ACQF-II project

Africa:

Green and Digital Skills Analysis

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ACRONYMS AND ABBREVIATIONS

OJV	Online job vacancy
OJA	Online job advertising
OJP	Online job posting
PES	Public Employment Services
ESCO	European Skills/Competences, qualifications, and Occupations
GDP	Gross domestic product
KDD	Knowledge discovery in databases
KPI	Key performance indicators
LMI	Labour market information
NGO	Non-governmental organisation
DPS	Data Production System

1. INTRODUCTION

In the dynamic job markets of Tunisia, Morocco, Kenya, and Egypt, the imperative to understand and adapt to evolving skill requirements has never been more pressing. This report leverages data-driven insights derived from extensive analyses of online job postings to map current trends and anticipate future demands in digital and green skill sets across these nations. Drawing from an array of esteemed sources, including the World Economic Forum's (WEF) Future of Jobs Report (2023), the Stanford Human-Centered Artificial Intelligence (HAI) Report (2025), and recent scholarly articles on green skills evolution (Smith et al., 2024; Doe & Johnson, 2023), we ensure comprehensive coverage and high reliability of our data, laying a robust foundation for actionable insights and strategic planning.

The rapid pace of transformation within these job markets necessitates a nuanced approach to capturing and analyzing skill-related data. Precise and reliable data serve not only to highlight existing skill gaps but also to predict shifts within the occupational landscape. According to the WEF (2023), by 2030, approximately 68% of job skills required today will have significantly evolved, reflecting a rapidly changing labor environment where investments in human capital become crucially important. Moreover, the Stanford HAI Report (2025) underscores a growing shift toward a 'skills-first' hiring approach, demonstrating that such practices can expand talent pools by 20%, boost female workforce participation by 24%, and increase Gen Z workforce engagement by 10%. This paradigm shift emphasizes professional roles as composites of critical skills and responsibilities, rather than fixed job titles.

Labour market policies in Kenya, Tunisia, Egypt, and Morocco stand at a pivotal juncture as these nations seek to align qualifications with occupational demands, ensuring workforce readiness for emerging opportunities. Kenya has prioritized policies that align educational outcomes with market needs, recognizing the essential role skills play in economic growth and innovation. Tunisia focuses strategically on vocational training integration, enhancing job readiness among youth and addressing persistent unemployment challenges. Egypt's initiatives expand vocational and technical education, facilitating smoother transitions from education to employment, particularly in rapidly growing industrial sectors, complemented by robust lifelong learning programs. Morocco emphasizes enhancing graduate employability through a qualifications framework aligning curricula with market competencies, actively engaging the private sector to design targeted training programs responsive to dynamic job market demands.

Across these countries, a common thread emerges: the strategic development of skills policies prioritizing relevant qualifications and promoting continuous learning and adaptability. These policies signal a commitment to transforming the labor market landscape, enhancing global competitiveness, and ensuring economic resilience amid shifting labor dynamics. Focusing on digital and green skills, this report analyzes their representation and growth trajectories within online job postings across these African nations. By identifying current trends and forecasting future demands, stakeholders are equipped to strategically manage transitions, developing a workforce prepared for a rapidly evolving digital and environmentally sustainable economic landscape.

Figure 1 – African job postings collected in the ETF database. Link to the dashboard:
https://public.tableau.com/app/profile/tabulaex/viz/ACQF-BigDataLMI-Africa/Home and
https://acqf.africa/skills-data-focus/big-data-lmi-green-dashboard-africa
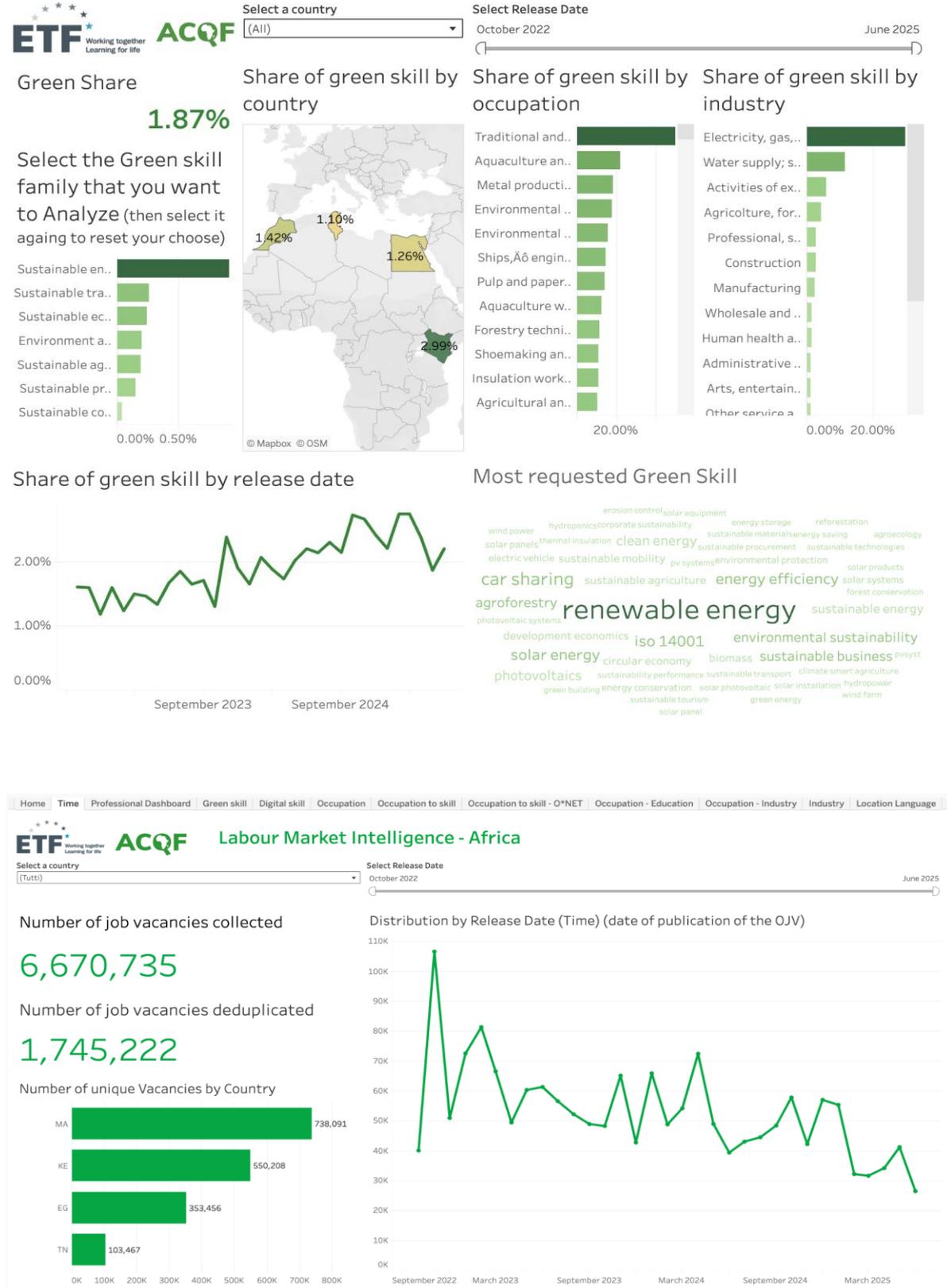
Figure 1 provides insights into labour market dynamics and emerging skill demands within Tunisia, Morocco, Kenya, and Egypt. The analysis spans from October 2022 to June 2025, capturing approximately 6.67 million job vacancies, which after deduplication amount to 1.74 million unique positions.

Morocco emerges prominently, accounting for the highest share of unique vacancies (692,330), followed by Kenya (528,222), Egypt (341,128), and Tunisia (101,390). The temporal distribution reflects fluctuations, indicative of underlying economic shifts, possibly reflecting seasonality, market adjustments, and varying economic activity levels across these nations.

