR base). Band shares computed as band FTE divided by total KZN formal-sector FTE for the same year. Wage band labels (Below poverty / Low wage / Lower middle / Upper middle / Upper / High / Very high / Top end) reflect SOI working categorisation, not Stats SA official poverty thresholds. Direction symbols apply the following thresholds to absolute change: ≈ for less than 0.50 percentage points, ↑ or ↓ for 0.50 to 2.00 percentage points, and ↑↑ or ↓↓ for 2.00 percentage points or more.

The conversion failure shows here as middle-band hollowing rather than polarisation: the share of formal workers earning between R12,800 and R25,600 per month declined by 3.50 percentage points from 2014 to 2025, whilst the share earning between R6,400 and R12,800 rose by 4.25 percentage points. The wage distribution is compressing toward the lower-middle rather than bifurcating. The combined share below R3,200 per month declined from 14.22% to 11.67%.

8.3.3 WAGE GROWTH IN THE CREATIVE ECONOMY (INDICATOR 38)

INDICATOR 38

Wage Growth in the Creative Economy

Two analytical dimensions presented in this section.

DIMENSION A

Real Wage Trend, Arts/Entertainment/Recreation

FTE-weighted median monthly income for the SIC 18 creative-economy sector, KZN formal sector, 2014 to 2025.

A

SHOWN AS
Figure 8.9

DIMENSION B

Indexed Wage Trajectory

Real wage indexed to 2014 = 100, exposing the magnitude of the 2021 collapse and the partial recovery to 2025.

B

SHOWN AS
Figure 8.9

Real wages in the KZN creative economy (Arts/Entertainment/Recreation, SIC 18) declined from R8,890 per month in 2014 to R8,396 in 2025, a fall of R494 in real terms or -5.6% over the period. The trajectory was substantially non-linear. Wages declined steadily from R8,890 in 2014 to R7,266 in 2020, a -18.3% real decline that pre-dates the pandemic. Between 2020 and 2021 the wage collapsed to R5,181, a single-year fall of 28.7% attributable to the combined impact of COVID-19 lockdown restrictions on entertainment venues and the July 2021 civil unrest, which disproportionately affected creative-economy small businesses in KwaZulu-Natal. The series has recovered partially since 2021, reaching R8,396 by 2025.

Indexed to 2014 = 100, the creative-economy real wage stood at 94.4 in 2025. The 2021 indexed value of 58.3 represents the lowest point in the series and the most severe single-year wage collapse among the seven strategic sectors across the eleven-year period. The 2025 recovery to 94.4 leaves the sector below its 2014 starting position and substantially below its pre-pandemic 2014 to 2019 trajectory. The national creative-economy wage benchmark series is not yet available in the workbook, so KZN performance cannot be set against a national reference point at this revision.

The combination of declining real wages with rising employment in this sector (Indicator 35 records +30.3% net job creation, the highest percentage growth among the seven strategic sectors) presents a notable pattern. The sector has expanded in headcount whilst the per-worker wage has compressed in real terms. The pattern is consistent with two readings: a workforce composition shift toward lower-paying creative-economy roles, or formalisation of previously informal creative work entering the formal sector at lower starting wages. The indicator data does not distinguish between these explanations. Whether the 2025 figure represents a recovery plateau or a continuing trajectory will be observable in the 2026/27 SEAD update.

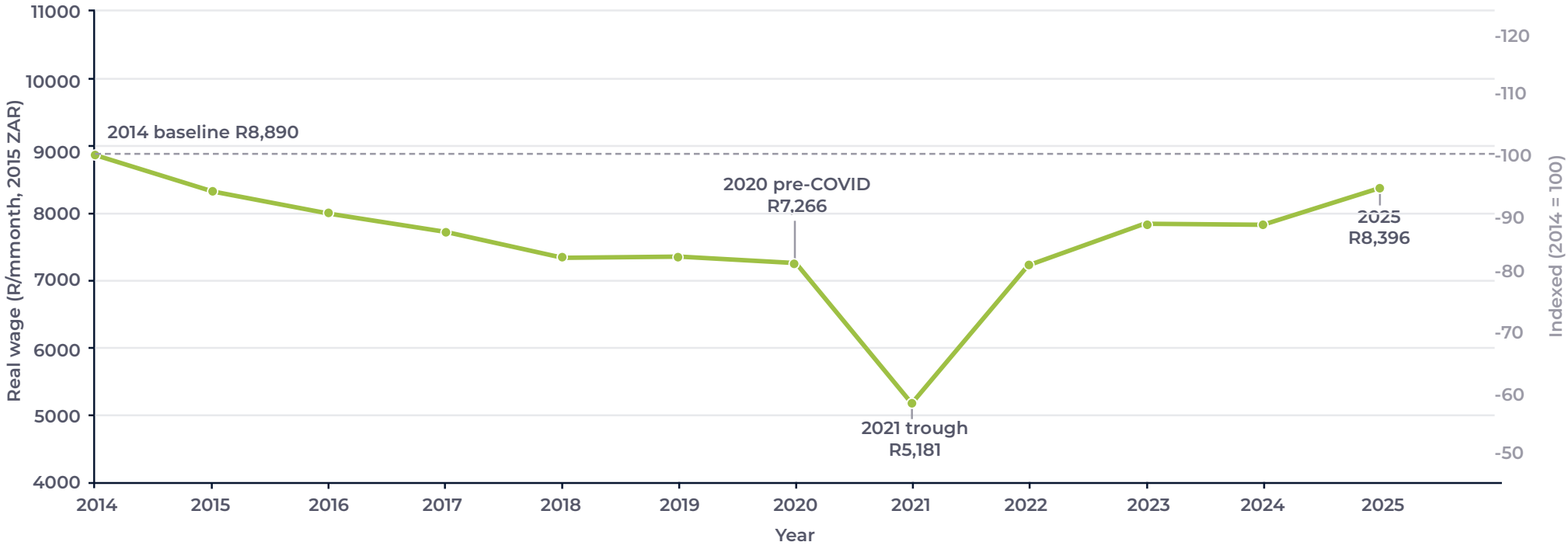


Figure 8.9: KZN creative-economy real wage trajectory, 2014 to 2025 (dual line chart, real ZAR per month and indexed to 2014 = 100; markers at 2020 pre-COVID level R7,266, 2021 trough R5,181, and 2025 partial recovery R8,396; reference line at 2014 baseline R8,890).

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 38 Dimensions A and B. Coverage: SIC 18 (Arts, Entertainment & Recreation), KwaZulu-Natal formal sector. Wages are FTE-weighted median monthly income in real (2015 ZAR base). National creative-economy wage benchmark is data-pending in the workbook.

The conversion failure shows here as the absence of recovery to baseline: real wages in the creative economy fell by 5.6% from 2014 to 2025, with a single-year collapse of 28.7% between 2020 and 2021 attributable to COVID-19 and the July 2021 civil unrest. By 2025 the indexed wage stands at 94.4 against a 2014 base of 100. Sector employment grew by 30.3% over the same period. The combination of declining real wages with rising employment is consistent with two analytically distinct readings: headcount expansion concentrated in lower-paying creative-economy roles rather than at the wage frontier, or formalisation of previously informal creative work entering the formal sector at lower starting wages. The indicator data does not distinguish between these readings.

8.4 Youth Employment in the Innovation System

Section 8.4 examines youth employment outcomes within KZN's formal economy through Indicator 39. The youth dataset covers ages 15 to 34, partitioned into two age bands: 15 to 24 (early entrants and trainees) and 25 to 34 (early-career professionals). The section traces youth FTE by sector and age band, the youthfulness index (the share of each sector's total formal employment held by 15 to 34-year-olds), the youth wage trajectory by age band, and the youth wage premium relative to the Agriculture baseline. The analytical frame is KwaZulu-Natal formal sector throughout. Indicator 39 follows the Indicator 36 wage architecture but partitions by age, allowing comparison between youth-specific outcomes and the all-worker series reported in Section 8.3.

Total formal-sector youth FTE in KZN fell from 599,347 in 2014 to 529,044 in 2025, a net loss of 70,303 jobs at -11.7% over the eleven-year period. The contraction is concentrated in the younger 15 to 24 band, which fell from 124,689 to 88,997 (-28.6%, a loss of 35,692 jobs), against a -7.3% decline in the 25 to 34 band (from 474,656 to 440,043, a loss of 34,613). The 15 to 24 band therefore contracted at approximately four times the proportional rate of the 25 to 34 band. The unequal contraction is the analytically significant feature of the youth employment series.

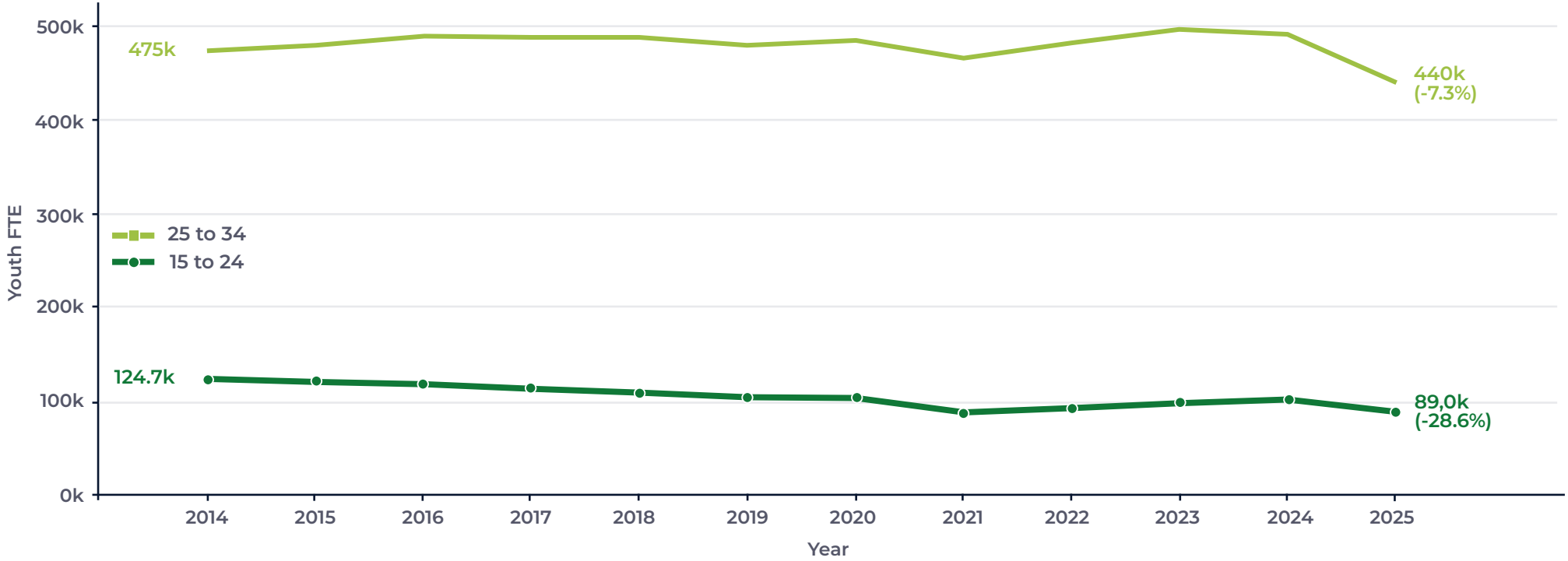


Figure 8.10: KZN total youth FTE by age band, 2014 to 2025 (line chart, two series; 15 to 24 band shown in dark green, 25 to 34 band in light green; reference markers at 2014 baselines and 2025 endpoints; secondary y-axis showing the cumulative percentage decline by band).

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Youth_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 39. Combined-row totals (15 to 34) for 2014 and 2025 reconcile to within four units of the sum of the 15 to 24 and 25 to 34 bands; this is a floating-point rounding artifact in upstream SEAD aggregation in the Manufacturing and Health rows and is not material. Government & Public Administration (SIC 15) is flagged anomalous in the workbook for the 2021 to 2024 period and is excluded from headline analytical claims; the corresponding rows are marked with a warning symbol in subsequent tables.

8.4.1 YOUTH EMPLOYMENT IN INNOVATION-RELEVANT SECTORS (INDICATOR 39)

INDICATOR 39

Youth Employment in Innovation-Relevant Sectors

Four analytical dimensions presented in this section.

DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D
Youth FTE by Age Band	**Youthfulness Index**	**Youth Wages by Age Band**	**Youth Wage Premium vs Agriculture**
Annual formal-sector youth FTE for the seven innovation-relevant strategic sectors plus selected benchmarks, partitioned into 15 to 24 and 25 to 34 age bands.	Each sector's youth share of total formal employment, traced 2014 to 2025. High values indicate youth-intensive sectors; declining values indicate ageing workforce composition.	FTE-weighted median monthly income for 15 to 24 and 25 to 34 youth workers, by sector, in real (2015 ZAR base) terms.	Each innovation-sector youth wage expressed as a multiple of the Agriculture youth wage in the same age band, exposing premium compression at the entry-career level.
SHOWN AS **Table 8.7**	SHOWN AS **Table 8.11**	SHOWN AS **Table 8.12**	SHOWN AS **Inline narrative**

Youth FTE in the seven innovation-relevant strategic sectors moved unevenly across the period. Three sectors gained youth FTE on a combined 15 to 34 basis: Finance & Insurance added 4,303 youth jobs (+22.8%, from 18,892 to 23,195), Information & Communication added 1,406 youth jobs (+13.3%, from 10,554 to 11,960), and Arts/Entertainment/Recreation added 551 youth jobs (+8.9%, from 6,168 to 6,719). Four sectors lost youth FTE: Logistics & Transport (-9,024, -31.0%), Agriculture (-9,870, -28.4%), Manufacturing including Agro-Processing (-16,970, -19.4%), and Professional/Scientific/Technical (-1,077, -6.6%). The aggregate combined 15 to 34 youth FTE of the seven strategic sectors fell from 203,287 to 172,606, a net loss of 30,681 jobs at -15.1% over the period; the strategic-sector youth contraction therefore exceeded the all-sector youth contraction of -11.7%.

Outside the strategic-sector frame, several non-innovation sectors recorded notable youth movements. Construction lost 16,135 youth FTE (-45.6%), the largest proportional decline of any sector tracked. Administrative & Support lost 19,346 youth jobs (-23.6%). Education added 8,729 youth FTE (+59.6%), the largest proportional gain. Wholesale & Retail Trade, the single largest non-anomalous youth-employer sector, added 4,217 jobs (+4.0%) but its share of total youth employment fell as the overall denominator shrank. In strategic sectors where youth FTE declined, the 15 to 24 band contracted more sharply than the 25 to 34 band. The three growth sectors split into distinct patterns: Finance & Insurance grew in both bands with the 15 to 24 band growing faster (+57.7% against +14.0%); Information & Communication grew in the 25 to 34 band (+17.6%) but held essentially flat in the 15 to 24 band (+1.6%, from 2,855 to 2,902); and Arts/Entertainment/Recreation recorded combined growth driven entirely by the 25 to 34 band (+28.5%) against a 15 to 24 contraction of -38.9%. The 15 to 24 contraction pattern therefore extends into one of the three sectors with combined youth growth.

Table 8.10: Youth FTE by Age Band, KZN Innovation-Relevant Sectors and Benchmarks, 2014 and 2025

SECTOR	SIC	15-24 2014	15-24 2025	15-24 % CHG	25-34 2014	25-34 2025	25-34 % CHG	COMBINED 2025	COMBINED % CHG
Finance & Insurance	11	3,803	5,997	+57.7%	15,089	17,198	+14.0%	23,195	+22.8%
Information & Communication	10	2,855	2,902	+1.6%	7,699	9,058	+17.6%	11,960	+13.3%
Arts/Entertainment/Recreation	18	1,789	1,093	-38.9%	4,379	5,625	+28.5%	6,719	+8.9%
Professional, Scientific & Technical	13	3,930	3,259	-17.1%	12,411	12,005	-3.3%	15,264	-6.6%
Manufacturing (incl. Agro-Processing)	3	15,856	9,362	-41.0%	71,563	61,088	-14.6%	70,450	-19.4%
Agriculture	1	7,962	3,241	-59.3%	26,802	21,653	-19.2%	24,894	-28.4%
Logistics & Transport	8	4,534	2,571	-43.3%	24,614	17,552	-28.7%	20,124	-31.0%
Strategic-sector subtotal (7)		**40,729**	**28,425**	**-30.2%**	**162,557**	**144,179**	**-11.3%**	**172,606**	**-15.1%**
Wholesale & Retail Trade	7	29,925	22,305	-25.5%	76,132	87,968	+15.5%	110,274	+4.0%
Education	16	3,760	6,032	+60.4%	10,887	17,343	+59.3%	23,376	+59.6%
Construction	6	7,679	2,800	-63.5%	27,699	16,443	-40.6%	19,243	-45.6%
Government & Public Admin ⚠	15	12,422	7,979	-35.8%	94,754	78,911	-16.7%	86,890	-18.9%
KZN total (15 to 34, all sectors)		**124,689**	**88,997**	**-28.6%**	**474,656**	**440,043**	**-7.3%**	**529,044**	**-11.7%**

Source: National Treasury SEAD Platform v5 (Province_MedianIncome_Youth_Industry5d.csv); KZN SOI Impact workbook FINAL, Indicator 39 Dimensions A, B and C. Coverage: KwaZulu-Natal formal sector, ages 15 to 34. The seven strategic sectors are reported first, with the strategic-sector subtotal row, followed by selected benchmark sectors (Wholesale & Retail Trade, Education, Construction, and Government & Public Administration). Manufacturing aggregates all sub-tiers including Agro-Processing at the SIC 1-digit level used in the youth dataset; the seven-strategic-sector definition therefore differs in granularity from the Indicator 34 definition reported in Section 8.2. The Combined 2025 column for the strategic-sector subtotal (172,606) reconciles to within two units of the sum of the 15 to 24 and 25 to 34 bands due to floating-point rounding in upstream SEAD aggregation. The ⚠ symbol marks Government & Public Administration as anomalous; the trough is data-flagged in the workbook and Government values are not used in headline narrative claims.