The share of green skills in job postings averaged at 1.88%, suggesting an increasing but still modest incorporation of environmental competencies into labour demands. Sectoral breakdown highlights electricity and water supply industries as primary drivers, reflecting clear alignment with infrastructure and sustainability priorities. The most frequently requested green skills include renewable energy, energy efficiency, environmental sustainability, and ISO 14001 compliance, underscoring industry shifts towards environmentally conscious operational frameworks. Occupations prominently integrating these green skills span traditional sectors, including manufacturing and aquaculture, indicating that the green transition is permeating across diverse economic activities.

Figure 2: Locations and languages in Africa from job postings – ETF Database
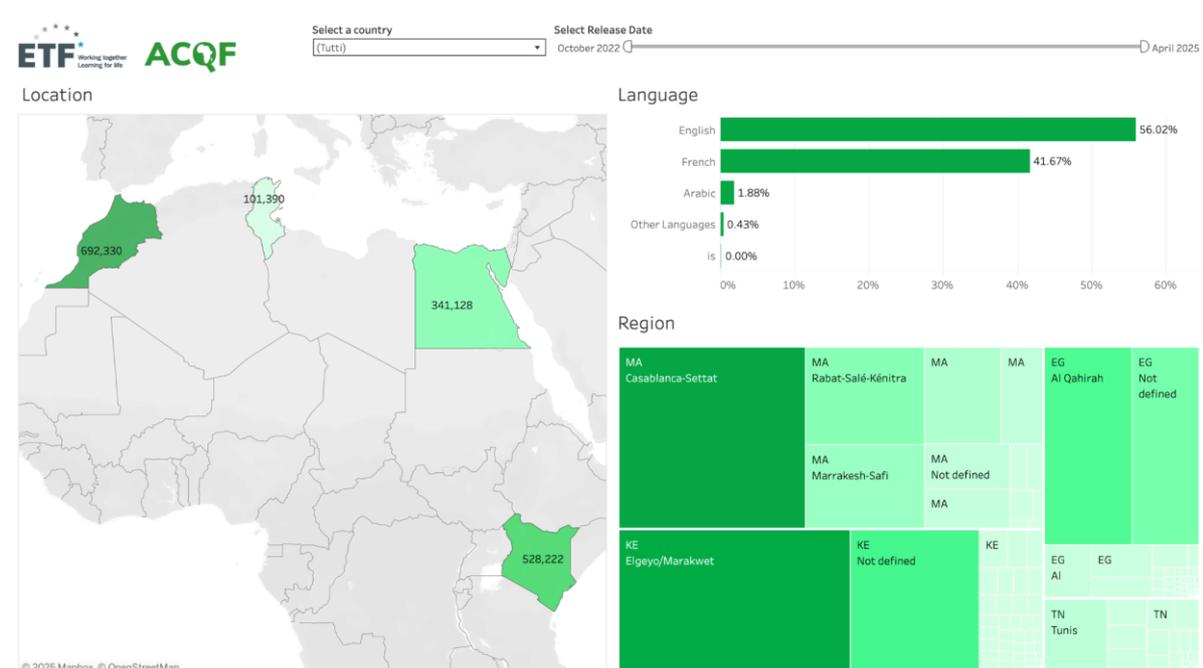

Figure 2 highlights language preferences clearly, showing English as the predominant language (56.02%), followed by French (41.67%), and Arabic (1.88%). This distribution illustrates diverse economic engagements and influences, with English indicating broader international integration and French reflecting historical and regional connections, particularly in North Africa. Morocco leads with the highest share of vacancies (692,330), high concentrated in regions such as Casablanca-Settat and Rabat-Salé-Kénitra, reflecting significant economic activity. Kenya follows closely (528,222), with major postings in Elgeyo/Marakwet. Egypt (341,128) and Tunisia (101,390) exhibit substantial vacancy volumes, focused in urban centers like Al Qahirah and Tunis.

Adopting skills-based hiring practices is critical to unlocking the substantial potential inherent in a skilled workforce, recognizing that skills have become a fundamental currency in today's dynamic labour market.

This significant shift aligns with global labour market trends and marks a transformative era of socio-economic advancement for Tunisia, Morocco, Egypt, and Kenya, each poised to benefit considerably by embracing this movement toward a sustainable, digital, and green economy. Online job postings constitute an essential resource, providing a real-time snapshot of labour market trends within these diverse African economies. They offer immediate insights into employer requirements, highlighting the precise skills, roles, and qualifications most in demand. Analyzing this valuable data enables researchers, policymakers, and educators to accurately identify industry developments, skills shortages, and shifts in job specifications, delivering deeper and more timely insights than traditional labour surveys typically allow. Furthermore, these postings reflect shifts in economic vitality, identifying burgeoning sectors and those experiencing challenges. Aligning education and training with labour market demands not only helps address immediate skills gaps but also fosters the creation of 'good jobs', roles characterized by quality employment conditions, job security, and opportunities for advancement. Thus, leveraging this data enhances alignment between educational curricula and market needs, promoting sustained economic growth and employment quality across these nations.

1.1.   Sectoral distribution of Online Job Postings

Table 1 offers a sectoral breakdown of online job postings by country, shedding light on the composition of labour demand across Agriculture, Manufacturing, and Services. The data highlights the dominance of the services sector across all four countries, with Morocco (600,650) and Kenya (474,356) leading in absolute figures. This pattern is consistent with global trends where service-oriented economies increasingly absorb the majority of employment demand, especially in urban and digitally transforming labour markets.

In the manufacturing sector, Morocco stands out with 84,071 postings, reflecting its relatively advanced industrial base and its role as a regional hub for sectors such as automotive, textiles, and electronics. Kenya (43,562) and Egypt (40,191) also show substantial demand in this domain, indicating growing industrialization and the expansion of formal employment opportunities in goods-producing sectors. Tunisia, with 17,464 manufacturing postings, registers the lowest figures, yet this still represents a key area of demand within its relatively smaller labour market.

Agriculture, by contrast, records significantly lower levels of formal job postings across all countries. Kenya leads with 4,005 postings, followed by Morocco (2,883), Tunisia (698), and Egypt (445). This underrepresentation of agricultural roles likely reflects the informality and subsistence-oriented nature of agricultural employment, which is less likely to be captured through digital platforms. It may also indicate a trend of rural-to-urban labour migration and the structural transition away from primary sectors.

The distribution of job postings underscores the growing importance of services and manufacturing in shaping labour market dynamics across North and East Africa. The data provides a vital basis for aligning vocational training and employment policies with real market needs, ensuring that education and labour market systems are better integrated to support economic transformation.

Table 1 – Job Postings by Country and Macro-Sector (ETF database – Lightcast elaboration)

	Category Sector			
Country	Agriculture	Manufactu..	Not defined	Services
Egypt	445	40,191	29,240	271,374
Kenya	4,005	43,562	6,453	474,356
Morocco	2,883	84,071	5,656	600,650
Tunisia	698	17,464	183	83,051

2. TWIN TRANSITION IN AFRICA

The African labour market is undergoing a simultaneous transformation shaped by two major forces: the digital transition and the green transition. These interconnected evolutions, often referred to as the "twin transition", are redefining employment landscapes across the continent.

Table 2 shows a progressive increase in the share of job postings requiring green and digital skills. Between 2023 and 2025, green skill demand rose from 1.73% to 2.09% of total postings, while digital roles saw an even more substantial rise, from 56.79% to 61.12%. Although the absolute number of postings declined in 2024 and 2025, likely due to cyclical or external economic factors, the proportional increase reflects the structural importance of digital and green competencies in modern African economies.

Table 2 – Job Postings by Africa - Lightcast Online Job Postings

Year	Unique Postings (Africa)	Green	Green Share%	Digital Postings	Digital Share%
2023	2570080	44378	1.73%	1459564	56.79%
2024	1976122	39929	2.02%	1186816	60.06%
2025	638114	13326	2.09%	390018	61.12%

Disaggregated data in Table 3 further illustrates the geographic spread of digital demand. South Africa leads significantly, posting over 1.8 million digital vacancies between 2022 and 2025, followed by Nigeria, Morocco, and Egypt. Kenya and Algeria also demonstrate high volumes, indicating broader digital diffusion across Anglophone and Francophone regions alike. Countries such as Côte d'Ivoire, Ghana, and Uganda show growing adoption, suggesting early but consistent engagement with digital transformation.

Green skills are particularly concentrated in South Africa, Nigeria, Egypt, and Morocco. Commonly requested roles include solar engineers, environmental compliance specialists, and energy auditors, with skillsets such as ISO 14000 certification, renewable energy systems design, and waste management proving particularly salient. Skills like PVsyst (photovoltaic system design), environmental laws, and climate change adaptation are frequently referenced, pointing to a maturing green economy.

Table 3 – Digital Job Postings by Africa - Lightcast Online Job Postings

Country	2022	2023	2024	2025
Algeria	21582	29512	29951	17205
Angola	2067	2067	1352	399
Belize	712	626	214	70
Benin	492	854	611	127
Botswana	1573	1997	473	137
Burkina Faso	1219	951	819	202
Burundi	733	533	555	174
Cameroon	4211	2812	1302	280
Central African Republic	2251	1908	1012	203
Chad	852	717	813	318
Côte di'Ivoire	1170	1508	1522	7209
Djibouti	503	355	370	150
Egypt	147805	188310	141751	38285
Eritrea	45	22	23	9
Ethiopia	4233	4874	2760	777
Gabon	4688	1754	702	178
Gambia	219	131	149	55
Ghana	4717	8479	2956	5144
Guinea	498	520	525	146
Guinea - Bissau	158	43	22	6
Kenya	86419	119252	93849	34999
Laos	2834	2189	1455	190
Lesotho	572	265	298	76

Country	2022	2023	2024	2025
Liberia	723	640	524	105
Libya	5655	768	548	194
Madagascar	1022	1134	1034	393
Malawi	997	843	707	208
Mali	2517	1387	806	187
Mauritania	631	348	315	118
Mauritius	10643	9177	8944	4199
Morocco	216318	181737	121667	58196
Mozambique	3705	2318	1837	540
Namibia	37571	9568	235	
Niger	3655	1479	1041	292
Nigeria	39594	164113	129882	63459
Rwanda	1072	1208	1038	377
Senegal	8787	6649	3948	825
Sierra Leone	1060	588	712	168
Somalia	2857	2210	1747	447
South Africa	490236	626284	541194	141370
South Sudan	2760	1191	1111	385
Sudan	3645	1357	1402	414
Tanzania	1042	1203	1517	663
The Republic of Congo	786	704	778	279
Togo	292	543	246	85
Tunisia	68789	53290	73241	7698
Uganda	13167	13717	5770	2123

Country	2022	2023	2024	2025
Zambia	3685	3724	2429	750
Zimbabwe	2742	3705	659	204

The digital-green nexus is especially evident in occupations that combine ICT and sustainability, such as smart meter technicians, environmental data analysts, and engineers in energy management systems. The rise in these roles suggests growing employer emphasis on technological solutions to environmental challenges, reflecting global patterns of convergence.

2.1.   AI Trends in the African labour market

Artificial Intelligence is rapidly emerging as a transformative force in the African labour market. The volume and variety of AI-related skills captured in online job postings from 2022 to 2025 reveal increasing employer demand for talent capable of developing, deploying, and managing intelligent systems.

South Africa is at the forefront, with high volumes of postings requiring skills in machine learning, artificial intelligence, deep learning, Apache Spark, and predictive modelling. The top AI-related occupations include data scientists, software developers, and data engineers, reflecting the need for professionals with strong analytical and programming competencies. South Africa's labour market also reveals demand for advanced frameworks such as TensorFlow, PyTorch, and Scikit-learn, alongside operational tools like Databricks and MLOps.

Egypt, Morocco, Nigeria, and Kenya also display growing interest in AI profiles. Egypt's job postings emphasize machine learning, predictive modelling, and natural language processing. Morocco demonstrates strong demand for Robot Framework and Apache Spark skills in QA and engineering roles, while Nigeria sees growth in roles integrating AI with marketing, software development, and environmental management.

The skillsets demanded indicate a clear diversification of AI applications, ranging from core software and data science roles to cross-disciplinary functions such as business intelligence, digital content production, and cybersecurity. In particular, AI-related skills are increasingly embedded in managerial and strategic roles such as IT directors, business analysts, and project managers.

Emerging AI applications also highlight sectoral innovation, including computer vision, chatbots, recommender systems, automation systems, and text retrieval. This suggests that AI is not only a driver of efficiency but also a foundation for new product development and customer engagement.

Countries such as Tunisia, Algeria, and Namibia, though smaller in volume, also exhibit significant AI activity, particularly in roles associated with education, software engineering, and public administration. The consistent rise of AI skill demand across these diverse contexts underlines the growing digital maturity of African economies.

To fully capitalize on these trends, African nations must invest in AI education, foster ecosystems for innovation, and strengthen linkages between academia and industry. Building capacity in foundational AI skills, alongside domain-specific applications, will be essential to ensure that the workforce is prepared for an increasingly automated and data-driven future.

3. LANGUAGES AND LOCATIONS

Figure 3 provides a comparative breakdown of language use in job postings across Egypt, Kenya, Morocco, and Tunisia. English dominates in Kenya (95.51%) and Egypt (91.35%), underscoring its status as a lingua franca in both Anglophone regions and international-facing sectors such as ICT and business services. In contrast, French is prominent in Morocco (56.69%) and Tunisia (16.90%), mirroring their colonial legacies and continued regional cooperation within Francophone institutions.

Arabic, while a key national language, appears less frequently in job postings, likely due to the international orientation of many sectors represented in online platforms, where English and French are preferred for wider reach. The low shares of postings in Arabic (not exceeding 8.25% in Egypt) suggest a digital and formal labour market skewed toward globalised professional norms.

Regional language patterns align closely with the economic geography of the labour market. Major metropolitan regions, such as Casablanca-Settat in Morocco, Al Qahirah in Egypt, Tunis in Tunisia, and Nairobi's surroundings in Kenya, serve as linguistic and economic hubs. These regions concentrate both the volume of job postings and the use of English or French, reinforcing the link between language skills and employability in competitive urban labour markets.

Complementary insights from Google Search trends (Figure 4) further support this linguistic-economic linkage. In Kenya, interest in digital careers, such as "Software Developer", far exceeds traditional roles like "Carpenter", with sustained and increasing search activity over the past five years. This trend is particularly visible in urban centres like Nairobi, Eldoret, and Kisumu.

The usage of languages in job postings reflects various factors including historical influences, educational systems, and the orientation of the job market towards global or regional trade. In all four countries, the predominance of European languages in job postings indicates a focus on engaging with international business environments. The lower use of local languages like Arabic could suggest that domestic businesses are looking to attract talent with multilingual capabilities or that international companies are a significant presence in these job markets. For labour market analysis, these language trends are crucial. They signify the need for language skills in job candidates, which can have implications for educational policies and highlight the necessity for language training as part of workforce development strategies.