The youthfulness index, computed as youth FTE divided by total sector FTE in the same year, exposes which sectors retain their youth-intensive character over time. Information & Communication retained the most youth-stable profile, moving from 54.65% youthful in 2014 to 52.79% in 2025, a decline of 1.86 percentage points. Finance & Insurance was almost unchanged at 49.98% in 2014 and 49.53% in 2025, a decline of 0.45 percentage points. These two sectors are the most stable on youthfulness among the seven strategic sectors. Across the full sector list, however, Education ranks first, rising from 37.59% to 40.74%, an increase of 3.15 percentage points consistent with the +59.6% youth FTE growth recorded for that sector. Most other sectors lost between 7 and 17 percentage points of youthfulness over the period.

The decline in the youthfulness index across most sectors does not in itself indicate a deterioration of youth opportunity; it reflects the ageing of the cohort employed in 2014 and the slower replacement rate at the 15 to 24 entry band. The interpretive consequence is that retention of mid-career workers (now ageing out of the 25 to 34 band) has outpaced the entry of new 15 to 24 workers across most sectors. The pattern is consistent with the disproportionate contraction of the 15 to 24 band reported earlier.

Table 8.11: Youthfulness Index, Selected Sectors, KZN, 2014 and 2025

SECTOR	2014	2025	Δ (PP)	DIRECTION	RANK BY STABILITY
Education	37.59%	40.74%	+3.15	↑↑	1 (gainer)
Finance & Insurance	49.98%	49.53%	-0.45	≈	2
Information & Communication	54.65%	52.79%	-1.86	↓	3
Other Services	45.00%	41.03%	-3.97	↓↓	4
Manufacturing	41.85%	34.53%	-7.32	↓↓	5
Health & Social Work	37.67%	29.02%	-8.65	↓↓	6
Wholesale & Retail Trade	56.79%	47.65%	-9.14	↓↓	7
Arts/Entertainment/Recreation	55.78%	46.16%	-9.62	↓↓	8
Admin & Support	57.09%	46.87%	-10.21	↓↓	9
Professional, Scientific & Technical	50.39%	39.70%	-10.69	↓↓	10
Logistics & Transport	40.10%	27.08%	-13.02	↓↓	11
Accommodation & Food Services	57.14%	44.07%	-13.07	↓↓	12
Agriculture	43.84%	30.57%	-13.27	↓↓	13
Construction	50.99%	34.19%	-16.80	↓↓	14
Government & Public Admin ⚠	27.70%	20.85%	-6.85	–	(anomalous)

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 39 Dimension B. Youthfulness index = sector youth FTE (15 to 34) divided by total sector FTE in the same year. Sectors sorted by stability (ascending magnitude of decline; gainer first). Direction symbols apply the following thresholds: ≈ for less than 0.50 percentage points, ↑ or ↓ for 0.50 to 2.00 percentage points, ↑↑ or ↓↓ for 2.00 percentage points or more. The ⚠ symbol marks Government & Public Administration as anomalous; the rank assignment is suppressed for that row.

Youth wage trajectories show a sharper compression than the all-worker series reported in Section 8.3. In the 25 to 34 band, the three core innovation sectors recorded substantial real wage losses: Finance & Insurance fell from R15,974 to R11,349 per month (-29.0%), Information & Communication from R18,719 to R14,752 (-21.2%), and Professional/Scientific/Technical from R14,578 to R12,705 (-12.8%). The Finance & Insurance 25 to 34 wage decline of -29.0% is more severe than the corresponding all-worker Finance & Insurance decline of -21.6% reported in Indicator 36, indicating that early-career professional positions in the sector have absorbed a disproportionate share of the wage compression. Logistics & Transport 25 to 34 wages declined modestly from R17,978 to R17,262 (-4.0%), in contrast to the +14.8% all-worker Logistics gain reported in Indicator 36.

In the 15 to 24 band, Finance & Insurance fell from R9,198 to R7,004 (-23.9%) and Logistics & Transport from R10,425 to R8,154 (-21.8%). Information & Communication 15 to 24 wages held essentially flat at R8,677 to R8,457, a decline of 2.5%. Manufacturing 15 to 24 wages rose from R6,520 to R7,798 (+19.6%), and Agriculture 15 to 24 wages from R3,219 to R4,372 (+35.8%). These youth-band gains exceed the all-worker movements recorded in Indicator 36 Dimension A, where Manufacturing was essentially flat at +0.5% and Agriculture rose by 22.6%. The 15 to 24 wage profile is therefore divergent across sectors: substantial gains at the lower-wage end (Manufacturing, Agriculture), substantial losses at the upper-middle (Finance, Logistics, PST), and stability in Information & Communication.

Table 8.12: Youth Wages by Age Band, KZN Innovation-Relevant Sectors, 2014 and 2025 (R/month, real)

SECTOR	15-24 2014	15-24 2025	15-24 % CHG	25-34 2014	25-34 2025	25-34 % CHG
Information & Communication	8,677	8,457	-2.5%	18,719	14,752	-21.2%
Logistics & Transport	10,425	8,154	-21.8%	17,978	17,262	-4.0%
Finance & Insurance	9,198	7,004	-23.9%	15,974	11,349	-29.0%
Professional, Scientific & Technical	7,517	6,540	-13.0%	14,578	12,705	-12.8%
Manufacturing	6,520	7,798	+19.6%	12,143	11,276	-7.1%
Arts/Entertainment/Recreation	5,721	5,903	+3.2%	9,384	8,204	-12.6%
Agriculture (baseline)	3,219	4,372	+35.8%	4,113	5,135	+24.8%

Source: National Treasury SEAD Platform v5; KZN SOI Impact workbook FINAL, Indicator 39 Dimensions E and F. Wages are FTE-weighted median monthly income in real ZAR (2015 base). Sectors sorted by 25 to 34 wage level descending.

The youth wage premium relative to the Agriculture baseline has compressed sharply in the 25 to 34 band. Information & Communication moved from 4.55 times the Agriculture 25 to 34 baseline in 2014 to 2.87 times in 2025, a decline of 1.68 multiples. Finance & Insurance fell from 3.88 to 2.21 times, a decline of 1.67 multiples. Professional/Scientific/Technical fell from 3.54 to 2.47 times, a decline of 1.07 multiples. Logistics & Transport fell from 4.37 to 3.36 times, a decline of 1.01 multiples. The 25 to 34 premium compressions exceed the corresponding all-worker premium compressions in Indicator 36 across all four sectors. The Logistics & Transport and Professional/Scientific/Technical cases are the most analytically striking because the all-worker series rose or held essentially flat over the period (+14.8% and +0.8% respectively per Indicator 36 Dimension A) whilst the 25 to 34 wage fell (-4.0% and -12.8%): youth and all-worker outcomes diverge in direction. In Information & Communication and Finance & Insurance, the all-worker series also declined but the 25 to 34 declines were sharper still (premium decline of 1.68 against 1.08 multiples, and 1.67 against 1.46 multiples respectively). The dominant driver in all four cases is the sharper decline in 25 to 34 sector wages; the Agriculture youth baseline rose by 24.8% over the period and contributes modestly to the wider compression at the upper-middle end.

The conversion failure shows here as scale gain coupled with value-capture loss at the entry-career level: youth FTE in Finance & Insurance and Information & Communication grew by 4,303 (+22.8%) and 1,406 (+13.3%) respectively over the period, whilst the corresponding 25 to 34 monthly wage in those same two sectors fell by R4,625 (-29.0%) and R3,967 (-21.2%) in real terms. The 25 to 34 wage premium relative to Agriculture compressed by 1.67 multiples in Finance & Insurance and 1.68 in Information & Communication. Youth participation in innovation work has expanded; the value extracted by those young workers has compressed.

8.5 Knowledge Production

Section 8.5 examines KZN's research publication output through Indicator 40. The dataset covers DHET-accredited research output units produced by the four KZN public higher-education institutions: the University of KwaZulu-Natal (UKZN), the Durban University of Technology (DUT), the University of Zululand (UNIZULU), and the Mangosuthu University of Technology (MUT). The series runs from 2015 to 2023, reflecting the standard DHET reporting lag of approximately two years; the 2024 and 2025 values are not yet available. The eight-year window allows compound annual growth comparisons between KZN institutions and the national per-capita benchmark, but the timeframe differs from the 2014 to 2025 window used elsewhere in this report. Direct year-on-year comparison with sector-employment indicators in Sections 8.1 to 8.4 is therefore not advised.

Knowledge production is conceptualised here as the upstream end of the innovation pipeline: the formal scientific outputs that feed downstream into knowledge use, technology transfer, and economic value-capture. The Indicator 40 architecture covers four analytical questions: how the aggregate output level has evolved, how concentrated the institutional landscape is, how KZN per-capita output compares with the national average, and what proportion of output takes which form (article, book chapter, or conference proceedings). The institutional concentration question is given particular weight because the conversion-failure thesis applies most clearly here: KZN ranks well on per-capita output, but the strength is single-institution.

8.5.1 RESEARCH PUBLICATION OUTPUT (INDICATOR 40)

INDICATOR 40

Research Publication Output

Four analytical dimensions presented in this section.

DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D
KZN Output Trajectory and CAGR	**Institutional Concentration and HHI**	**Per-Capita Benchmark vs National**	**Youth Wage Premium vs Agriculture**
KZN aggregate research output units 2015 to 2023, with compound annual growth rate computed against the 2015 base.	Each KZN institution's share of provincial research output, plus the Herfindahl-Hirschman Index (HHI) and effective-N concentration metrics traced annually 2015 to 2023.	Per-capita research output per 100 academic staff, by KZN institution, against the national per-capita average; UKZN's 2023 national rank and the gap-to-baseline shown for the other three KZN institutions.	Share of articles, book chapters, and conference proceedings in each KZN institution's 2023 output, exposing the differentiation in output strategy between research-intensive and applied universities
SHOWN AS **Figure 8.11**	SHOWN AS **Table 8.13**	SHOWN AS **Figure 8.12**	SHOWN AS **Inline narrative**

KZN aggregate research output grew from 2,147.91 units in 2015 to 3,277.93 units in 2023, a net addition of 1,130.02 units at +52.6% over the eight-year window. The compound annual growth rate is 5.43%, computed against the 2015 base. The series peaked at 3,414.6 units in 2022 before easing to 3,277.93 in 2023, a single-year decline of 4.0%. Whether the 2022 peak represents a structural ceiling or a temporary fluctuation will be observable in subsequent DHET reporting cycles. The 5.43% CAGR is the headline KZN performance figure for knowledge production over the measurement window.

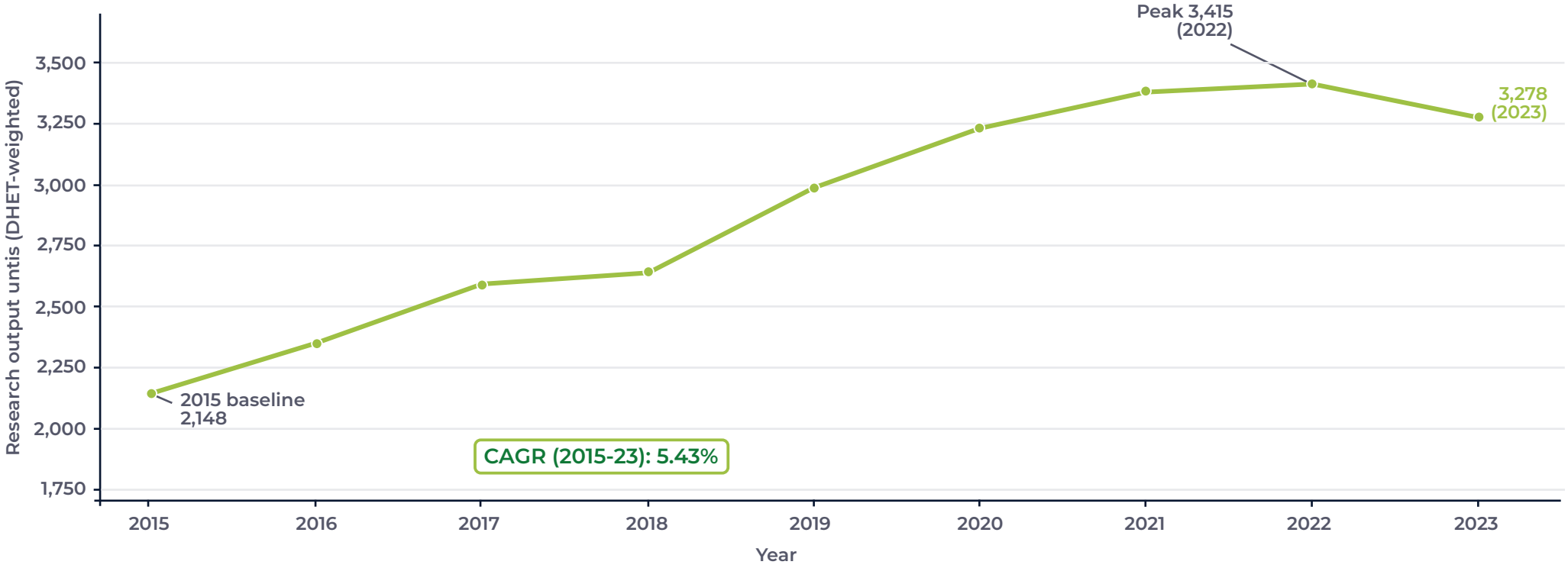


Figure 8.11: KZN aggregate research output trajectory, 2015 to 2023 (line chart, units; reference markers at 2015 baseline of 2,147.91, 2022 peak of 3,414.6, and 2023 endpoint of 3,277.93; trendline showing 5.43% CAGR).

Source: DHET Research Outputs (annual ministerial reports); KZN SOI Impact workbook FINAL, Indicator 40 Dimensions 1 and 6. Output units are weighted DHET research outputs (subsidy units), aggregated across the four KZN public higher-education institutions. Series runs from 2015 (the earliest year in the workbook) to 2023 (the most recent published DHET data); 2024 and 2025 values are not yet available due to standard DHET reporting lag.

The institutional landscape has de-concentrated meaningfully over the eight-year window. UKZN's share of KZN research output fell from 82.1% in 2015 to 71.5% in 2023, a decline of 10.6 percentage points. The decline is driven by faster growth at the smaller institutions rather than by absolute contraction at UKZN. UKZN output rose from 1,763.25 units to 2,344.57 over the period, a CAGR of 3.63%. DUT output rose from 235.62 to 581.90 (CAGR 11.96%), UNIZULU from 130.40 to 246.85 (CAGR 8.30%), and MUT from 18.64 to 104.62 (CAGR 24.06%, albeit from the smallest base in the system, which the workbook flags explicitly). The Herfindahl-Hirschman Index of institutional concentration fell from 0.690 in 2015 to 0.550 in 2023, with a single-year peak of 0.737 in 2016. The effective number of institutions, computed as 1 divided by HHI, rose from 1.45 to 1.82 over the period.

Whilst the de-concentration trend is positive in direction, the 2023 HHI of 0.550 remains well above the n=4 equal-distribution floor of 0.250. The KZN knowledge production system therefore continues to be characterised by single-institution dominance in absolute terms. UKZN alone produced 2,344.57 of the 3,277.93 KZN total in 2023, with the remaining three institutions collectively producing 933.37 units. The trajectory toward de-concentration depends on the smaller institutions sustaining their high growth rates, which in turn depends on staffing, funding, and research support. The trajectory is favourable but the level remains imbalanced.