Figure 3 – Languages by Locations – Comparison between ETF Countries – ETF database.
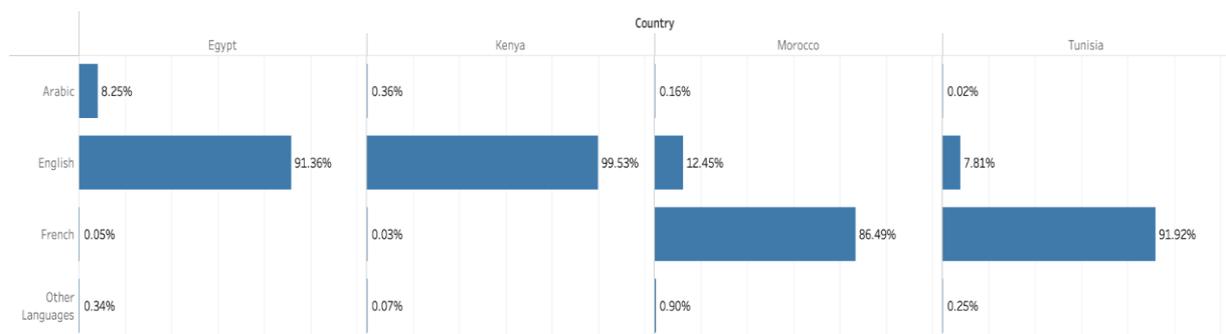
When comparing interest in "Artificial Intelligence" and "Solar Energy" over the long term, both topics have shown marked growth, with AI experiencing a dramatic rise since 2021. City-level data confirms that this interest is concentrated in digitally dynamic regions of Kenya, such as Nairobi, Nakuru, and Mombasa. The related queries reveal the nature of emerging digital and green aspirations among users. In AI, breakout queries include "AI chat", "AI generator", and "ChatGPT AI", pointing to increasing public engagement with generative technologies. In green energy, terms such as "solar panel", "solar battery", and "solar energy" dominate, reflecting practical, solutions-oriented interest.
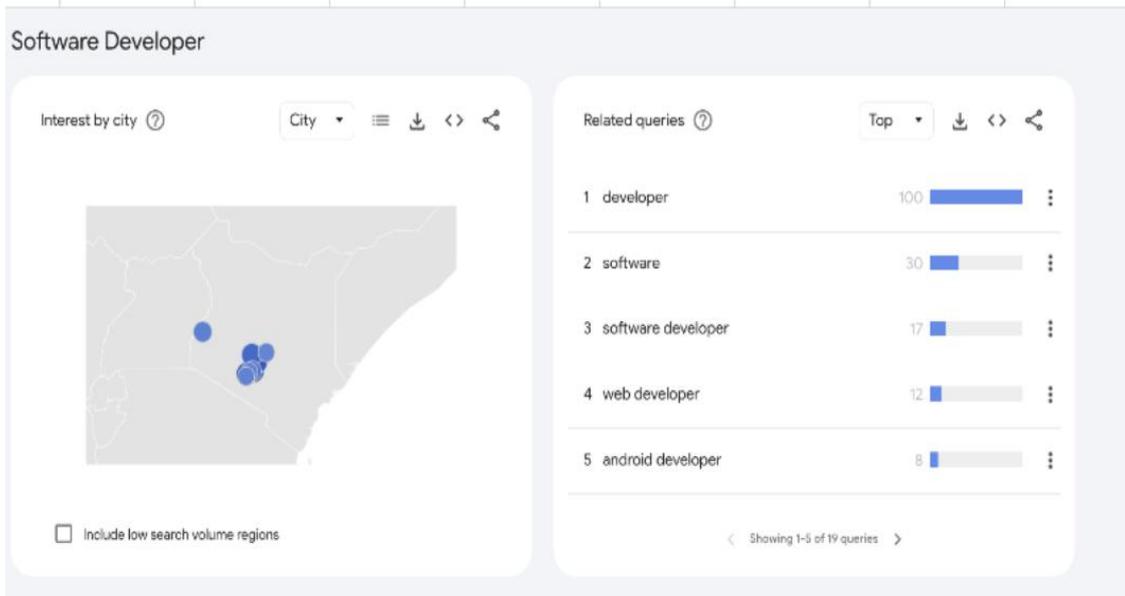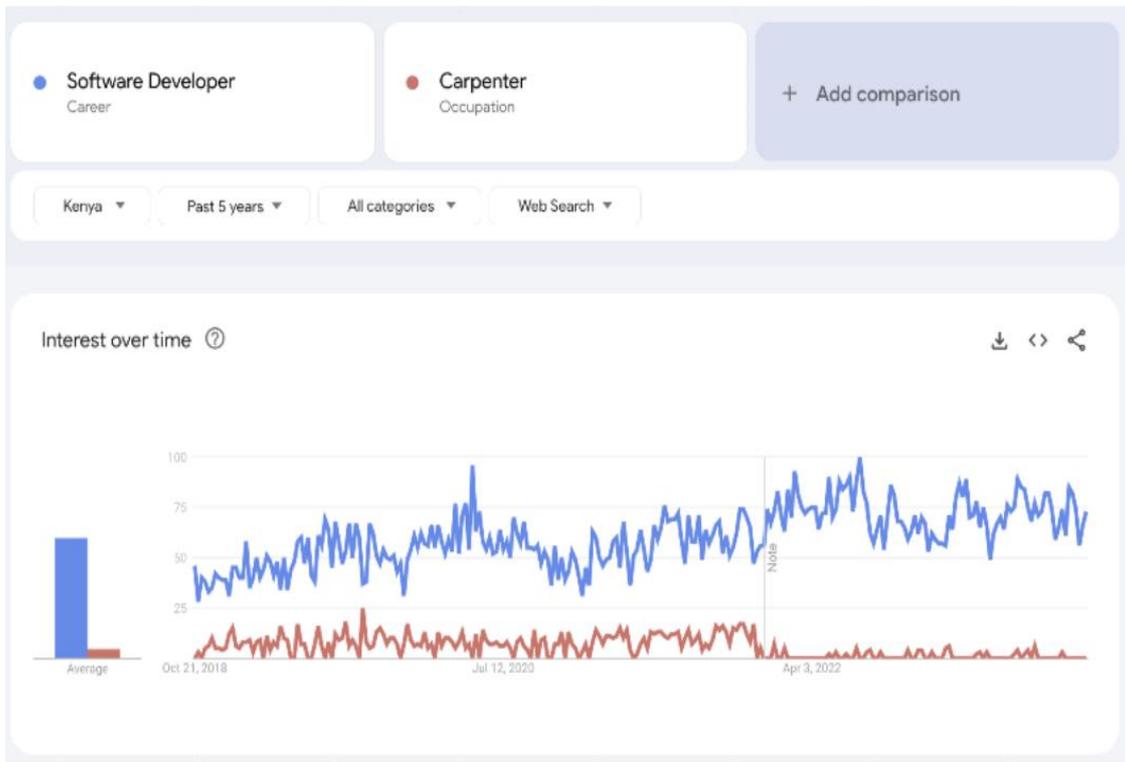
These combined signals, from job postings and search analytics, demonstrate the central role of language and geography in shaping access to future-facing jobs. They also highlight how urban areas are emerging not only as economic but also as cognitive centres, where digital fluency and environmental awareness are accelerating most rapidly.

Analysis of Google Trends data reveals significant linguistic variation in job search behaviours across African countries, shaped by historical, educational, and economic contexts. Language use in online searches serves as a proxy for both labour market orientation and the cultural-linguistic composition of the workforce.

In countries with strong historical and economic ties to Anglophone systems, such as Kenya, English dominates job search queries, particularly in globally integrated sectors like ICT. Conversely, in Francophone North African countries such as Morocco and Tunisia, French remains prominent, especially in sectors influenced by colonial legacies or educational systems where French remains the primary language of instruction, including healthcare and public administration. Arabic, while widely spoken, tends to feature more in searches for localised or informal trades. For example, searches for occupations such as carpenters in Egypt or Morocco are frequently conducted in Arabic, reflecting the domestic and community-based nature of these roles. Sector-specific patterns also emerge. In Tunisia's tourism sector, bilingual searches in both Arabic and French are common, driven by the need to cater to a diverse international clientele. Academic job seekers in Egypt often search in English, especially when targeting international teaching and publishing opportunities. Similarly, healthcare professionals in Morocco typically conduct job searches in French, in line with the language of medical training and clinical practice.

These distinctions reflect how language choice in job search behaviour is shaped by the occupational profile, level of formalisation, and international orientation of the sector. For employers and platforms, recognising these linguistic patterns is essential for effective outreach and inclusive labour market access. For job seekers, strategically aligning the language of their searches with sectoral expectations can enhance discoverability and job matching outcomes.

Figure 4 – Compare Google Search in African countries.

4. OCCUPATION ANALYSIS

The occupational composition of online job postings across Egypt, Kenya, Morocco, and Tunisia reveals distinct patterns that reflect the educational profiles, sectoral specialisations, and labour market dynamics of each country. The distribution is presented according to major ISCO occupational groups, with "Professionals" and "Technicians and associate professionals" consistently dominating demand in all four countries (Table 3).

Professionals account for the largest share of postings in Egypt (48.56%) and Kenya (43.10%), followed by Tunisia (32.17%) and Morocco (31.92%). These high figures suggest strong employer demand for workers with tertiary education, especially in sectors such as ICT, education, health, engineering, and business services. The dominance of professional roles also aligns with broader trends in service sector expansion and the digitisation of work processes.

Technicians and associate professionals rank second across all countries, representing a substantial portion of postings in Tunisia (25.58%) and Morocco (22.80%). These roles, often requiring mid-level technical skills or vocational education, are essential for operational functions in healthcare, telecommunications, energy, and administrative services. Their high share reflects the increasing complexity of routine tasks and the rising importance of specialised, non-academic training pathways.

Managerial positions are prevalent in Kenya (21.31%) and Egypt (16.29%), indicating a relatively strong demand for leadership and coordination functions, possibly driven by the growth of private sector firms, international development initiatives, and start-up ecosystems in these countries. By contrast, Morocco (9.20%) and Tunisia (7.66%) report lower demand for such roles, potentially reflecting more hierarchical or public-sector-dominant employment structures.

Clerical support workers show substantial representation in Tunisia (18.23%) and Morocco (13.97%), while their presence is more moderate in Egypt (7.89%) and Kenya (7.74%). These positions often support formal sector institutions such as government agencies, financial services, and administrative functions, suggesting relatively robust bureaucratic and support service sectors in North Africa.

Service and sales workers also feature prominently in Morocco (12.93%) and Tunisia (9.16%), consistent with the significance of the hospitality, retail, and tourism sectors in these economies. In Egypt and Kenya, where service roles are less pronounced in online postings (5.21% and 4.09% respectively), informal employment in these domains may be underreported in formal digital datasets. Lower shares are observed across craft and related trades workers, plant and machine operators, and elementary occupations, particularly in Egypt and Kenya, where digital platforms may not fully capture demand in lower-skilled or informal sectors. Elementary occupations are highest in Morocco (4.26%) and Tunisia (2.79%), but still represent a relatively small portion of total demand. Skilled agricultural, forestry, and fishery workers are nearly absent from online postings in all countries, reaffirming the limited representation of agricultural jobs in formal vacancy platforms.

The data presented in Table 3 reflects a structural concentration of online labour demand in higher-skilled, service-oriented occupations, reinforcing the importance of advanced and intermediate skills in contemporary African labour markets. The findings call for greater investment in higher education, technical training, and managerial capacity development, while also recognising the underrepresentation of informal and lower-skilled employment in online data sources.

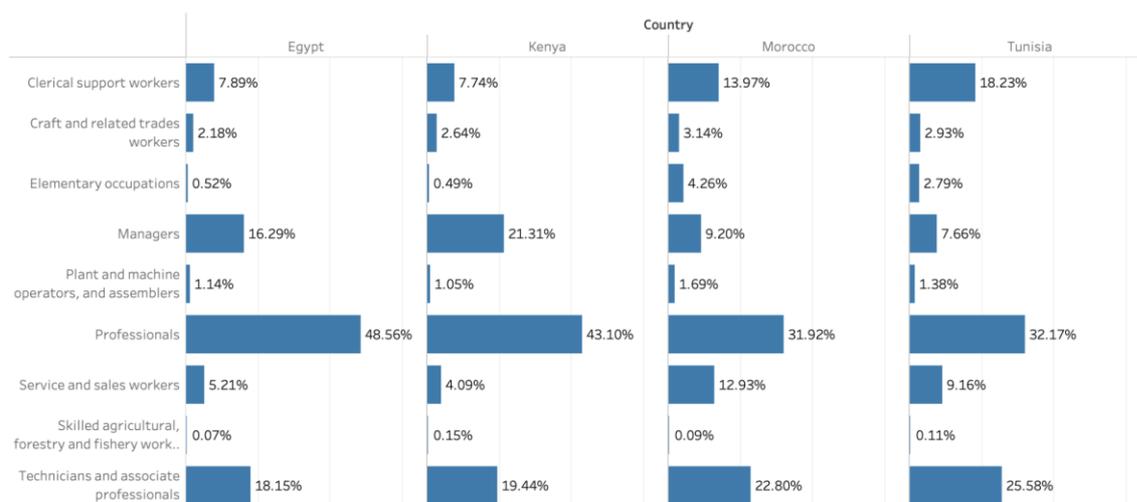*Table 3 – Occupation vs Countries – ETF database – Lightcast elaboration*

Figure 5 provides a comparative overview of the distribution of top occupations across Egypt, Kenya, Morocco, and Tunisia, highlighting occupational specialisations and national labour market structures. Several important patterns emerge from this analysis:

- High concentration of specific roles in Morocco and Kenya: Many occupations show a strong dominance in either Morocco or Kenya, indicating structural demand in their economies. For instance:
  - Retail and wholesale trade managers and Salespersons are overwhelmingly represented in Morocco (over 70%), likely reflecting the country's well-developed retail sector and strong commercial infrastructure.
  - Software developers and Web/multimedia developers are more prominent in Kenya (35% and 30%, respectively), consistent with its reputation as a regional digital hub and its expanding tech ecosystem, sometimes referred to as "Silicon Savannah".
- Tunisia's strong presence in administrative, education, and service roles: Tunisia demonstrates significant shares in roles such as:
  - Administrative and executive secretaries (39.03%)
  - Accounting associate professionals (23.74%)
  - Receptionists (27.87%)

This suggests a high level of formalisation and demand for clerical and support roles, perhaps linked to Tunisia's educated workforce and its reliance on administrative services and hospitality.

- Egypt's representation in technical and analytical roles: Egypt shows concentrations in:
  - Accountants (33.81%)
  - Engineering professionals (38.24%)
  - Secondary education teachers (30.76%)

This indicates a demand for technically skilled professionals and educators, in line with Egypt's investment in infrastructure and education reform.

Gendered and service-oriented roles across the region:

- Roles such as cleaners and helpers, receptionists, and personal care workers are primarily clustered in Morocco and Tunisia, suggesting persistent demand for gendered service jobs in hospitality and domestic sectors. Morocco, for instance, dominates cleaners and helpers

(89.38%) and contact centre information clerks (68.80%), pointing to outsourcing and tourism-driven service economies.
- Uneven distribution in technology and management roles: While Kenya and South Africa (not in this figure but relevant in prior sections) dominate in AI and software roles, Egypt and Morocco also contribute to technical roles like systems analysts and IT service managers, though in smaller proportions. Management analysts, financial advisors, and public relations professionals are more evenly spread across the four countries, indicating widespread interest in strategic, customer-facing roles.