Table 8.13: KZN Research Output, Institutional Composition and Per-Capita Benchmark, 2015 and 2023

INSTITUTION / METRIC	2015 UNITS	2023 UNITS	OUTPUT CAGR	2015 SHARE	2023 SHARE	2023 PER-CAP	VS NAT AVG (1.14)
University of KwaZulu-Natal (UKZN)	1,763.25	2,344.57	+3.63%	82.1%	71.5%	2.01	+0.87 (rank 2 nat'l)
Durban University of Technology (DUT)	235.62	581.90	+11.96%	11.0%	17.8%	0.85	-0.29
University of Zululand (UNIZULU)	130.40	246.85	+8.30%	6.1%	7.5%	0.75	-0.39
Mangosuthu University of Technology (MUT)	18.64	104.62	+24.06%	0.9%	3.2%	0.44	-0.70
KZN Total / aggregate	**2,147.91**	**3,277.93**	**+5.43%**	**100.0%**	**100.0%**	**–**	**–**
HHI (concentration index)	0.690	0.550	–	–	–	–	–
Effective number of institutions	1.45	1.82	–	–	–	–	–
National per-capita average (benchmark)	0.88	1.14	+3.29%	–	–	1.14	baseline

Source: DHET Research Outputs; DHET HEMIS staff data for permanent academic staff headcount; KZN SOI Impact workbook FINAL, Indicator 40 Dimensions 1, 2, 3, 4 and 7. Output units are weighted DHET research outputs. Per-capita = output units per 100 permanent academic staff. HHI = sum of squared institutional shares; floor for n=4 equal distribution = 0.25. Effective N = 1 / HHI. UKZN national rank (2 of 26 universities reporting per-capita output in 2023) drawn from Dimension 4 cross-section. Output CAGRs reconcile to the workbook to 0.01% across all five rows. The 2023 KZN aggregate per-capita is not reported because aggregation across institutions of differing scale would obscure UKZN's anchor effect. Per-capita values for DUT, UNIZULU, and MUT are taken from the Dimension 4 cross-section table; the Dimension 3 series shows DUT at 0.86 due to a 0.01-unit rounding difference between source files.

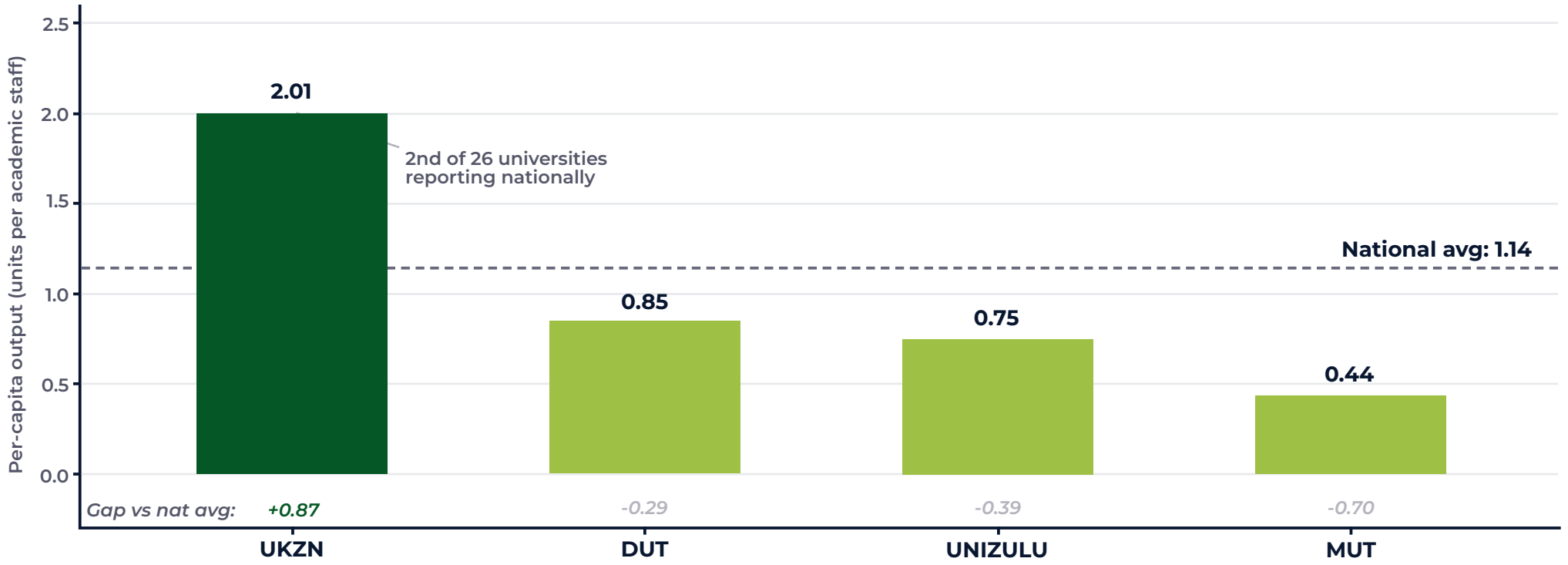


Figure 8.12: Per-capita research output by KZN institution at 2023, against national average (vertical bar chart, units per 100 staff; bars for UKZN 2.01, DUT 0.85, UNIZULU 0.75, MUT 0.44; horizontal reference line at national average 1.14; UKZN bar marked with national rank annotation '2nd of 26 universities reporting').

Source: DHET Research Outputs; KZN SOI Impact workbook FINAL, Indicator 40 Dimension 4. National per-capita average (1.14) drawn from Dimension 3 series for 2023.

Per-capita performance places UKZN substantially above the national average but exposes the gap at the other three KZN institutions. UKZN's 2023 per-capita of 2.01 places it 2nd nationally among 26 universities reporting, behind UJ at 2.37. The 26-university universe used here is the set of public universities reporting DHET research output units in 2023; the Ecosystem chapter uses a 23-university universe, which is the subset with usable patent data. Stellenbosch (1.55), University of the Free State (1.53), and Wits (1.52) make up the rest of the top five. UKZN's per-capita CAGR of 5.50% over the window outpaces the national average CAGR of 3.29%, which means UKZN is widening its lead rather than holding constant. The remaining three KZN institutions all sit below the national average of 1.14: DUT at 0.85 (below national by 0.29), UNIZULU at 0.75 (below by 0.39), and MUT at 0.44 (below by 0.70). The unweighted mean of the three is 0.68, leaving a gap of 0.46 below the national reference.

The output type composition at 2023 reveals further institutional differentiation. UKZN articles account for 87.2% of UKZN output, with book chapters at 11.2% and conference proceedings at 1.7%. MUT is the most article-dominant at 97.2% articles, with negligible book and conference output. UNIZULU sits at 84.2% articles and 10.8% books, broadly tracking the UKZN profile. DUT shows the most diversified output mix: 82.8% articles, 6.8% books, and 9.3% conference proceedings, the highest conference share among KZN institutions. The DUT profile is consistent with its university-of-technology status, which historically emphasises applied and engineering research where conference venues carry substantive weight.

The conversion failure shows here as single-institution dependence: KZN's per-capita research output ranks strongly nationally with UKZN at 2.01 placing 2nd of 26 universities reporting, but the strength is concentrated in one institution. The remaining three KZN institutions all sit below the national per-capita average of 1.14 (DUT 0.85, UNIZULU 0.75, MUT 0.44; mean 0.68). Without UKZN, KZN's institutional knowledge production would underperform the national benchmark by 0.46 per-capita units. The 2015 to 2023 trajectory is favourable: HHI fell from 0.690 to 0.550 and the smaller institutions are growing fastest, but the level remains imbalanced.

8.6 Key Observations for the Impact Category

The following highlights key observations from the eleven indicators in the Impact category. The observations are organised by the five sub-domains of the Impact pipeline: manufacturing and Knowledge-Intensive Services, innovation-relevant sector employment, wages and the creative economy, youth employment, and knowledge production. The organising thesis across the eleven indicators is one of conversion failure: KZN performs strongly on absolute scale, headcount, and participation indicators across the Impact pipeline, but the province's intensity, throughput, and value-capture metrics consistently track below the corresponding national reference points. The pattern is visible at every pipeline stage examined here, from manufacturing composition through wage premium and youth wage trajectories to the institutional concentration of knowledge production. Overall, the Impact category data describes a provincial innovation system that delivers participation but does not yet convert that participation into the high-intensity outcomes that comparable provinces achieve.

Manufacturing and Knowledge-Intensive Services

- Total formal manufacturing employment in KwaZulu-Natal contracted modestly over the period, falling 2.5% from 213,133 FTE in 2014 to 207,710 in 2025. The decline was concentrated in a single year: employment fell from 219,394 in 2024 to 207,710 in 2025, a single-year loss of 11,684 jobs that accounts for the entire net contraction over the eleven-year window.
- High-technology manufacturing employment fell from 3,386 FTE in 2014 to 2,607 in 2025, a contraction of 23.0% in absolute terms. The high-tech share of total KZN formal employment fell from 0.23% to 0.17%, with a trough of 0.15% in 2023 before partial recovery to 0.17% by 2025. The recovery remains well below the 2014 to 2017 plateau.
- Medium-high-tech manufacturing grew 6.4% over the period, from 47,866 FTE in 2014 to 50,910 in 2025, but the growth is concentrated entirely in Motor Vehicles & Trailers (SIC 29), which gained 8,266 jobs at +42.0%, consistent with the province's automotive anchor around Prospecton. The remaining four medium-high sub-sectors collectively recorded a net loss of 5,222 jobs over the same period, with broad-based contraction in Chemicals (-24.7%), Electrical Equipment (-37.2%), and Machinery & Equipment (-5.5%).
- Knowledge-Intensive Services employment grew 19.3% over the period to reach 110,890 FTE in 2025. The gains are spatially concentrated: eThekwini accounts for 76.0% of provincial KIS employment, with Information & Communication at 88.1% within eThekwini and Finance & Insurance at 76.0%. The remaining ten KZN districts collectively retain 24.0% of the KIS workforce.

Innovation-Relevant Sector Employment

- Strategic-sector employment across the seven innovation-relevant sectors grew 10.2% over the period, from 287,088 FTE in 2014 to 316,421 in 2025, a net addition of 29,333 jobs. Absolute additions were concentrated in Finance & Insurance (+8,802), Professional/Scientific/Technical (+5,997), and Agro-Processing (+4,146).
- Indexed against the corresponding South African series at 2025, KZN outperformed the national benchmark on three sectors: Information & Communication (+4.1pp), Finance & Insurance (+3.1pp), and Logistics & Transport (+0.9pp). The province underperformed on four sectors, most starkly Agriculture (-29.7pp), Arts/Entertainment/Recreation (-15.1pp), Professional/Scientific/Technical (-11.3pp), and Agro-Processing (-2.4pp).
- The Agriculture under-tracking is the largest sectoral gap in the dataset. KZN agriculture employment grew 3.0% over the period whilst national agriculture employment grew 32.8% over the equivalent window. The pattern is structural rather than cyclical and is flagged as a Confirmed Structural Finding in the workbook.
- Sector-share concentrations within KZN formal employment have shifted only modestly over the period. Logistics & Transport declined from 5.08% to 4.78% of

formal employment, the largest share decline; Finance & Insurance rose from 2.70% to 3.05%, the largest share gain. The strategic-sector composition is broadly stable across the eleven-year window.

Wages, Inequality, and the Creative Economy

- The innovation wage premium relative to the Agriculture baseline has compressed across all three core innovation services sectors. Information & Communication moved from 4.43 times the Agriculture median in 2014 to 3.35 times in 2025, a decline of 1.08 multiples. Finance & Insurance fell from 4.05 to 2.59 times, a decline of 1.46 multiples. Professional/Scientific/Technical fell from 3.30 to 2.72 times, a decline of 0.59 multiples.
- The wage premium compression operates more sharply at the early-career level. The 25-to-34 wage premium compression exceeds the all-worker premium compression in all four sectors examined, with the Logistics & Transport youth premium falling 1.01 multiples against an all-worker decline of 0.30. The data is consistent with headcount expansion in innovation-relevant sectors having occurred at wage points lower than the existing wage frontier, though the indicator system cannot itself distinguish this from alternative compositional explanations.
- The KZN inter-sector wage Gini coefficient stood at 0.610 in 2014, rose to a peak of 0.669 in 2018, and has declined to 0.612 by 2023. The wage band distribution shows compression toward the lower-middle bands: the share of workers earning between R6,400 and R12,800 per month rose from 20.06% to 24.31% over the period, the largest band-share increase observed in the data.
- Real wages in the KZN creative economy declined from R8,890 per month in 2014 to R8,396 in 2025, a fall of 5.6% in real terms. The trajectory is non-linear: wages collapsed to R5,181 in 2021, a single-year fall of 28.7% attributable to the combined impact of COVID-19 lockdown and the July 2021 civil unrest, before partial recovery. The combination of declining real wages with rising employment in the same sector (Indicator 35 records +30.3% net job creation) is consistent with either a workforce composition shift toward lower-paying creative-economy roles or formalisation of previously informal creative work at lower starting wages; the indicator data does not distinguish between these readings.

Youth Employment in the Innovation System

- Total formal-sector youth FTE in KZN declined 11.7% over the period, from 599,347 to 529,044. The contraction operates asymmetrically across the two age bands: the 15-to-24 band declined 28.6% whilst the 25-to-34 band declined 7.3%, with the entry-stage band contracting at approximately four times the proportional rate of the early-career band.
- The strategic-sector youth contraction of -15.1% over the period exceeded the all-sector youth contraction of -11.7%. Youth employment within the seven innovation-relevant sectors therefore tracked the all-sector trajectory but with a steeper rate of decline, indicating that strategic-sector employment growth at the all-worker level was not delivered through proportional youth absorption.
- The two core innovation services sectors that recorded combined youth growth, Finance & Insurance (+22.8%) and Information & Communication (+13.3%), saw their 25-to-34 monthly wage fall by 29.0% and 21.2% respectively over the same period in real terms. Youth participation in innovation work expanded over the period; the value extracted by those young workers compressed.

Knowledge Production

- KZN aggregate research output grew 52.6% from 2,148 units in 2015 to 3,278 in 2023, a CAGR of 5.43% over the eight-year window. The trajectory peaked at 3,415 units in 2022 before easing to 3,278 in 2023, a single-year decline of 4.0%. Whether the 2022 peak represents a structural ceiling or a temporary fluctuation will be observable in subsequent DHET reporting cycles.
- Institutional concentration of KZN research output has eased over the period. The Herfindahl-Hirschman Index of institutional concentration fell from 0.690 in 2015 to 0.550 in 2023, with UKZN's share of provincial output declining from 82.1% to 71.5%. The de-concentration is driven by faster growth at the smaller institutions rather than by absolute contraction at UKZN.
- UKZN per-capita research output of 2.01 units per 100 academic staff in 2023 places the institution second nationally among 26 reporting universities, behind only the University of Johannesburg at 2.37. The remaining three KZN institutions, namely DUT 0.85, UNIZULU 0.75 and MUT 0.44, all sit below the national per-capita average of 1.14, with an unweighted mean of 0.68 leaving a gap of 0.46 below the national reference.

Section 8.7 traces the implications of these observations for the regional innovation system.

8.7 Implications for Innovation in KwaZulu-Natal

Strong scale, weak conversion across the Impact pipeline

The Impact category mirrors the People category in pattern. KZN ranks in the national top three on absolute scale and participation indicators (manufacturing base size, strategic-sector employment, knowledge production volume), but falls to mid-table or lower on the corresponding intensity, throughput, and value-capture indicators: high-technology share, wage premium, youth wage premium, and institutional knowledge production breadth. The pattern is not driven by any single weak indicator but is consistent across multiple Impact pipeline stages. The implication is that the binding constraint on KZN's downstream innovation outcomes does not sit at the entry stage of any sub-domain but at the conversion stage: the mechanisms by which large headcount bases are translated into high-intensity, high-value-capture outcomes.

Single-anchor dependence is a recurring structural feature

Three Impact indicator families exhibit a common structural pattern: a dominant single component generates KZN's strong aggregate position, with the remaining components substantially weaker. Motor Vehicles & Trailers accounts for the entire +6.4% medium-high-tech manufacturing growth over the period, with the remaining four medium-high sub-sectors collectively losing 5,222 jobs. eThekwini accounts for 76.0% of provincial KIS employment, with Information & Communication at 88.1% metro concentration. UKZN accounts for 71.5% of provincial research output in 2023 and is the only one of the four KZN universities with per-capita output above the national average. The three cases share a structural pattern but the underlying mechanisms differ: corporate dependence in the Motor Vehicles case (where a single large-employer decision could materially shift provincial figures), structural metro-clustering in the eThekwini KIS case (a globally observed feature of Knowledge-Intensive Services rather than a province-specific vulnerability), and institutional concentration with strong absolute performance in the UKZN case (where provincial rank-2 per-capita output sits alongside a thin secondary tier). The implication for the provincial innovation strategy is that resilience-building requires three different secondary-anchor responses rather than a single recipe: diversification within technology manufacturing where the secondary tier is structurally weak, KIS-pipeline development outside eThekwini where the question is whether secondary-city KIS clusters can be seeded at all in current conditions, and continued throughput growth at DUT, UNIZULU, and MUT where the smaller-institution trajectory is already favourable. Prospecton's automotive base, eThekwini, and UKZN are all positive provincial assets; the structural risk lies in the under-developed second tier behind each of them, but the intervention pathway is mechanism-specific.