Figure 5 - Top occupations
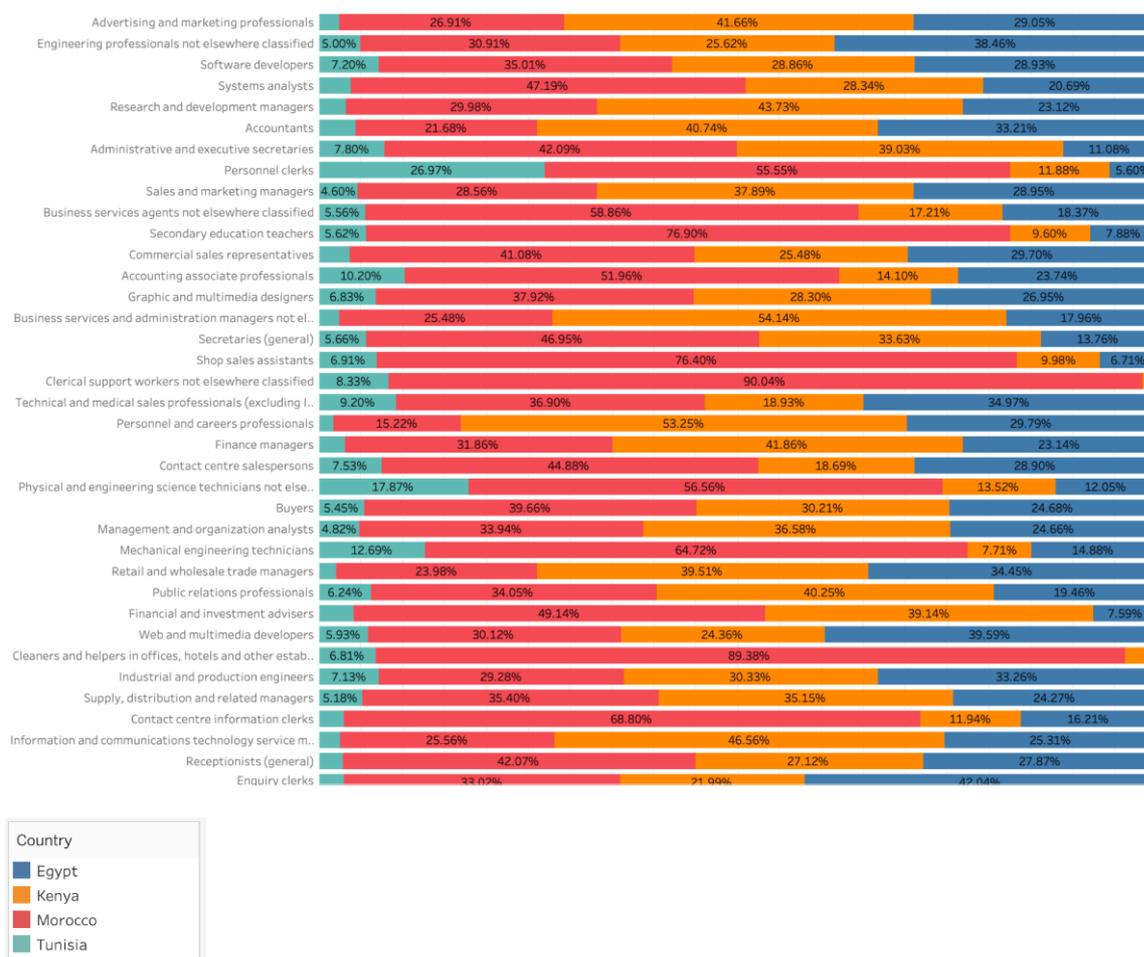
Figure 5 reflects how occupational demand across these countries is influenced by each country's economic profile, sectoral strengths, and workforce development strategies. Kenya and Egypt show stronger digital and analytical specialisations, Morocco maintains a dominant role in retail and service positions, and Tunisia leans toward administrative and hospitality-related employment. These insights can support targeted policy and training interventions aligned with each country's economic trajectory and labour market needs.

4.1. AI Occupations and Skills in Demand in Africa

The growing adoption of AI across African labour markets is reflected in the clear surge of employer demand for AI-related occupations and skillsets. Drawing from extensive job posting data, a number of

trends can be identified that point to an evolving technological ecosystem where data science, software development, and systems architecture play critical roles.

- Data-Centric Roles Dominate AI Labour Demand: At the top of the list is the Data Scientist occupation, particularly associated with Machine Learning (11,541 postings), followed by competencies in Artificial Intelligence, Predictive Modelling, TensorFlow, and Apache Spark. This strong demand for data science professionals indicates that organizations are increasingly relying on data-driven decision-making, algorithmic modelling, and analytics as key drivers of innovation and efficiency.
- Software Development as the Backbone of AI Deployment: The second major cluster of demand centres on Software Developers and Engineers, with significant needs for expertise in Machine Learning (7,098 postings), Artificial Intelligence (6,988), and tools like Apache Spark, Chatbots, and Deep Learning frameworks (e.g., PyTorch, TensorFlow). These roles are fundamental in building and operationalizing AI systems, ranging from automation tools and recommendation engines to conversational interfaces.
- Rising Demand for AI Integration in Broader Occupations: AI is increasingly embedded across a wide range of functions beyond traditional tech roles. Examples:
    - IT Managers/Directors, Project Managers, and Product Managers, all of whom are now expected to possess AI familiarity.
    - Marketing Specialists and Digital Content Producers, who are integrating Text Retrieval Systems and AI-driven analytics into their workflows.
    - Cybersecurity Analysts, Communications Managers, and even Office Assistants who engage with AI tools in increasingly digitized work environments.
- Tool-Specific Demand Reflects Applied AI Maturity: broad categories like "machine learning" or "AI", employers increasingly specify operational tools, suggesting a mature and application-driven market. Examples:
    - Apache Spark (5,236 for Data Engineers, 3,048 for Data Scientists)
    - TensorFlow, PyTorch, and Scikit-learn as standard libraries for model training
    - Databricks, MLOps, and Keras, reflecting the integration of model deployment and lifecycle management
    - Text Retrieval Systems, with high use cases in marketing and web development contexts
- Cross-Functional and Emerging Roles: The data reveals a diffusion of AI-related competencies across roles in:
    - Business Intelligence and Analytics (e.g., Analysts and Architects)
    - Network Engineering and Automation Systems
    - Mobile App Development, Graphic Design, and UI/UX - all increasingly requiring AI-enabled capabilities
- Geographic Spread and Sectoral Implications: While the specific country breakdown is not provided in this segment, previous chapters indicated that South Africa, Egypt, Kenya, Morocco, and Nigeria are leading in AI job postings. These roles are likely spread across sectors such as finance, telecommunications, healthcare, education, and energy - areas where digital transformation is progressing most rapidly.

The African AI labour market is rapidly diversifying, with demand extending well beyond core technical roles to encompass managerial, creative, and operational functions. Employers are not only seeking talent with foundational AI knowledge but also expect fluency in specific platforms, programming libraries, and applied tools. This suggests an urgent need for upskilling initiatives, industry-academia collaboration, and policy frameworks that can scale AI literacy across the continent's workforce. To remain competitive and inclusive, national strategies must support both advanced training for tech specialists and broader integration of AI skills across all levels of the workforce - from entry-level roles to executive leadership.

5. GREEN AND DIGITAL SKILLS

As global attention turns increasingly toward climate change and sustainability, African labour markets are also beginning to reflect this shift through a growing focus on green skills. Green skills refer to the knowledge, abilities, and values needed to live in, develop, and support a sustainable and resource-efficient society. These include competencies in areas such as renewable energy, sustainable agriculture, waste management, and environmental compliance, which are becoming progressively integrated into job roles across various sectors.