Agricultural under-tracking as a constraint on the Agro-Processing pipeline

The structural under-tracking of KZN agriculture employment against the national series, with KZN at +3.0% over the 2014 to 2025 window against national at +32.8% and a -29.7pp indexed gap at 2025, represents the largest single-sector divergence in the strategic-sector dataset. The pattern is verified as structural rather than cyclical or data-artefactual, and is flagged in the workbook as a Confirmed Structural Finding for further investigation. The implication for the Impact category specifically operates through the Agro-Processing pipeline. Agro-Processing was one of the three strongest sectoral additions in KZN over the period (+4,146 jobs at +14.6%) and uses primary agricultural output as its input pipeline. Over the measured window the input base supported the Agro-Processing growth observed; the constraint is therefore not currently operative. The forward risk is that if the divergence between KZN and national agricultural employment continues to widen over a multi-year horizon, the upstream input base on which Agro-Processing depends would eventually be compressed, with second-order consequences for one of the few innovation-relevant manufacturing sub-sectors that has grown over the measurement window. The indicator data does not identify the underlying mechanism uniquely; candidate explanations include land reform and tenure dynamics, differential mechanisation rates, KZN-specific crop composition (notably sugar cane), and informal-sector capture not picked up by formal-sector administrative data. A targeted analytical study into the KZN agricultural employment trajectory, disaggregating the formal-sector contraction into mechanisation, sub-sector composition, and tenure components, is therefore a candidate for the 2026/27 research agenda. In the interim, innovation interventions targeted at the Agro-Processing pipeline should consider the upstream input-base trajectory as part of the strategic context rather than treating Agro-Processing as a freestanding intervention target.

Wage premium compression as a value-capture failure

The innovation wage premium has compressed across all three core innovation services sectors over the period, and the compression is sharper at the early-career level than at the all-worker average. Combined with strong employment growth in Finance & Insurance (+22.5%), Information & Communication (+15.6%), and Professional/Scientific/Technical (+17.8%), the data suggest that new innovation employment in ICT, Finance, and Professional/Scientific/Technical has occurred at wage points below the existing wage frontier rather than at it. This reading is more secure for these three sectors than for sectors with substantial informal-economy exposure, because ICT, Finance, and Professional/Scientific/Technical operate within mature formal-sector frameworks where alternative explanations such as informal-to-formal workforce migration are less plausible. The implication is that headline employment-growth metrics overstate the value-capture performance of the innovation system. A policy

response focused on growing innovation employment without distinguishing wage-frontier expansion from lower-end expansion will not by itself deliver improving real-wage outcomes for the innovation workforce. Whether the compression reflects supply-side pressure (graduates outpacing demand) or demand-side weakness (employers downgrading entry-level positions) cannot be distinguished from the indicator data alone, but the policy direction is the same: workforce-development planning should treat innovation-employment growth and innovation-wage growth as separate questions with separate intervention pathways.

Youth participation expanded but value extraction worsened

Finance & Insurance recorded +22.8% combined youth FTE growth and Information & Communication +13.3% over the period, against a -11.7% all-youth decline at the provincial level. These two innovation services sectors are absorbing youth at a rate that runs against the broader provincial trend, which is a positive signal for early-career access to innovation work. However, the 25-to-34 monthly wage in those same sectors fell 29.0% and 21.2% respectively in real terms over the same window. The implication is that the gain in youth absorption has been delivered at the cost of materially worse pay than the same roles commanded at the start of the measurement period. The 15-to-24 band tells a different story: it contracted by 28.6% over the period, approximately four times the proportional contraction observed at the 25-to-34 band, suggesting that early-stage entry to formal employment has weakened more sharply than early-career consolidation. The data therefore identifies two analytically distinct intervention objectives that the indicator system itself cannot rank against each other. The first is improving formal-sector access at the entry stage, where the relevant policy instruments are youth employment programmes, learnership scaling, and formal-sector entry support targeted at the 15-to-24 band. The second is protecting real-wage outcomes within the early-career stage, where the relevant policy direction is on the demand-side conditions in Finance and ICT that have allowed early-career wages to compress whilst employment expands. The priority ranking between these two objectives is a value judgement that sits with the provincial policy authority rather than with the indicator data; what the data does establish is that both gaps are material and neither is addressed by interventions targeted at the other.

Creative economy as an interpretive case

Indicator 38 documents the most pronounced employment-versus-wages divergence in the dataset. The Arts/Entertainment/Recreation sector grew employment by 30.3%, the highest growth rate across the seven strategic sectors, whilst real wages fell 5.6%. The 2021 collapse to R5,181 per month, a 28.7% single-year fall attributable to the combined COVID-19 lockdown impact on entertainment venues and the July 2021 civil unrest, marks the most severe single-year wage shock in any of the seven sectors. The 2025 partial recovery has not returned wages to the 2014 baseline. The indicator data is consistent with two analytically distinct readings, neither of which can be ruled out from the indicator system alone. The first is that creative-economy employment expansion has been delivered at lower wage points, in a pattern consistent with that observed in Finance and ICT youth wages: sector growth concentrated below the wage frontier rather than at it. The second is that the sector has authentically broadened the formal innovation workforce by absorbing workers previously in informal or precarious creative work, in which case the average-wage decline reflects the entry of a wider workforce at lower starting wages rather than the downgrading of existing roles. The two readings imply different policy responses: the first calls for demand-side interventions on wage-frontier roles, the second for support to the new formalisation pipeline itself. The provincial innovation strategy should treat the choice between these readings as an open question that the indicator data cannot close, and the workbook flags Ind38 wage composition disaggregation as a candidate addition for the 2026/27 edition.

Research output trajectory as a positive structural signal

KZN aggregate research output grew 52.6% from 2015 to 2023, a CAGR of 5.43% per annum. The institutional concentration trajectory is favourable: the Herfindahl-Hirschman Index fell from 0.690 to 0.550, driven by faster growth at the smaller KZN institutions (DUT at CAGR 11.96%, UNIZULU at 8.30%, MUT at 24.06% from a small base) rather than by absolute contraction at UKZN. The de-concentration is from a high starting point and the 2023 HHI of 0.550 still substantially exceeds the n=4 equal-distribution floor of 0.250, but the direction of travel is correct. The implication is that current institutional support arrangements at the smaller universities, particularly the research-throughput growth at DUT, represent a positive structural signal that warrants protection rather than redirection. Within the Impact category, the knowledge-production trajectory is the cleanest positive signal in the data, with both volume growth and de-concentration moving in the right direction over the eight-year window. The risk to monitor is whether the 2022-to-2023 4.0% single-year output decline marks a structural ceiling or a temporary fluctuation; the answer will only become observable across subsequent DHET reporting cycles. Overall, the Impact category implications point in a consistent direction: protect the secondary anchors and small-institution trajectories that are quietly succeeding, target value-capture mechanisms where headline scale conceals underlying weakness, and treat the open interpretive questions on creative-economy and value-capture mechanisms as priority candidates for indicator-system enhancement in the 2026/27 cycle.

9. DISCUSSION

9.1 The Diagnostic

KwaZulu-Natal sits in the national top three on almost every measure of absolute scale that this framework collects, and in mid-table or below on almost every measure of intensity, throughput and value capture. These two findings describe one system, not two.

The scale findings are substantial. The province produces the country's largest NSC examination cohort, at 171,368 candidates in 2025, and its formal employment base is the second largest nationally. KwaZulu-Natal has held third place on Gross Expenditure on R&D in every year of the 12-year measurement series, and its leading university ranks second nationally on per-capita research output.

Mobile internet penetration leads the country at 80.0%, the Bachelor pass share leads at 52.0%, and Not-for-Profit R&D growth has been the strongest of any provincial R&D performer over the nine-year window. Taken together, these are not marginal positions; they describe a province whose innovation foundation is materially in place at the layers the framework measures.

The conversion findings sit alongside these. Real Business R&D has contracted by approximately 42% over the nine-year window, at a real CAGR of –5.94%. SET graduation per 100,000 of population has fallen below its 2015 starting point. High-technology manufacturing employment has lost 23.0% of its 2014 base over the eleven years to 2025. Knowledge-intensive services employment has grown by 19.3% but is concentrated at 76.0% within eThekwini. The TVET system attracts the second-largest national share of N3 Engineering registrations and converts them at rank eight of nine on completion rate. Real wages have contracted across three of the four core knowledge-intensive services sectors examined in Section 8. The pattern is consistent: where the framework measures absolute scale, KwaZulu-Natal sits in the top three, and where it measures the conversion of that scale into the next-stage outcome, the province is rarely above the national mean.

The strengths these findings describe are genuine, and the conversion-failure diagnosis is not a denial of them. What the diagnosis claims is something different: not that KwaZulu-Natal lacks the structural preconditions for innovation, but that the province assembles those preconditions and then fails to convert them at the layers the framework measures. That failure is itself structural rather than incidental.

KZN assembles scale at the foundational layer; conversion fails at the next stage

Both findings describe one system, not two; the conversion-failure diagnosis is not a denial of the strenghts

PROVINCIAL ASSETS

Where the framework finds top-three positions and improving trajectories

NSC examination cohor

NSC examination cohor *largest in the country*	**171,368**
Gross Expenditure on R&D *national rank, 12 years running*	**3rd**
Bachelor pass share *1st nationally*	**52.0%**
Mobile internet penetration *1st nationally*	**80.0%**
UKZN per-capita research output *national rank (26-university universe*	**2nd**
Not-for-Profit R&D growth *real CAGR, strongest provincial performer*	**+4.55%**
Living Lab footprint *national entries anchored in KZN*	**3 of 3**

CONVERSION FAILURES

Where scale does not translate into the next-stage outcome

Real BERD *9-year contraction, 1.6 x national rate*	**-42%**
SET graduation per 100k *2023 figure, below 2015 starting point of 76.8*	**69.0**
High-tech manufacturing *employment loss 2014-2025, most severe mfg tier*	**-23.0%**
KIS spatial concentration *employment held within eThekwini metropole*	**76.0%**
TVET N3 completion *44.9% vs 50.8% national average*	**rank 8/9**
KIS real wage compression *Finance & Insurance over 11 years*	**-21.6%**
Doctoral SET enrolment *contracting since peak; rank fell to 4 in 2023*	**↓ 2019**

The province assembles the structural preconditions for innovation and then fails to convert them at the layers the framework measures.

Figure 9.1: The dual finding: substantial scale alongside material conversion failure

Source: Sections 4 to 8 of the KZN State of Innovation 2025/26

Four structural features running consistently across the categories produce this gap. The first is concentration: provincial activity is anchored on single nodes at every level a more distributed system would be expected. The second is composition: where KwaZulu-Natal has scale, that scale tends to support entry-level participation more than it supports the deployment activity that converts participation into innovation output. The third is throughput: human-capital pipelines lose volume at multiple transition stages between school exit and doctoral completion. The fourth is value capture: where the system does produce volume, the value retained per unit is contracting at the firm level, compressed at the wage level, and weakening at the productive-employment level. Our four-feature architecture is not a theoretical taxonomy applied to the data. Each feature emerged as a recurring structural pattern across categories during the diagnostic process, and each is observable in three or more independent indicator families across the framework; the architecture follows the data rather than imposing a frame on it. The four sections that follow examine each in turn.

The features are connected, but the chapter does not advance a tested causal chain between them. Concentration at the institutional level can shape composition, since a single institution's research orientation has outsized influence on provincial composition overall. Throughput failure and value-capture failure are temporally and structurally adjacent, and the relationship between them is consistent with a hypothesis of weak domestic demand for innovation-pipeline output, although the framework does not test this directly. Each feature surfaces a different aspect of the same diagnosis, and the chapter examines them sequentially because that is the cleanest reading, not because they are causally separable from one another.

The diagnostic architecture

Four structural features running consistently across the framework, each observable in three or more independent indicator families

CONCENTRATION	COMPOSITION	THROUGHPUT	VALUE CAPTURE
Anchored on single nodes	*Configured for entry-level*	*Volume lost at transitions*	*Less retained per unit*
INSTITUTIONAL **UKZN** 71.5% research output 81.3% doctoral SET 57.1% patents (16 of 28)	CONNECTIVITY **Mobile-led** 80.0% mobile (1st) 7.5% fixed-home -9.9pp vs national	TVET ASSESSMENT **Single-stage loss** N3 registration: rank 2 Completion: rank 8 of 9 44.9% vs 50.8% national	FIRM INVESTMENT **Real BERD** –42% over 9 years CAGR –5.94% vs –3.73% nat. 1.6x the national rate
SPATIAL **eThekwini** 72.0% facilities 82.1% funding mechanisms 76.0% KIS employment	R&D BASE **Higher-Ed/NFP-tilted** BERD 32.0% (vs ~ 35% nat.) NRF 10.0% (vs ~ 4% nat.) BERD share - 2.13pp	SCHOOL TO SET **Trajectory divergence** NSC 90.6%, Bachelor 1st SET enrol –8.0% (nat. –1.2%) SET grad/100k below 2015	WORKER WAGE **KIS sectors** F&I –21.6%, Educ. –21.8% I&C –7.3%, PST flat Youth F&I –29.0%
SECTORAL **Motor Vehicles** +8,266 jobs (medium-high) Four other sub-sectors -5,222 jobs net	RESEARCH **Open-science** UKZN rank 19 of 23 on patents per output IPC C and G below mean	DOCTORAL PIPELINE **Delayed contraction** Peaked 2019, contracting Four-to-six year lag UKZN rank fell to 4 in 2023	PRODUCTIVE EMPLOYMENT **High-tech mfg** –23.0% over 11 years 3,386 → 2,607 FTE Most severe mfg tier

Figure 9.2: Four-mechanism diagnostic architecture

Source: Innovate Durban Research and Impact Department, Section 9 analysis

9.2 Concentration

The provincial innovation system is anchored on single nodes at every level a province of KwaZulu-Natal's scale would be expected to carry a more distributed footprint. The pattern shows up institutionally in the research and human-capital data, spatially in the ecosystem and labour-market data, and sectorally in the manufacturing data. Each instance sits within a different category and a different indicator family, but together they describe a system that has not diversified the bases on which its scale advantages depend.

In research and doctoral training, UKZN is the single anchor. The institution holds 71.5% of provincial research output in 2023 and 81.3% of provincial doctoral SET enrolment in the same year. The institutional Herfindahl-Hirschman Index for KZN research output has fallen from 0.690 to 0.550 over the 2015 to 2023 window, although this moderation is largely a function of UKZN's share falling from a higher base rather than substantial new diversification across the four institutions. UKZN also holds 16 of the 28 KZN university patent applications recorded between 2015 and 2023, a 57.1% share that is the largest provincial portfolio across the four institutions. The four KZN universities are not equivalent contributors to the provincial research base; one institution carries a share of provincial output that has moderated but not normalised. The doctoral pipeline contraction visible from 2019 onwards is therefore a UKZN dynamic before it is anything else, and the moderation in UKZN's absolute output post-2021 sits in temporal proximity to that contraction on the four-to-six-year doctoral completion lag.

In ecosystem and labour-market terms, eThekwini is the single anchor. The metropole holds 72% of provincial innovation facility entries in the Innovate Durban facility register and 82.1% of KZN-anchored funding-support mechanisms. Knowledge-intensive services employment is concentrated at 76.0% within eThekwini at 2025, and 84.1% of KIS additions over the 2014 to 2025 window have also landed in the metropole. Information and Communication employment stands at 88.1% metro concentration. Five of KwaZulu-Natal's eleven districts have no confirmed innovation facility presence at all. eThekwini's dominance is not steady; it is intensifying on the additions side relative to the stock side, indicating that the trajectory is one of widening concentration rather than equilibrium. The ten remaining districts collectively account for less than a quarter of provincial KIS employment.

In manufacturing, the single anchor is Motor Vehicles. Medium-high-technology manufacturing employment grew by 6.4% over the eleven-year window, and Motor Vehicles and Trailers added 8,266 jobs. The remaining four medium-high sub-sectors lost 5,222 jobs collectively, with Other Transport Equipment adding 1,100 against broad-based contraction in Chemicals, Machinery and Electrical Equipment. The growth aggregate is, in effect, a single-sub-sector story. KwaZulu-Natal's medium-high-technology employment trajectory is a Motor Vehicles trajectory, and the rest of the tier is contracting. The province's exposure to a single sector at this layer of the manufacturing base is the sectoral instance of the same single-node risk that runs through the institutional and spatial findings.