In Africa, the expansion of green skills is driven by both necessity and opportunity. Climate-related vulnerabilities, such as water scarcity, desertification, and energy deficits, are prompting governments and businesses to prioritize sustainability initiatives. At the same time, international investments and policy commitments - such as those outlined in the African Union's Agenda 2063 and the UN's Sustainable Development Goals - are reinforcing the transition toward greener economies. Online job postings reveal that green skills are no longer confined to traditional environmental roles but are now embedded across a wide range of occupations. From sales and construction to software development and finance, demand for competencies such as ISO 14001, solar energy systems, and energy efficiency is on the rise. This broad integration suggests that green transitions are not sector-specific but system-wide, requiring widespread upskilling and adaptation.

This trend presents a dual opportunity: to align economic growth with environmental sustainability and to create inclusive, future-ready employment pathways. However, it also highlights the urgent need for responsive training systems, cross-sectoral policy coordination, and investment in green infrastructure. In the sections that follow, we explore the types of green skills in demand, their occupational distribution, and the implications for workforce development strategies across the continent.

Green skills are becoming increasingly embedded in Africa's labour markets, aligning with global environmental targets and regional sustainability goals. Recent data highlights a diffusion of environmentally relevant skills and occupations across multiple sectors, not only in renewable energy but also in construction, transport, manufacturing, education, and administration..

Figure 6 showcases the most commonly requested green concepts in job postings. "Renewable energy" leads overwhelmingly with nearly 13,000 mentions, followed by "car sharing", "ISO 14001", "solar energy", and "energy efficiency." These terms reflect both the technological and regulatory dimensions of the green transition - spanning infrastructure, standards, and behavioural change.

In terms of occupational alignment, several green concepts are closely tied to specific job profiles. For example, 'covoiturage' (car sharing) frequently appears in roles related to business services agents, administrative clerks, and marketing professionals - highlighting the intersection between green mobility and commercial functions. Similarly, 'isolation thermique' (thermal insulation) is strongly associated with systems analysts, construction supervisors, and sales representatives, indicating demand for energy-efficient building solutions. Postings referencing 'renewable energy' are most common in engineering and R&D roles, suggesting that innovation and infrastructure projects are key drivers. Engineering professionals not elsewhere classified reported 730 postings for renewable energy, followed by 717 referencing ISO 14001 environmental standards. Research and development managers accounted for over 600 mentions across renewable energy, agroforestry, and energy efficiency, emphasizing their role in leading green innovation.

Green demand extends to digital and creative domains as well. Software developers were associated with both 'renewable energy' and 'covoiturage', while web and multimedia developers and systems analysts are involved in promoting or integrating green services through digital platforms. This points to an emerging convergence between sustainability and digital transformation.

Use cases are equally diverse:

- In energy: Electrical engineers, software developers, and sales managers contribute to deploying renewable energy systems.
- In transport: Car-sharing strategies are reflected in marketing, logistics, and clerical positions.
- In construction: Energy-efficient practices such as insulation and sustainable materials impact construction supervisors, architects, and labourers.
- In administration: ISO 14001 and sustainable business principles are appearing in postings for accountants, HR specialists, and procurement officers.

The green transition is influencing a broad swath of the African job market. Importantly, green skills are no longer confined to specialised technical domains - they are increasingly present in everyday roles, reflecting a systemic shift toward sustainability. To capitalise on this, vocational and tertiary education systems must adapt curricula to reflect environmental competencies, particularly in sectors undergoing rapid transformation.

This growing demand also implies significant opportunities for inclusive employment. Many green roles - especially those linked to energy efficiency, urban mobility, and sustainable construction - are accessible to mid-skilled workers, enabling broad workforce participation in the green economy. As Africa continues to urbanise and invest in infrastructure, embedding green skills across all education and employment systems will be crucial to ensuring a resilient, sustainable future.

Figure 6 – Green skills word-cloud
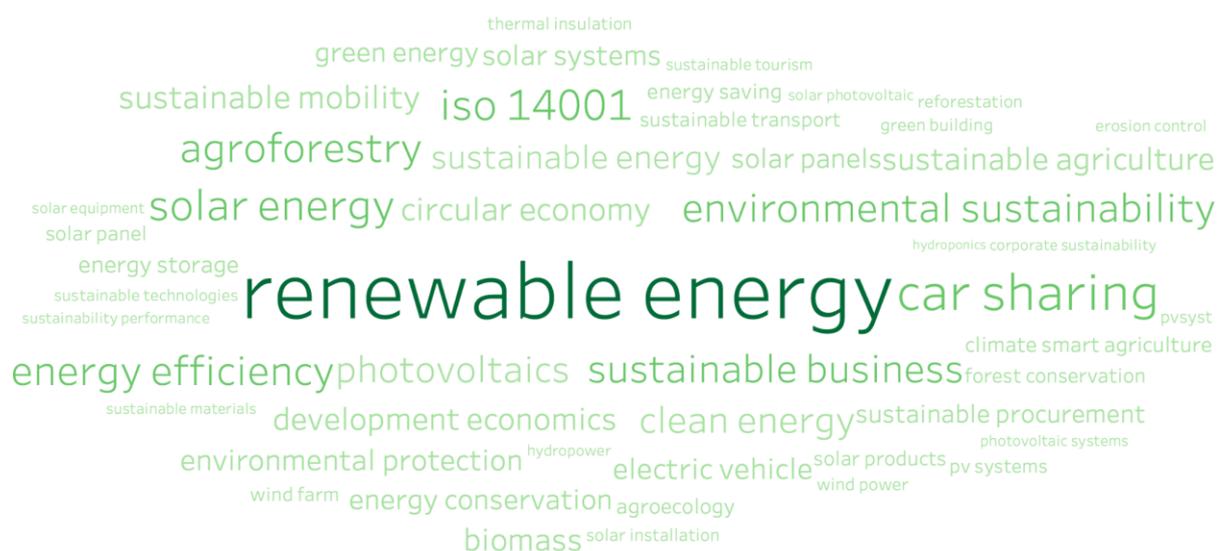
Figure 7 illustrates the distribution of occupations based on their share of digital and green skill requirements. Occupations in the upper-right quadrant - such as environmental engineers, protection professionals, and research managers - demonstrate high levels of both green and digital integration. These roles are central to driving innovation in areas like environmental monitoring, renewable energy systems, and sustainability analytics.

Several environmental roles exhibit strong digital engagement. Environmental engineers show a green skill share of 17.8% and a digital share exceeding 80%, highlighting their role in data-driven environmental

solutions. Similarly, environmental protection professionals report over 15% green skill share, often requiring digital tools for compliance monitoring, GIS, and reporting. Convergence is also evident in occupations like electrical engineers and analysts, where digital design, energy simulation, and smart grid technologies merge with sustainability goals. Finance, marketing, and public relations roles - traditionally not considered green - also show increasing green-digital integration through sustainability reporting, green investment platforms, and digital campaigns.

Some green-intensive occupations remain digitally underserved. Forestry technicians and agricultural managers have high green relevance (over 10%) but relatively low digital uptake, reflecting sectoral gaps in digital infrastructure or training. These roles represent key opportunities for targeted reskilling and digital inclusion strategies. On the other end of the spectrum, several clerical, retail, and hospitality occupations demonstrate low shares of both green and digital skills, highlighting areas at risk of stagnation if upskilling efforts do not reach these workers.