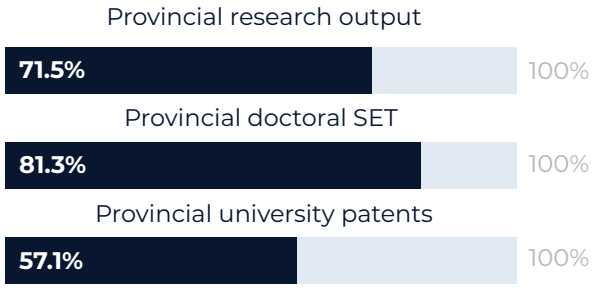
The same single-anchor pattern at three levels of the provincial system

Concentration shows up institutionally, spatially, and sectorally; each panel below displays an indicator family in which one node dominates the provincial total

INSTITUTIONAL

UKZN

One of four KZN universities

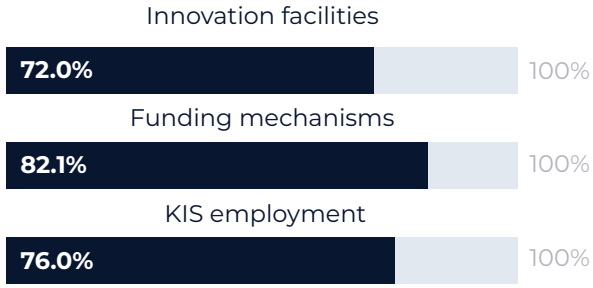


HHI fell from 0.690 (2015) to 0.550 (2023), substantially above the n=4 floor of 0.250

SPATIAL

eThekwini

One of eleven KZN districts

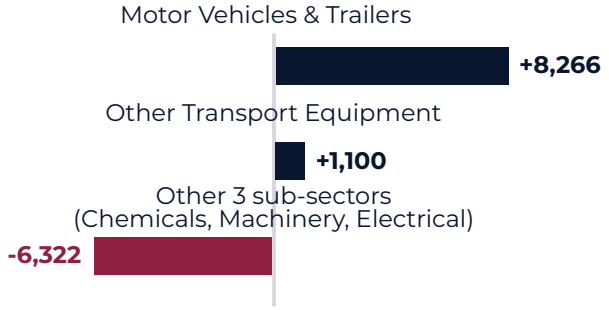


5 of 11 districts have no confirmed innovation facility presence; concentration is intensifying

SECTORAL

Motor Vehicles

One of five medium-high-tech sub-sectors



Stripping out Motor Vehicles, the other four medium-high-tech sub-sectors lost 5,222 jobs

A provincial innovation system anchored on a single institution, a single metropole, and a single manufacturing sub-sector has limited capacity to absorb downturns at any one of those nodes.

Figure 9.3: Concentration profile across institutional, spatial and sectoral levels

Source: People (Section 4); Ecosystem (Section 7); Impact (Section 8)

The implication is not that any of the dominant nodes is performing poorly. UKZN's per-capita research output ranks second nationally. eThekwini hosts the strongest provincial digital connectivity and the densest concentration of university and ecosystem infrastructure in the province. Motor Vehicles is the strongest medium-high-technology manufacturing performer in KwaZulu-Natal. The provincial system therefore rests on three productive nodes whose individual performance is genuinely strong, and the diagnosis at the system level sits at a different layer. A provincial innovation system in which doctoral training, research output, patent activity, ecosystem facilities, funding mechanisms, knowledge-intensive employment and medium-high-technology manufacturing each depend dominantly on a single node has limited capacity to absorb the loss or under-performance of any one of those nodes. The post-2019 doctoral SET enrolment contraction is a test case currently in motion. A system with only one substantial doctoral SET host is, by construction, a system whose research output trajectory tracks one institution's enrolment decisions, and the early indication visible in UKZN's 2023 doctoral SET graduation rank fall to fourth nationally is consistent with that exposure.

Concentration is not a description of distribution alone. It is a description of the single-node risk that follows from over-concentration. The strengths the dominant nodes provide are real, and the conversion-failure diagnosis at this level is not that those nodes are weak. It is that the system around them is thin enough that downturns at any one of them cannot be absorbed elsewhere. The next mechanism, composition, addresses a related but distinct structural feature: the configuration of the scale that does exist, and whether it is suited to the conversion task that follows.

9.3 Composition

The second structural feature concerns the shape of provincial scale rather than its size. Where KwaZulu-Natal has scale, that scale tends to be configured for entry-level participation rather than for the deployment activity that produces innovation output. The pattern shows up in connectivity, in the funding architecture and the underlying R&D base, and in the orientation of the provincial research output. Each instance sits within a different category and a different indicator family, but each represents a version of the same structural move: provincial scale exists at the foundational layer of a system, with proportionately less scale at the layer that converts foundational access into productive output.

In connectivity, the composition is mobile-led. Mobile internet penetration leads the country at 80.0%, the LTE-capable device base of 13.0 million SIMs places KwaZulu-Natal second nationally, and any-access internet reaches 84.2% of the population. Fixed-home internet sits at 7.5%, approximately 9.9 percentage points below the national average and 37.4 percentage points below the Western Cape. The mobile-led configuration supports the consumption-side use that has expanded most visibly in South African digital activity over the period, including browsing, messaging, mobile payment and video. It is less well suited, however, to the bandwidth-intensive and stable-connection uses that sustained research workloads, large dataset transfer and cloud-based collaborative work require. The mobile-versus-fixed distinction is not directly measured by the access indicators; the workbook reports channels rather than productive-use intensity, and the consumption-versus-production reading is interpretive overlay rather than a tested claim. The composition argument that survives this caveat is that KwaZulu-Natal's connectivity scale sits dominantly on the access channel best suited to consumption-side activity, with comparatively less scale on the channel that supports innovation work directly.

In capital architecture, the composition tilts away from the business sector. Access to funding mechanisms is not itself a constraint: KwaZulu-Natal places third nationally on accessible mechanisms, with 95 anchored in the province and 450 accessible to it. Beneath that access layer, the provincial Gross Expenditure on R&D is dominantly Higher Education at 34.9% and Business at 32.0%, with Science Council at 16.3%, Not-for-Profit at 10.0% and Government at 6.8%. KwaZulu-Natal's Business R&D share sits somewhat below the approximately 35% national share, and its Not-for-Profit share is materially above the approximately 4.0% national share. The provincial R&D base is therefore configured for knowledge generation and mission-led work to a greater degree than the national average, and for commercial innovation activity to a lesser degree. The composition is widening over the series rather than holding steady: real Business R&D has contracted at a CAGR of –5.94% over the nine years from 2014/15 against –3.73% nationally, whilst KwaZulu-Natal Not-for-Profit R&D expanded at +4.55%, the strongest single-sector real expansion in the provincial Investment series.

In the research base, the composition is focused on published research and knowledge dissemination rather than commercial IP. UKZN ranks second nationally on per-capita research output in 2023 within the 26-university public university universe, an absolute volume of publication-side knowledge production that is structurally strong.

On patent applications per 100 DHET research output units, however, UKZN ranks 19 of 23 reporting institutions over the 2015 to 2023 window, where the patent universe excludes three institutions with no recorded activity in the period. KwaZulu-Natal universities sit below the national mean on patent intensity at IPC Sections C and G, the chemistry and physics sections that should be the strongest commercialisation candidates of the existing research base. The composition is not in itself a performance failure: research orientation toward open science and basic discovery has its own value, and many institutions deliberately choose this configuration. What the composition does mean is that the provincial research base produces volume at the publication stage and produces comparatively less patentable IP per unit of that volume. The research output the system generates flows through dissemination rather than through protected commercial assets.

The system-level implication of these three composition tilts is not that any one of them is incorrect at the level of the activity it supports. The mobile network leads the country and brings 80.0% of the population into digital activity. Higher Education and Not-for-Profit R&D produce public-good research and mission-led work for which they are designed and at which the province ranks well nationally. Open-science research generates knowledge that has its own routes to social and economic benefit, and the per-capita output ranking demonstrates the productivity of the existing configuration. The provincial scale at the foundational layer of the system is materially in place, and the conversion-failure diagnosis at this level is not that the foundational layer is weak. The implication sits at a different layer. A province with mobile-led connectivity, Higher Education-and-mission-led R&D, and open-science-led research orientation generates one kind of innovation system, configured for breadth and access, with a comparatively smaller stock of the activities that convert breadth and access into commercial innovation outputs. The composition matches the layer of the system being measured at the foundational end well; it matches the layer being measured at the conversion end less well. This is not a finding that the composition should be reversed. It is a finding that the composition the province has produces the conversion gap that the rest of this chapter describes.

Composition describes a system whose scale exists at sufficient size but in a configuration that is poorly suited to the conversion task that follows. Concentration described a system anchored on single nodes. Throughput, the third mechanism, addresses what happens to volume as it moves from one stage of the human-capital pipeline to the next, and where the system loses that volume at the transitions between stages. As with the first two mechanisms, the throughput findings are not an indictment of any single stage; they describe how stages connect, or fail to connect, in ways that compound across the pipeline as a whole.

9.4 Throughput

The third structural feature is throughput: the rate at which the human-capital pipeline carries volume from one stage to the next. Three transition points in the provincial pipeline show material loss between entry and exit. The three transitions are not equivalent in form: one is a single-stage assessment loss, one is a divergence between two improving and contracting trajectories, and one is a delayed-effect contraction at the entry stage. They share a structural property: the volume entering the next stage is materially smaller than the volume that should reach it. They nonetheless require different interventions, and 9.7 treats them separately rather than as a single throughput failure.

The TVET Engineering assessment stage converts a second-largest national registration cohort into an eighth-of-nine completion outcome. The school-exit-to-post-school transition shows a SET trajectory diverging from the school-level improvement that should feed it. The doctoral pipeline began contracting in 2019, and the contraction is starting to surface at the graduation end on the four-to-six-year completion lag. Each is a volume loss at a transition. Together they describe a pipeline that loses material throughput at the points where the system is asked to convert one stage's output into the next stage's input.

In the TVET Engineering pipeline, KwaZulu-Natal ranks second nationally on N3 Engineering registrations, with 5,087 candidates representing 23.0% of the national total due to throughput loss at the assessment stage. On N3 completion rate, however, the province ranks eight of nine nationally, at 44.9% against a national average of 50.8%. The pre-exam attrition rate is not driving the gap; the registration-to-completion shortfall is concentrated at the exam stage itself, indicating that students are reaching the assessment but not passing it. The province registers a cohort second-largest in the country and converts it at a rate eighth-of-nine. This is the most compressed expression of throughput failure in the report.

In the school-to-post-school transition, the volume entering SET is not tracking the volume leaving the NSC and the primary reason is visible in subject choice at school level. Only 37% of NSC candidates choose Mathematics over Mathematical Literacy, and this caps the volume of school exits eligible for SET-stream programmes regardless of how the headline pass rate moves.

NSC pass rates have risen from 69.7% in 2014 to 90.6% in 2025, and Bachelor pass share has moved from 32.5% to 52.0% over the same period, placing KwaZulu-Natal first nationally on the Bachelor metric. SET enrolment, by contrast, has not recovered from its 2019 peak; the 2023 level sits 8.0% below that peak, against a national SET shortfall of 1.2% over the same window. The KZN decline is approximately seven times the national rate. SET graduation per 100,000 of population stands at 69.0 in 2023, below the 76.8 recorded in 2015. The data does not test the mechanism connecting school improvement and post-school contraction; what it does establish is that the two trajectories are diverging materially over the series.

In the doctoral pipeline, the throughput loss is the most lagged of the three. KZN doctoral SET enrolment peaked in 2019 and has been contracting since, with the institutional concentration at UKZN intensifying the contraction's effect on the provincial total. Doctoral graduation outcomes follow doctoral enrolment by approximately four to six years, which means the contraction starting in 2019 has only recently begun to register at the graduation end. The first observable signal is UKZN's 2023 doctoral SET graduation rank, fourth nationally, which is the institution's first non-rank-one outcome since 2019 and is consistent with the timing the lag structure would predict. The contraction visible in the enrolment series will, on the lag, surface in the graduation series and the research-output series in the years immediately following this publication. The throughput loss at this stage is therefore not yet fully visible; what is visible is the leading edge of a contraction whose downstream effects on research output and high-skill workforce supply are still in the pipeline.

Three transition points where the human-capital pipeline loses material volume

TVET assessment is a single-stage loss; school-to-SET is a trajectory divergence; doctoral is a delayed-effect contraction at the entry stage

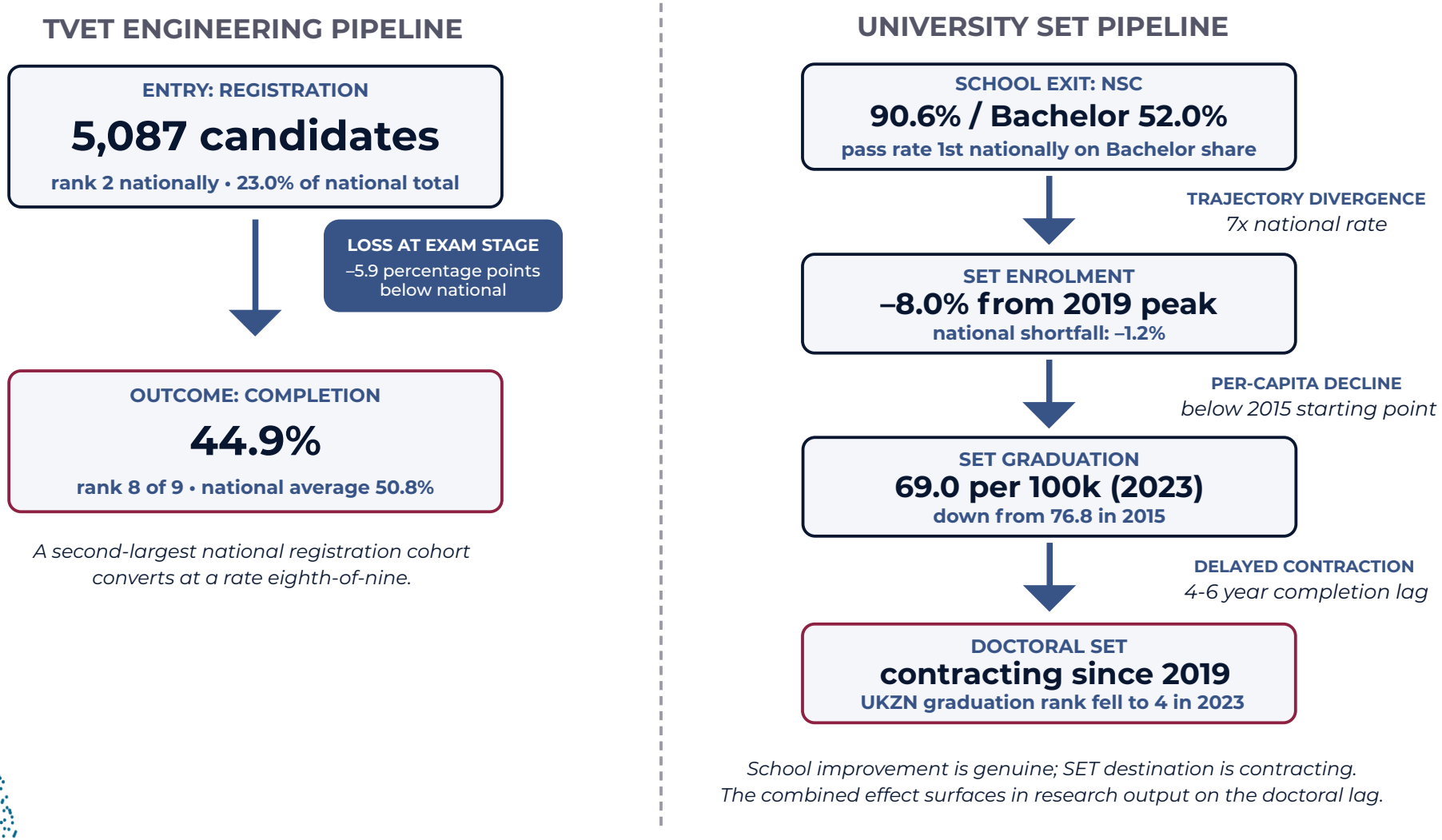


Figure 9.4: Three throughput-loss transitions in the KZN human-capital pipeline

Source: People category, Section 4

The three throughput losses are not equivalent in character. The school stage's improvement is genuine and provincial NSC outcomes lead the country on Bachelor pass share, demonstrating that the entry stage of the human-capital pipeline is functioning at provincial scale. At the school-exit-to-post-school transition, the school-side supply is improving whilst the SET destination is contracting. At the TVET assessment stage, the loss is concentrated at the exam itself rather than at any supply stage upstream. At the doctoral stage, the contraction is enrolment-driven and the graduation effects follow on the lag structure. Three distinct loss mechanisms therefore operate at three points in the pipeline, and the combined effect over time is a system producing fewer skilled artisans, fewer science and engineering graduates per capita, and fewer doctoral researchers than the school-level improvements alone would predict. The school stage's improvement is genuine; the outputs of the system in the late 2020s and early 2030s will nevertheless be shaped by the post-school transitions visible in this edition rather than by the entry-stage improvements that sit alongside them.

Throughput describes a system whose volume contracts at the points where it is asked to convert one stage into the next. Concentration described single-node risk in distribution; composition described scale configured for the wrong end of the conversion task. Value capture, the final mechanism, addresses what the system extracts per unit of the volume that does make it through. Where throughput shows a system losing volume, value capture shows the system retaining less return on the volume that survives. As with the first three mechanisms, the value-capture findings are not an indictment of the volume that does flow through; they describe what happens to that volume once it reaches the productive stages of the system.

9.5 Value Capture

The fourth structural feature is value capture: the value the system retains per unit of activity it produces. The pattern shows up at three levels. At the level of firm investment, real Business R&D has contracted at approximately 1.6 times the national rate over the nine-year window. At the level of worker compensation, real wages have contracted across three of the four core knowledge-intensive services sectors that grew over the period. At the level of high-technology manufacturing employment, the province has lost 23.0% of its 2014 base over the eleven years to 2025, the most severe contraction of any manufacturing tier. Each instance is a different cut of the same underlying observation: the system produces volume but retains less value per unit of that volume than the headline measures of activity suggest.

The BERD contraction introduced in 9.3 as a composition finding takes on a different character when read as a value-capture signal. At the firm-investment level, the contraction is the most pronounced finding in the Investment category. Real Business R&D in KwaZulu-Natal has fallen at a CAGR of –5.94% over the nine-year window 2014/15 to 2023/24, against a national rate of –3.73% over the same period. The KZN contraction is therefore approximately 1.6 times the national rate. The directional trajectory is partly a national-trend phenomenon, given that real BERD contracted nationally over the same window; what is KZN-specific is the magnitude of the contraction, and the share-of-national-BERD loss of 2.13 percentage points captures that relative deterioration directly. The 2023/24 real index sits at 57.6 against a 2014/15 base of 100, representing the loss of approximately 42% of real purchasing power in provincial business R&D over nine years. The firm-level investment in innovation activity is the input that should sustain conversion from research and human-capital pipelines into commercial output; its contraction at this magnitude is the most direct signal in the framework that the value extracted from provincial innovation activity for re-investment is contracting.

At the worker level, real wages in three of the four core knowledge-intensive services sectors have contracted over the eleven-year window 2014 to 2025. Finance and Insurance fell from R17,887 to R14,028 per month, a real decline of 21.6%. Education fell by 21.8% over the same period. Information and Communication fell by 7.3%. Professional, Scientific and Technical was effectively flat at +0.8%. The compression has been more severe for younger workers in these same sectors: the 25-to-34 age band recorded a 29.0% real decline in Finance and Insurance and a 21.2% decline in Information and Communication, whilst the all-worker compressions over the same period were 21.6% and 7.3% respectively. Knowledge-intensive services employment growth has therefore been absorbed by the labour market without proportional wage gains for the workers in those sectors, and the youth cohort entering KIS work has captured less of the value than the all-worker average. The data is at workforce-aggregate level rather than individual-worker level; the compression is consistent with composition shifts toward earlier-career hiring within these sectors as well as with direct compensation contraction, and the data does not separate the two mechanisms.

At the manufacturing-employment level, the high-technology tier has contracted most severely. KwaZulu-Natal lost 23.0% of its 2014 high-technology manufacturing employment base over the eleven years to 2025. The medium-high-technology growth that 9.2 identified as a Motor Vehicles trajectory does not extend to the high-technology tier, where no equivalent single-sub-sector

positive offset is visible. Real BERD and the high-technology manufacturing employment series have both contracted significantly over the same eleven-year window, although their year-on-year trajectories differ: real BERD contracted fastest between 2017/18 and 2020/21 and has partially recovered, whilst high-technology manufacturing declined most sharply in 2021 to 2023 and has stabilised modestly since. The two series are therefore not temporally aligned year-on-year, but they describe a private-sector R&D base and a high-technology productive-employment base that have both contracted materially over the measurement window. The data does not establish a tested causal relationship between the two; what it does establish is that the firm-investment side and the productive-employment side of the high-technology system have both lost material capacity over the same window.

Real BERD and high-tech manufacturing employment have both contracted, on different timing

Real BERD contracted fastest 2017/18 to 2020/21; high-tech manufacturing decline was concentrated 2021 to 2023

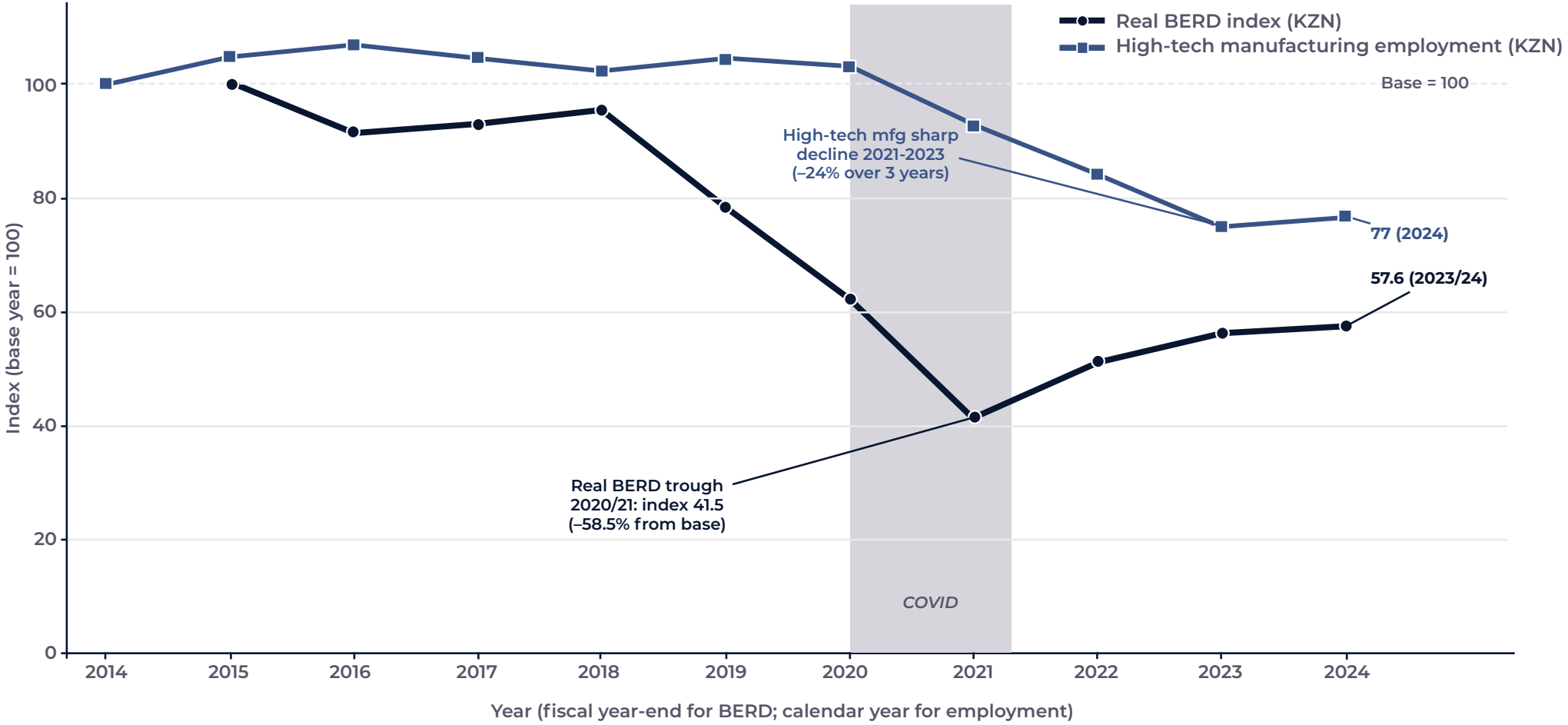


Figure 9.5: Real BERD index paired with high-tech manufacturing employment, KZN

Source: HSRC/CeSTII (BERD); SEAD (Pharmaceuticals SIC 21 + Computer/Electronic SIC 26)

Across the three instances, the pattern is the same: the system continues to produce volume but retains less value per unit of that volume than it did at the start of the measurement series. The volume itself is genuine across the strengths catalogued earlier in this chapter; what the value-capture finding describes is not the absence of activity but the rate at which that activity is converted into retained value. The data does not establish causal direction between the firm-investment, worker and productive-employment series; it does establish that they have moved in the same direction over the same window. The patent-per-output ratios discussed in 9.3 are a related instance from a different angle: 9.3 framed those ratios as a question of research orientation, whereas the value-capture reading describes the rate at which research output converts into protected commercial IP. The value-capture finding sits across the three layers of value retention that the framework measures, and the contractions across those layers move in the same direction over the measurement series.

Value capture closes the diagnostic spine of this chapter. Concentration described where provincial activity is anchored, composition described how the scale that exists is configured, throughput described what happens to volume between stages of the human-capital pipeline, and value capture describes what the system retains from the volume that survives. Together the four features account for the conversion gap the chapter began with. What the framework that produced these findings does not see, and what the diagnostic implies for provincial innovation policy, are the work of the sections that follow.

9.6 What the Framework Cannot See

The diagnostic in the preceding sections rests on indicators drawn from formal-sector data sources throughout. DBE examination records, DHET HEMIS returns, HSRC R&D surveys, Statistics South Africa Quarterly Labour Force Survey, SEAD tax-panel extracts, ICASA regulatory data and CIPC company-register data are the principal sources, and each is a record of formal economic and educational activity. The framework was designed at this scope. What the framework does not see is therefore a structural feature of provincial innovation measurement in South Africa rather than a defect of this edition, and the conversion-failure diagnosis it produces is consequently a finding about the formal innovation system rather than the full innovation economy of the province.

The largest single category of activity the framework does not measure is innovation occurring within the informal sector. The QLFS series shows informal-sector employment ranging between 16% and 22% of total provincial employment in any given quarter over the 2014 to 2025 window, and the inclusion of agricultural and private-household employment brings the non-formal share of provincial employment to approximately one-third throughout the period. None of the 40 indicators in the 2025/26 framework measures innovation generated, adapted or diffused within that share of the provincial economy. Mobile payment adoption, informal logistics networks, home-based food processing at commercial scale, township-level manufacturing and the broader applied innovation activity of the informal sector leave no trace in any of the categories. It is plausible, although not directly demonstrable from the current indicators, that some proportion of the conversion-failure pattern observed in the formal system is partially offset by innovation activity occurring outside it. The diagnostic is therefore a description of where the formal system is converting and where it is not. A framework that does not measure approximately one-third of provincial employment cannot claim to describe the full innovation activity of the province, and the conversion-failure diagnosis should be read with that boundary explicitly in view.

Three further limits sit within the formal framework itself. Most indicators report at provincial level, and within-province spatial claims are therefore directly evidenced only where district-level data exists, principally in the ecosystem facility register. The Investment category carries three indicators deferred from this edition because the source data is not disaggregated at the required resolution: R&D Personnel intensity at FTE provincial level, the HERD institutional split across UKZN, DUT, MUT and UNIZULU, and Business R&D by industry sub-sector. These are dissemination gaps at HSRC rather than analytical gaps in the framework, and each is documented in Section 6.8. The Impact category carries data-quality flags on Government youth FTE for 2022 to 2024, on Other Transport Equipment for 2020 to 2022, and on the post-2017 Finance and Insurance composition shifts that complicate the wage-compression series. None of these flags displaces a diagnostic-level claim, but each bounds the precision with which the underlying finding can be read. The framework also does not test whether the conversion-failure pattern observed in KwaZulu-Natal is unique to the province or shared with other provinces with similar manufacturing bases and university structures. A multi-province comparative diagnostic would clarify whether what this chapter describes as a structural KZN problem is in fact a regionally widespread pattern with KZN-specific magnitude, or a province-specific phenomenon.

These limits constrain the diagnostic at its edges. They bound the claims at their margins; they do not, on the evidence the framework does collect, invalidate them. Incorporating informal-sector innovation activity, were it possible, might reduce the measured intensity gap and shift the conversion-failure finding at

the margins. It would not eliminate the TVET throughput deficit, the doctoral pipeline contraction, the BERD real-terms decline or the high-technology manufacturing employment loss, since each of those findings is anchored on formal-sector data that does not depend on the informal sector for its measurement. The same logic applies to the deferred Investment indicators: their resolution would refine the diagnostic but is unlikely to reverse the central conversion-failure finding. The framework that produced this chapter has its limits, and the diagnostic the chapter advances is the diagnostic that this framework, on this evidence, supports. A dedicated supplement on informal-sector innovation activity, prepared for the 2026/27 edition, would be the single most valuable methodological addition to this framework and would allow the conversion-failure diagnosis to be tested against a fuller picture of provincial innovation activity than the current data permits.

9.7 Implications

The implications that follow from this diagnostic are organised around five priorities. Each is anchored on evidence the chapter has surfaced and names a specific intervention rather than a thematic ambition. The priorities are not equivalent in scale or in urgency, and they are sequenced by the structural feature each is designed to address.

The interventions that follow sit within the policy space that the National Development Plan, the Department of Science and Innovation Decadal Plan, and the Department of Trade Industry and Competition industrial policy framework define for provincial actors. Provincial implementation depends on alignment with these national frameworks, particularly for higher-education capacity, R&D incentive design and innovation infrastructure funding. The priorities are framed at the provincial level because that is the scope of this report; effective execution requires coordination across the three tiers of government, and the absence of a current KZN provincial innovation strategy is itself a structural gap that the recommendations below presume will be addressed.

How the five priorities map ontp the four diagnostic mechanisms

Each priority is anchored to one or more structural features identified in 9.2 to 9.5; the priorities follow from the mechanisms rather than from a thermatic checklist

PROVINCIAL PRIORITY	CONCENTRATION	COMPOSITION	THROUGHPUT	VALUE CAPTURE
Spatial inclusion *Distribute capacity beyond eThekwini and UKZN*	●	·	·	·
Capital architecture *BERD reversal or ecosystem recalibration*	·	●	·	●
Commercialisation infrastructure *Missing-middle infrastructure plus public procurement*	·	●	·	●
Digital connectivity *Fixed-line at innovation sites beyond mobile-led layer*	·	●	·	·
Human-capital pipeline *Three transitions: TVET, school-to-SET, doctoral*	·	·	●	·

● Priority directly addresses this mechanism

Figure 9.6: Provincial priorities mapped to diagnostic mechanisms

Source: Innovate Durban Research and Impact Department, Section 9.7 analysis

Spatial inclusion

The first priority follows from the concentration mechanism. The provincial innovation system is currently anchored on a single metropolitan area and a single dominant institution at every layer of activity the framework tracks, and the diagnostic in 9.2 showed this concentration is intensifying rather than steadying on the additions side. The structural response is not to reduce the role of eThekwini or UKZN; both are productive nodes whose strengths the framework has documented. The response is to build supplementary capacity in the parts of the province currently outside the innovation system as the framework measures it.

The five districts with no confirmed innovation facility presence are uThukela, iLembe, uMkhanyakude, Zululand and Amajuba. Their economic profiles, population densities and existing enterprise bases differ substantively, and a uniform spatial intervention is unlikely to be effective. What the evidence supports is a district-differentiated approach that identifies the one or two highest-priority facility or support gaps in each underserved district, rather than attempting to replicate the eThekwini ecosystem at provincial scale. The Living Lab model, in which KwaZulu-Natal leads the country with three of three national entries, is the existing mechanism most suited to this kind of distributed and contextually embedded support; its potential reach into non-metro districts has not yet been tested at the scale the diagnostic suggests is needed.

Three concrete interventions follow from this priority. First, anchor at least one university or science council presence in the economically most active of the currently underserved districts, since ecosystem development requires an institutional anchor of some kind. Second, establish a provincial Fab Lab outside eThekwini as a first step towards closing the hardware-innovation gap that the Ecosystem chapter identified. Third, design the next generation of funding-support mechanisms with explicit non-metro eligibility requirements rather than allowing eThekwini proximity to function as a de facto filter.

Capital architecture

The second priority follows from the composition and value-capture mechanisms together. Real Business R&D in KwaZulu-Natal has contracted at approximately 1.6 times the national rate over the nine-year window, and the provincial R&D base is structurally tilted away from the business sector compared to the national pattern. These two findings reinforce each other: the firm-level investment that should sustain conversion from research and human-capital activity into commercial output is contracting, and the underlying composition of the R&D base provides less of a Business-R&D foundation than the national average to begin with.

The policy response runs along two paths that are not mutually exclusive. The first is a deliberate effort to reverse the BERD trajectory through targeted incentives, matched-funding mechanisms, or sector-specific R&D support directed at KwaZulu-Natal's comparative-advantage sectors: agro-processing, logistics technology, and the automotive supply chain that 9.2 identified as the medium-high-technology anchor. The second is a recalibration of existing ecosystem support to the actual private-sector base that exists, rather than the larger and more R&D-intensive base the province once had. The two are complementary because the first responds to the directional trajectory and the second responds to the steady-state composition.

The Not-for-Profit R&D sector recorded a real CAGR of +4.55% over the same window, the strongest single-sector real expansion in the provincial Investment series. This is a genuine area of provincial strength that the current ecosystem architecture does not adequately reflect. The design of mechanisms to channel NFP R&D capacity into commercialisation pipelines, particularly in health, agriculture and environmental sectors where the NFP base is concentrated, is an under-explored area worth scoping in the 2026/27 cycle.

Commercialisation infrastructure

The third priority addresses the research-to-commercialisation transition, which the chapter identified as a composition gap in 9.3 (the open-science orientation of provincial research) and a value-capture gap in 9.5 (the patent-per-output ratios that sit below national means at IPC Sections C and G). The research base produces volume; the system extracts proportionately less commercial IP per unit of that volume than the national pattern.

The structural intervention is the missing-middle infrastructure that connects research output to commercial deployment. KwaZulu-Natal currently has no Fab Lab in the national register, the only top-four province in this position. The Living Lab footprint is strong on count but the absolute scale is small relative to the volume of research the province produces.

Technology transfer capacity at university level is constrained, and the ratio of patent applications to research output sits at the open-science end of the national distribution. A KZN Research Commercialisation and Prototype Fund, designed specifically to support the conversion of provincial research output into IP, prototype, and pre-commercial deployment, is the most direct instrument that the diagnostic supports.

The demand side of this priority is public procurement. A provincial Testbed and Demonstration Network, in which provincial government acts as a first customer for KZN-developed innovations, would close the missing middle from the demand side rather than only the supply side. Procurement-driven demand for innovation outputs is currently almost absent from the provincial innovation policy mix. The combination of supply-side commercialisation infrastructure and demand-side procurement is structurally more likely to shift outcomes than either intervention alone.

Digital connectivity

The fourth priority follows from the connectivity composition gap identified in 9.3. KwaZulu-Natal leads the country on mobile internet penetration but sits 9.9 percentage points below the national average and 37.4 percentage points below the Western Cape on fixed-home internet. Mobile-led connectivity supports the consumption-side digital activity that has expanded over the period; it is less well suited to the production-side workloads that innovation work requires.

The structural response is targeted fixed-line capacity expansion in the locations where innovation work happens: at universities and university precincts, at TVET colleges, at science councils, and within the secondary urban centres outside eThekwini that currently sit between metro fixed-line density and rural mobile-only access. The intervention is not a shift from mobile to fixed at the consumer level; it is a deliberate addition of fixed-line capability at the institutional and productive-use layer of the system. The mobile network is already in place; what the diagnostic suggests is missing is the bandwidth-and-stability layer that sits underneath sustained research and collaborative work. This priority is also a precondition for several others: spatial inclusion depends on connectivity at non-metro institutional sites, the human-capital pipeline depends on digital infrastructure at TVET and university level, and commercialisation infrastructure depends on the connectivity that supports collaborative work between research nodes.

Human-capital pipeline

The fifth priority follows from the throughput mechanism. The chapter identified three transition points where the human-capital pipeline loses material volume between entry and exit, and each transition has a different structural character requiring a different intervention.

At the TVET Engineering assessment stage, the throughput failure is concentrated at the exam itself rather than at any pre-exam stage. The intervention runs at college level: workshop infrastructure, lecturer capacity, structured exam preparation, and the kind of student support provision that converts attendance into completion. The TVET workshop-infrastructure deficit identified in the Infrastructure category provides part of the structural explanation, albeit not the whole one, and targeted capital investment in TVET engineering facilities would address both the throughput gap and the infrastructure deficit at the same time.

At the school-to-post-school transition, the binding constraint is the Mathematics participation rate at school level, where 37% of NSC candidates choose Mathematics over Mathematical Literacy. The post-school transition cannot expand SET-eligible volume beyond what subject choice at school level provides. The provincial Education department retains the primary policy levers here, but the implication for the innovation system is that SET-pipeline expansion above the current trajectory is structurally bounded by school-level subject choice. Any SET-expansion strategy from the innovation system side must therefore engage school-level subject choice as a binding upstream variable.

At the doctoral stage, the post-2019 enrolment contraction is the most time-sensitive finding in the chapter. The four-to-six-year completion lag means decisions made now will determine the provincial research-output trajectory in the late 2020s and early 2030s. The intervention is a targeted programme on doctoral SET retention and completion at KZN universities, with particular attention to UKZN given its dominant share of provincial doctoral output. Funding continuity, supervision capacity, and the cost-of-living pressures that disproportionately affect postgraduate students are the most frequently cited drivers of doctoral attrition nationally and the policy levers most directly aligned with the provincial gap.

Sequencing

These five priorities are not independent of one another. Spatial inclusion requires the connectivity that the digital priority addresses. The commercialisation priority depends on the human-capital pipeline that the throughput priority addresses. The capital architecture priority and the commercialisation infrastructure priority share a structural concern with the missing middle between research output and firm-level deployment. Implementation that addresses any one priority in isolation will produce limited returns. Overall, the provincial innovation policy framework that would most effectively respond to the findings in this chapter is one that treats the four mechanisms identified in the diagnostic as facets of a single structural problem, and the five priorities derived from those mechanisms as facets of a single coordinated response.

Implementation realism bounds these priorities. Each intervention spans more than one tier of government: spatial inclusion requires DHET, DSI and provincial Education coordination; capital architecture requires the Department of Trade, Industry and Competition (DTIC) and National Treasury alignment on incentive design; the human-capital pipeline interventions sit primarily within DHET and the provincial Education department. The provincial actor in this policy space, currently the KZN Department of Economic Development, Tourism and Environmental Affairs along with sector-specific provincial departments and provincial entities including Innovate Durban, has limited unilateral capacity to deliver these interventions at scale. The priorities are framed at the level of analytical response to the diagnostic; the implementation pathway requires an institutional architecture that does not currently exist in the province, and constructing that architecture is itself part of what the diagnostic implies.

9.8 Closing

KwaZulu-Natal's innovation system shows substantial scale, institutional depth and genuine areas of provincial strength. The province produces the country's largest NSC examination cohort, holds third place on absolute R&D investment, leads the country on Bachelor pass share, Living Lab footprint and mobile internet penetration, and ranks second nationally on per-capita research output through its leading university. The Not-for-Profit R&D sector has expanded faster than any other provincial R&D performer over the nine-year window, and the medium-high-technology manufacturing base anchored by the automotive sector has added jobs over the period. These are foundations on which a provincial innovation system can be built, and they reflect investments and decisions made over multiple decades by the province's universities, ecosystem actors, government departments and private-sector firms.

Our diagnostic is that the province assembles those foundations and does not consistently translate them into the throughput, intensity and value capture the framework measures further down the system. The conversion failure is structural rather than incidental. It shows up at every layer of the system. Concentration is single-node at the institutional level, and composition tilts toward foundational rather than productive use. Throughput is lost across the human-capital pipeline, and value capture is compressed across firm investment, wages and high-technology employment. The diagnosis is not a denial of the strengths; it is an account of how those strengths translate, or fail to translate, into the next-stage outcomes downstream of where they sit.

The 2026/27 SOI cycle will return to several of the indicators deferred from this edition, and a dedicated supplement on informal-sector innovation activity prepared for that cycle would be the single most valuable methodological addition to the framework. Beyond methodology, the priorities in 9.7 set out what a coordinated response to the diagnostic, taken as a whole, would look like. The province has the underlying assets that the diagnostic both identifies and respects. The conversion gap is the work in front of provincial innovation policy.

10. CONCLUSION

Two KwaZulu-Natals are visible in the indicator data this report assembles. The first is a province of scale and structural participation: South Africa's second-largest economy, the largest National Senior Certificate examination cohort in the country at 171,368 candidates in 2025, a third-place ranking on absolute Gross Expenditure on R&D held in every year of the twelve-year measurement series, and a research university that sits second nationally on per-capita research output. The second is a province of conversion failure: R&D intensity at seventh of nine provinces, real Business R&D at a 2023/24 index of 57.6 against a 2014/15 base of 100, Science, Engineering and Technology (SET) graduation per 100,000 of population below its own 2015 starting point, N3 Engineering completion rate ranked eighth of nine provinces, and high-technology manufacturing employment down 23.0% over the eleven-year window to 2025. These are not two different provinces; they are the same province read at different analytical registers. The conversion-failure framing introduced in Section 3 and argued at length in Section 9 is the lens through which the report holds these readings together: scale is materially in place at the layers the framework measures, and conversion of that scale into next-stage outcomes is consistently weaker than the input scale predicts. Each of the five categories shows this pattern in a structurally distinct form.

The diagnostic operates inside the structural baseline established in Section 2. KwaZulu-Natal's GDP share has held in a narrow band of 15.8% to 16.5% across the past decade, with the eThekwini metropole generating an indicative 55 to 60% of provincial economic output. The official unemployment rate stood at 32.3% in Q4:2025, the absorption rate at 34.9% (placing approximately two-thirds of working-age residents outside formal employment), and broad labour underutilisation at 49.1%. Informal-sector activity, when agriculture and private household employment are included, accounts for approximately one-third of all employed persons, and the OECD's characterisation of the South African labour market as one of exclusion rather than informal absorption applies to KZN's data without modification. Approximately 742,000 young people aged 15 to 24 in the province are not in employment, education or training (Q1:2024), the largest absolute provincial NEET cohort nationally. The strengths the indicator data records, the largest NSC cohort, the third-place R&D rank, the leading per-capita research output, are real, and the gap between those strengths and provincial outcome-layer absorption is what determines whether they translate into the labour-market conditions Section 2 sets out.

The People category shows scale and improvement at the participation layer alongside throughput failures at three downstream transitions. KwaZulu-Natal produced the country's largest 2025 NSC examination cohort, ranks first nationally on the 2025 Bachelor pass share at 52.0% (the only province above 50%) and first nationally on distinctions per 1,000 candidates at 633.5. District performance has converged sharply on the provincial average across the 2016 to 2025 window, with all twelve KZN districts on improving trajectories and the standard deviation across district pass rates declining from 7.31 percentage points in 2016 to 1.91 percentage points in 2025, a 74% reduction in dispersion. The conversion gaps sit downstream of these participation strengths. Mathematics subject participation, at 36.7% of KZN candidates writing Mathematics rather than Mathematical Literacy, constrains the volume of candidates entering SET pathways from the school stage. The Technical and Vocational Education and Training (TVET) engineering pipeline carries the second-largest national share of N3 registrations but the eighth-place national rank on N3 completion rate, with the 2023 deficit driven by examination failure rather than registration-to-examination attrition. SET graduation per 100,000 of population sits below its 2015 starting level despite enrolment growth, and doctoral SET enrolment is concentrated at 81.32% in a single institution. The pattern in the human-capital pipeline is throughput failure at successive transitions rather than absence at any one stage.

The Infrastructure category shows parity at basic electrification alongside compositional gaps in both school-level innovation infrastructure and digital connectivity. School-level electricity reaches 100% in the EFMS 2025 cross-section, parity with the eight other provinces, although KZN records the second-highest off-grid share nationally at 7.5% (434 schools), with KZN and the Eastern Cape together accounting for 82% of the country's 993 off-grid schools. School library access stands at only 26.1% (rank 4 of 9, with 4,281 KZN schools without a library), school laboratory access at 13.5%, and school computer centre access at 34.9% with the rate declining 1.6 percentage points from 2019. The school-level infrastructure that supports STEM pathway development from the upstream stage is therefore in place at scale only for electricity. At the household layer, internet access stands at 84.2% any-access, with mobile internet at 80.0% leading the country and the LTE-capable device base at 13.0 million SIMs, second nationally behind Gauteng. Fixed-home internet sits at 7.5%, ranking sixth of nine provinces (joint with North West) and 9.9 percentage points below the national average and 37.4 percentage points below the leading province. Rural 5G coverage at 15% places KZN seventh of nine and produces the largest urban-rural coverage gap in the country at 65 percentage points. The composition is mobile-led at the household layer and asymmetric at the school layer: research and commercialisation work depends on symmetric

high-speed connectivity at universities and innovation precincts, and on the school-level laboratory and library infrastructure that supports STEM pathway development upstream, neither of which the provincial profile yet provides at the scale the indicator data on the People category requires.

The Investment category shows scale and stability at the public R&D base held against a private-sector contraction with no counterpart in the other R&D performing sectors. KwaZulu-Natal has held third national rank on absolute Gross Expenditure on R&D throughout the twelve-year measurement series, behind Gauteng and the Western Cape and ahead of every other province in every year. Not-for-Profit R&D is the strongest single growth signal in the category at +4.55% real CAGR over the nine-year window, with a real index of 149.3 against a 2014/15 base of 100; Higher Education R&D shows positive nine-year real growth at +1.25% real CAGR; Government R&D has held broadly flat in real terms (+0.44% real CAGR), and Science Council R&D has contracted modestly (−1.02% real CAGR). Business R&D, by contrast, has contracted in real terms to a 2023/24 index of 57.6 against a 2014/15 base of 100, the deepest single-sector contraction in the Investment category and approximately 1.6 times the equivalent national real CAGR. Aggregate real GERD has contracted at −1.81% per annum across the same window, against a national real CAGR of −0.87%, a contraction approximately twice the national rate; the real index for 2023/24 stands at 84.9. The Western Cape has gained 11.9 percentage points of national share in BERD over the nine-year window, moving past KZN in the three largest performing sectors. R&D intensity has sat sixth-to-seventh of nine on R&D as a share of provincial Gross Value Added (GVA) across the same period. The provincial composition is one of stable absolute presence and partial sector growth held against a private-sector contraction the public R&D base does not offset, with the aggregate real-terms trajectory contracting at twice the national rate.

The Ecosystem category shows institutional presence held against structural gaps in the configuration of that presence for commercialisation activity. The Innovate Durban Facility Register at version 16.3 records 18 innovation support organisations anchored in KZN, three Living Labs (tied first nationally with the Eastern Cape), and two Science Parks (tied first nationally with Gauteng). The province sits third nationally on the count of locally anchored funding-support mechanisms at 95, with a further 355 nationally available South African instruments equally accessible. The configuration of these strengths, however, is weighted away from the deployment functions that translate research into commercial activity. The four KZN universities collectively recorded patent application ratios ranging from 0.68 to 5.73 per 100 Department of Higher Education and Training (DHET) research output units across 2015 to 2023; UKZN, the dominant research producer, sits at 0.68 and ranks nineteenth of twenty-three South African public universities on this measure, against a national median of 3.12. Of the 95 KZN-anchored funding-support mechanisms, 54.7% are advisory in nature and 33.7% are capital instruments. Fabrication Labs are absent from the provincial register entirely. The presence of innovation support is not in dispute; the configuration of that support for the research-to-deployment transition is.

The Impact category shows positive sectoral employment growth in knowledge-intensive services and a rising knowledge-production trajectory held against a manufacturing base that has contracted at the technology-intensive tiers most relevant to the innovation thesis. Knowledge-intensive services employment grew by 19.3% over the eleven-year window to 110,890 full-time equivalent (FTE) jobs in 2025, the strongest sectoral employment trajectory in the Impact category. The growth is, however, concentrated at 76.0% within eThekwini and is accompanied by wage premium compression beneath the headline figure. Aggregate research output, the cleanest positive signal in the Impact category, grew 52.6% from 2,148 units in 2015 to 3,278 in 2023, with the institutional concentration index falling from 0.690 to 0.550 over the same window as the smaller KZN universities expanded their research base faster than UKZN. UKZN per-capita research output remains second nationally at 2.01 units per 100 academic staff. High-technology manufacturing employment fell from 3,386 FTE in 2014 to 2,607 in 2025, a contraction of 23.0%, and the high-tech share of total provincial formal employment fell from 0.23% to 0.17%. Total formal manufacturing employment moved from 213,133 FTE in 2014 to 207,710 in 2025, a net loss of 5,423 jobs at −2.5%; the headline aggregate conceals composition shifts, with medium-high-technology manufacturing growing 6.4% on the back of Motor Vehicles alone and the remaining four medium-high sub-sectors losing 5,222 jobs collectively. The doctoral pipeline lag connection traces post-2019 enrolment contraction forward to post-2021 research-output moderation on a four-to-six-year completion lag, a cross-category temporal chain not previously quantifiable in the publication series. The pattern at the outcome layer is positive net knowledge-intensive employment growth and a strengthening research base held against a manufacturing decline at the high-technology tier.

Section 9 organises these per-category findings under four structural features. Concentration describes provincial activity anchored on single nodes at every

level a more distributed system would carry: institutionally at one university, spatially at the metropolitan core, and sectorally at a single sub-sector of medium-high-technology manufacturing. Composition describes scale that is configured for participation rather than for the deployment activity that produces innovation output: connectivity is mobile-led at the household layer, the R&D performing-sector mix tilts toward Higher Education and Not-for-Profit performers and away from Business relative to the national mix, and the research base is open-science orientated relative to the national distribution of patent-to-publication ratios. Throughput describes material loss between successive stages of the human-capital pipeline, with the loss concentrated at three transitions: school-to-SET registration, the TVET assessment stage, and doctoral enrolment-to-graduation. Value Capture describes the value the system retains per unit of activity it produces, visible at three levels: firm-investment contraction in Business R&D, worker-compensation compression in three of the four core knowledge-intensive services sectors, and productive-output contraction in high-technology manufacturing employment. The four mechanisms are not independent; they are connected facets of the same gap, and the per-category paragraphs above carry the specific empirical anchors against which each mechanism is read.

Section 9.7 draws five priorities for action from these mechanisms. Spatial inclusion targets the five KZN districts with no confirmed innovation facility presence (uThukela, iLembe, uMkhanyakude, Zululand and Amajuba) as the structural test of whether the ecosystem can extend beyond the eThekwini metropole. Capital architecture rebalancing addresses the Business R&D contraction through targeted incentives, matched-funding mechanisms, and sector-specific R&D support directed at the province's comparative-advantage sectors (agro-processing, logistics technology, and the automotive supply chain), with the Not-for-Profit R&D growth signal indicating where instrument-side support can land productively. Commercialisation infrastructure addresses the research-to-deployment transition through university technology transfer functions, the missing-middle facilities including Fabrication Labs (currently absent from the provincial register), and demand-side mechanisms including public procurement. Targeted fixed-line capacity expansion addresses the connectivity composition gap at innovation-active locations, prioritising universities, TVET colleges, science councils and the secondary urban centres outside eThekwini rather than broad consumer rollout. Human-capital pipeline interventions address the throughput failure at the three transition points where the loss is concentrated: TVET examination preparation, school-stage Mathematics participation, and doctoral programme support during the post-2019 enrolment contraction. The five priorities are not independent of one another; the chapter argues that they should be treated as facets of a single coordinated response rather than addressed in isolation. Implementation realism bounds the priorities: each spans more than one tier of government, the absence of a current provincial innovation strategy is itself a structural gap that the recommendations presume will be addressed, and constructing the institutional architecture required to deliver them is itself part of what the diagnostic implies.

The 2025/26 edition advanced the measurement framework in several respects that made the gap more precisely locatable than in previous editions. The introduction of an explicit conceptual framework in Section 3, grounded in innovation systems theory and operationalised through the OECD Oslo Manual and the South African National Advisory Council on Innovation's provincial measurement conventions, replaced the implicit framing of earlier editions with a stated theoretical lens. The Layer 2 sectoral analysis, with its formal admissibility tests applied to logistics and port-linked services, agri-food and agro-processing, and creative industries, gave the report a structured way to examine the sectors where KZN's structural characteristics are analytically material but not visible in national headline comparisons. The methodological note at the head of Section 9 made the analytical posture explicit: the conversion-failure thesis is the inherited frame rather than an emergent finding, the four-mechanism architecture is a constructed interpretive reading of the indicator data, and the chapter's hedging conventions reflect this hierarchy.

At the indicator and source level, four advances widened what the framework can see. The introduction of patent-to-publication ratios across the four KZN universities, drawn from the Companies and Intellectual Property Commission (CIPC) register for the first time, placed the commercialisation orientation gap on an explicit numerical footing. The expansion of the Impact category from employment counts to a full wage structure and youth employment analysis revealed the wage premium compression running beneath the knowledge-intensive services growth headline. The doctoral pipeline lag connection, tracing post-2019 enrolment contraction forward to post-2021 output moderation on a four-to-six-year completion lag, demonstrated a cross-category temporal chain that was not previously quantifiable. The Facility Register at version 16.3, with a documented corrections log and operational status classifications for every KZN entry, produced an Ecosystem baseline substantially more defensible than any prior edition. Collectively, these advances did not change the conversion-failure framing the report operates within; they sharpened the specificity at

which the gap can be located in the indicator data.

What the framework cannot yet do is as important as what it can. The informal economy innovation supplement recommended for the 2026/27 edition remains the most significant outstanding gap. The finding that approximately one-third of KZN's employed persons work outside the formal sector means the diagnostic is bounded in ways the current framework cannot quantify, and the absence of indicators that capture innovation activity outside the formal sector is the single most consequential limit on the present edition's analytical reach. Two further structural limits sit within the formal framework itself. Most indicators report at provincial level, with within-province spatial claims directly evidenced only where district-level data exists, principally in the Ecosystem facility register; the spatial concentration findings the report advances are therefore narrower in geographic resolution than the diagnostic's policy implications would benefit from. The framework does not test whether the conversion-failure pattern observed in KwaZulu-Natal is unique to the province or shared with other provinces of similar manufacturing base and university structure; a multi-province comparative diagnostic would clarify whether what the report describes is a regionally widespread pattern with KZN-specific magnitude or a province-specific phenomenon.

Five cross-category statistical relationships hypothesised in this edition warrant formal investigation in subsequent editions: school achievement to SET enrolment, the doctoral pipeline to research output, the Business R&D contraction to high-technology employment, knowledge-intensive services employment growth to wage premium compression, and the R&D performing-sector composition to commercial innovation outcomes. The sample sizes and data frequencies available at provincial level do not currently support reliable inference on these relationships, but the directional associations are sufficiently consistent across the indicator data to constitute a research agenda for the next planning cycle.

Three data gaps within the formal framework also remain unresolved. R&D Personnel at full-time equivalent level should be treated as the highest-priority data negotiation with the Human Sciences Research Council Centre for Science, Technology and Innovation Indicators (HSRC/CeSTII) for the next reporting cycle, given that this gap drove the formal deferral of the R&D Personnel Intensity indicator from the present edition. The Higher Education R&D institutional split across KZN's four universities (UKZN, DUT, MUT and UNIZULU) is constrained by HSRC publication conventions and may require provincial-level data sharing arrangements with the four institutions directly.

The Business R&D by industry sub-sector breakdown is the third deferred Investment data extension; its resolution would identify which industries within KZN BERD are driving the contraction documented in the Investment category, with implications for sector-specific provincial response. Closing these three gaps over the next two reporting cycles would meaningfully narrow the conditions under which the diagnostic operates with incomplete information.

The publication series has produced seven consecutive editions of provincial innovation measurement, each building on the methodological foundation of the last. What the 2025/26 edition contributes is a more precisely specified version of a diagnostic that has been directionally present throughout: KwaZulu-Natal consistently generates the structural conditions for innovation at scale and consistently under-converts them. The value of that precision lies not in the diagnosis itself, which practitioners and policymakers in the province have intuited for years, but in the specificity of where, at which pipeline stage, and by how much the conversion fails. That specificity is what evidence-based provincial innovation policy requires. The Technical Report sits alongside the Snapshot, which condenses these findings for non-specialist audiences, and Celebrating KwaZulu-Natal Innovators, which complements the quantitative diagnosis with case-based evidence on practitioner experience in the provincial system. Together the three documents establish the evidence base against which the strategic commitments articulated at provincial level (in the Department of Economic Development, Tourism and Environmental Affairs 2025–2030 strategic plan) and at national level (in the Science, Technology and Innovation Decadal Plan and the digital policy instruments finalised in 2024) can be assessed, and against which the next edition of the State of Innovation in KwaZulu-Natal will measure progress. The conversion gap, on the evidence this edition assembles, is the work in front of provincial innovation policy.


“
KwaZulu-Natal produced
the country’s largest 2025 NSC
examination cohort,
ranks first nationally on the
2025 Bachelor pass share at 52.0%
(the only province above 50%)
and first nationally on distinctions
per 1,000 candidates at 633.5.
”

11. REFERENCES

Companies and Intellectual Property Commission (CIPC). (2025). *Patent register: IPC class data for complete and accepted patent applications, 2015 to 2023.* CIPC: Pretoria.

Department of Basic Education (DBE). (2014 to 2025). *National Senior Certificate examination reports (annual series).* DBE: Pretoria.

Department of Basic Education (DBE). (2019, 2021, 2023, 2024, 2025). *National Education Infrastructure Management System (NEIMS) reports (selected years).* DBE: Pretoria.

Department of Basic Education (DBE). (2025a). *2025 National Senior Certificate examination report: The class of 2025.* DBE: Pretoria.

Department of Basic Education (DBE). (2025b). *Education Facility Management System (EFMS) report, August 2025.* DBE: Pretoria.

Department of Communications and Digital Technologies (DCDT). (2024a). *ICT and digital economy masterplan.* Republic of South Africa.

Department of Communications and Digital Technologies (DCDT). (2024b). *National data and cloud policy.* Republic of South Africa.

Department of Co-operative Governance and Traditional Affairs (COGTA). (2020). Profile: *eThekwini metro (District Development Model).* COGTA: Pretoria. Available at: https://www.cogta.gov.za/ddm/wp-content/uploads/2020/07/Metro-Profile_Ethekwini.pdf

Department of Co-operative Governance and Traditional Affairs (COGTA). (2021). *KwaZulu-Natal Provincial Spatial Development Framework (PSDF): First Draft Spatial Development Framework (2022 to 2027).* COGTA: Pretoria.

Department of Higher Education and Training (DHET). (2015 to 2025). *Higher Education Management Information System (HEMIS) data, 2015 to 2023.* DHET: Pretoria.

Department of Higher Education and Training (DHET). (2024). *Permanent academic staff headcount data: Higher Education Management Information System (HEMIS) extract.*

Department of Higher Education and Training (DHET). (2025a). *Research Outputs database: Evaluation of universities' research outputs, 2015 to 2023.* DHET: Pretoria.

Department of Higher Education and Training (DHET). (2025b). *Statistics on post-school education and training in South Africa 2023 (PSET Report).* DHET: Pretoria.

Department of Higher Education and Training (DHET) and Development Policy Research Unit (DPRU). (2024). *Fact sheet: Persons who are not in employment, education or training (NEETs), August 2024. DHET:* Pretoria. Available at: https://lmi-research.org.za/wp-content/uploads/2024/09/WEB-DPRU-FACTSHEET-7-7-6b-NEETs-1.pdf

Department of Science and Innovation (DSI). (2019). *White Paper on Science, Technology and Innovation.* DSI: Pretoria.

Department of Science and Innovation (DSI). (2022). *Science, Technology and Innovation Decadal Plan 2022 to 2031.* DSI: Pretoria.

Department of Sport, Arts and Culture and Department of Communications and Digital Technologies (DSAC and DCDT). (2024). *National artificial intelligence policy framework. Republic of South Africa.*

Edquist, C. (Ed.) (1997). Systems of Innovation: *Technologies, Institutions and Organizations.* London: Pinter Publishers.

Gauteng Innovation Observatory. (n.d.). Gauteng Innovation Observatory. North West University, in partnership with the Gauteng Department of Economic Development. Available at: https://gauteng-innovationobservatory.com/ [Accessed April 2026].

Human Sciences Research Council (HSRC) and Centre for Science, Technology and Innovation Indicators (CeSTII). (2016). *South African national survey of research and experimental development: Statistical report 2015/16.* HSRC and CeSTII for DSI: Pretoria.

Human Sciences Research Council (HSRC) and Centre for Science, Technology and Innovation Indicators (CeSTII). (2025). *South African national survey of research and experimental development: Statistical report 2023/24.* HSRC and CeSTII for DSI: Pretoria.

Independent Communications Authority of South Africa (ICASA). (2019 to 2026). *State of ICT Sector Reports (annual series).* ICASA: Pretoria.

Innovate Durban. (2025a). *State of Innovation in KwaZulu-Natal 2024/25.* Innovate Durban: Durban.

Innovate Durban. (2025b). *Innovation Support Facility Register v16.3 (December 2025).* Innovate Durban: Durban.

Innovate Durban. (2025c). *Funding Map (December 2025).* Innovate Durban: Durban.

KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA). (2017). *Final draft KwaZulu-Natal Innovation Strategy 2017 to 2027.* Province of KwaZulu-Natal.

KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA). (2021). *District economic profiles: eThekwini metropolitan municipality.* EDTEA: Pietermaritzburg. Available at: https://www.kznedtea.gov.za/documents/EThekwini%20District%20Economic%20Profile.pdf

KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA). (2025). *Strategic Plan for 2025 to 2030: Vote 4, KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs*. EDTEA: Pietermaritzburg. Available at: https://www.kznedtea.gov.za/documents/Strategic%20Plan%202025-2030.pdf

KwaZulu-Natal Provincial Planning Commission. (2012). *Condensed version of the KwaZulu-Natal Provincial Growth and Development Strategy and Plan: 2012 to 2030*. Province of KwaZulu-Natal.

Lundvall, B.-Å. (Ed.) (1992). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning.* London: Pinter Publishers.

Mudiriza, G. and De Lannoy, A. (2023). *Profile of young people not in employment, education or training (NEET) aged 15 to 24 years in South Africa: an annual update*. SALDRU Working Paper No. 298. Southern Africa Labour and Development Research Unit, University of Cape Town. Available at: https://www.opensaldru.uct.ac.za/handle/11090/1031

National Advisory Council on Innovation (NACI). (2023). *South African science, technology and innovation indicators report 2023.* Department of Science and Innovation.

National Advisory Council on Innovation (NACI). (2024). *South African science, technology and innovation indicators report 2024.* Department of Science and Innovation.

National Advisory Council on Innovation (NACI). (2025). *South African science, technology and innovation indicators report 2025.* Department of Science and Innovation.

National Planning Commission (NPC). (2012). *National Development Plan 2030: Our future – make it work.* Republic of South Africa.

Nell, A. and Visagie, J. (2025). Spatial Tax Panel 2014 to 2024, version 5.1. In SEAD-SA, Cities economic outlook 2026: *Cities in flux – pathways of stress, adjustment and renewal.* National Treasury Cities Support Programme; Human Sciences Research Council; University of the Free State; University of the Witwatersrand.

Nelson, R. R. (Ed.) (1993). *National Innovation Systems: A Comparative Analysis.* New York: Oxford University Press.

OECD. (2015). *Frascati Manual 2015: Guidelines for collecting and reporting data on research and experimental development*. OECD Publishing, Paris. https://doi.org/10.1787/9789264239012-en

OECD. (2025). *OECD economic surveys: South Africa 2025 (Volume 2025/14)*. OECD Publishing, Paris. https://doi.org/10.1787/7e6a132a-en

OECD. (2026). Transformative research and technology infrastructures: *Policy guidance for the OECD's Agenda for Transformative Science, Technology and Innovation Policies.* OECD Publishing, Paris.

OECD and Eurostat. (2018). *Oslo Manual 2018: Guidelines for collecting, reporting and using data on innovation (4th ed.). OECD Publishing, Paris.* https://doi.org/10.1787/9789264304604-en

Province of KwaZulu-Natal. (2024). *KwaZulu-Natal Moses Kotane Research Institute Act 3 of 2024.* Province of KwaZulu-Natal.

Quantec Research. (2025). *EasyData: Provincial gross value added at constant prices (database).* Quantec Research: Pretoria.

SEAD-SA. (2026). *Cities economic outlook 2026: Cities in flux – pathways of stress, adjustment and renewal.* National Treasury Cities Support Programme; Human Sciences Research Council; University of the Free State; University of the Witwatersrand.

Statistics South Africa. (2014 to 2025). *Quarterly Labour Force Survey series, 2014Q1 to 2025Q3 (Statistical Release P0211).* Compiled from individual quarterly releases. The 2025Q3 release is the final edition in the comparable pre-ICLS-break series for provincial sector data; 2025Q4 headline rates are drawn from the QLFS Trends 2008 to 2025Q4 workbook.

Statistics South Africa. (2023). *Census 2022: Statistical release (Report No. P0301.4).* Statistics South Africa: Pretoria.

Statistics South Africa. (2024). *General Household Survey 2023.* Statistics South Africa: Pretoria.

Statistics South Africa. (2025). *General Household Survey 2024.* Statistics South Africa: Pretoria.

Statistics South Africa. (2025a). *Mid-year population estimates 2025 (Statistical Release P0302).* Statistics South Africa: Pretoria.

Statistics South Africa. (2025b). *Provincial gross domestic product, 2024 (Statistical Release P0441.2).* Statistics South Africa: Pretoria.

Statistics South Africa. (2026a). *Gross domestic product: Quarter ended December 2025 (Statistical Release P0441).* Statistics South Africa: Pretoria.

Statistics South Africa. (2026b). *Quarterly labour force survey, Quarter 4: 2025 (Statistical Release P0211).* Statistics South Africa: Pretoria.

Statistics South Africa. (2026c). *Subjective poverty in South Africa: Findings from the income and expenditure survey, 2022/2023 (Report No. 03-10-31).* Statistics South Africa: Pretoria.

Statistics South Africa. (2026d). *Quarterly employment statistics (QES), December 2025 (Statistical Release P0277).* Statistics South Africa: Pretoria.

UVU Africa. (2025). *Cape Technology and Innovation Ecosystem Report 2025.* UVU Africa, in partnership with the Western Cape Government, Wesgro and the City of Cape Town. Available at: https://www.westerncape.gov.za/edat/cape-technology-and-innovation-ecosystem-report-2025

World Bank. (2022). Poverty and inequality platform: Gini index, South Africa. World Bank Group. https://pip.worldbank.org

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