The online data underscore a growing intersection of sustainability and digitalisation in African labour markets. To support inclusive and forward-looking workforce development, policies should promote hybrid skillsets across sectors - not just in high-tech or environmental roles, but throughout value chains. Investments in training infrastructure, digital access, and modular green learning pathways can help bridge current gaps and ensure that the twin transitions foster opportunity rather than division. Strategic partnerships between education providers, employers, and governments will be essential to mainstream green-digital literacy and ensure no occupation is left behind in Africa's transformation toward a resilient and inclusive future of work.

Figure 7 – Digital share and green share – ETF database – African countries – Lightcast elaboration
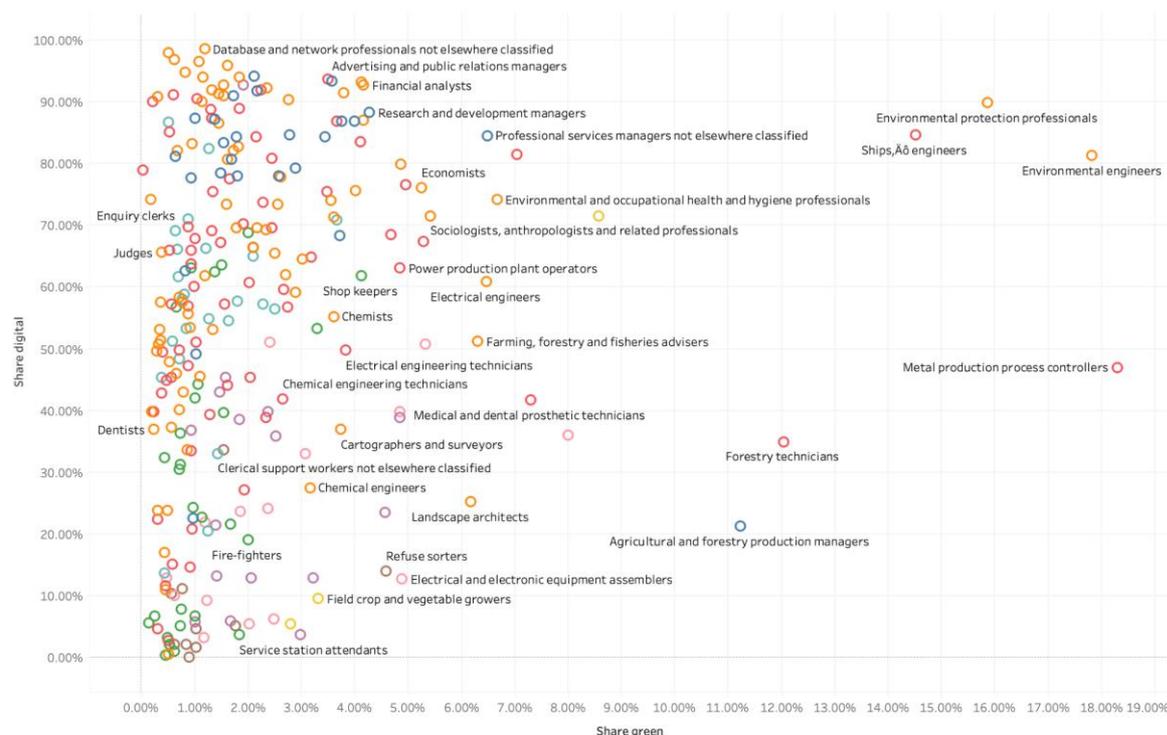

Figure 8 presents percentages associated with IT and not-ICT professions across the different countries. Each bar represents the proportion of professionals in that specific field within the given country.

Digital skills have become a critical pillar of workforce development across African labour markets, enabling participation in both local and global digital economies. The growing integration of information and communication technologies (ICT) across industries - from business operations to creative sectors - has led to a surge in demand for foundational and advanced digital competencies.

Figure 8 summarises the most frequently requested digital skills based on online job postings. At the core of the demand are essential digital literacy skills: "computer literacy" appears in nearly 800,000 postings (14.3% of total mentions), followed closely by "Microsoft Office" and "office software", together accounting for over 1 million mentions. These are foundational capabilities required in administrative, clerical, and service roles, highlighting the pervasiveness of basic ICT across occupations. The next tier of demand features more technical and role-specific digital skills. For instance, database knowledge (4.2%), spreadsheet software (4.1%), and computer programming (4.1%) are increasingly embedded in job profiles for analysts, engineers, and finance professionals. Skills related to data processing (2.4%), business ICT systems (2.8%), and data analysis (2.9%) underline the growing need for analytical capabilities in middle- and high-skilled roles.

Creative and marketing functions also show a digital footprint. Skills such as social media marketing (1.9%), digital marketing techniques (1.4%), and using creative suite software (1.5%) are common in roles involving communication, content creation, and brand strategy. The appearance of programming languages like SQL, Java, PHP, and Python, as well as skills related to software design patterns, query languages, and cloud technologies, reflects rising demand for developers, digital engineers, and ICT specialists. Use cases across African markets include:

- Administrative and education sectors: Requiring proficiency in word processing, presentation tools, and spreadsheets.
- Business and finance: Leveraging database systems, SQL, and data analytics for decision support and automation.
- Tech and development roles: Demanding programming skills (Python, Java, scripting), web development, and cloud-based systems.
- Marketing and content creation: Using creative and collaboration software, managing social media platforms, and applying digital marketing strategies.

This evidence supports the view that digital skills are not limited to the ICT sector but are widely distributed across economic activities. The inclusion of skills like "e-learning", "cloud technologies", and "ICT system administration" points to a workforce increasingly engaged in hybrid and digitalised environments. Public and private stakeholders should prioritise the integration of digital competencies into national education and training systems. Upskilling initiatives targeting youth, women, and underserved groups will be key to building an inclusive digital economy. In doing so, Africa can not only meet rising employer expectations but also enable broader socioeconomic development through digital transformation.

Figure 8 – Digital skills word-cloud

6. CONCLUSION AND POLICY RECOMMENDATIONS

Africa's labour markets are undergoing a fundamental transformation shaped by the dual forces of the green and digital transitions. While distinct in nature, these transitions are increasingly interconnected, reshaping both the demand for skills and the structure of employment across sectors. Evidence from job postings and digital trace data demonstrates a growing demand for workers equipped with green knowledge - such as energy efficiency, renewable energy systems, or sustainable transport - and digital competencies, including data analysis, software development, and ICT system management.

This twin transition is generating new opportunities, particularly in emerging sectors such as sustainable construction, renewable energy deployment, digital services, and smart mobility. However, the demand is uneven across countries and occupations, requiring targeted policy action to ensure inclusiveness and sustainability.

Green transformation is deeply embedded in roles such as engineers, R&D managers, sales professionals, and technicians, with growing reference to concepts such as ISO 14001, photovoltaics, and car sharing. Digital transformation cuts across almost all occupations. Foundational digital skills like office software and computer literacy are now near-universal requirements. More advanced skills - such as Python, SQL, or digital marketing - are increasingly concentrated in tech, business, and data-centric roles.

Overlap is rising: occupations like software engineers, systems analysts, or environmental engineers often require both green and digital competencies, demonstrating convergence.

Sector	Green Dimension	Digital Dimension	Use case (examples)
Renewable Energy	Solar, wind, ISO 14001	Data monitoring, cloud platforms	Engineers using digital twins to simulate energy output in solar farms

Sector			
Construction	Thermal insulation, sustainable materials	BIM (Building Information Modelling), CAD tools	Architects designing zero-emission buildings using advanced digital modelling
Transport & Mobility	Car sharing, electric vehicles	GPS integration, real-time data systems	Digital platforms coordinating sustainable urban mobility services
Agriculture & Agroforestry	Climate-smart agriculture, reforestation	IoT sensors, satellite data	Farmers using drones and AI to monitor soil conditions in reforestation efforts
Education	Environmental literacy	E-learning platforms, digital content creation	Schools offering hybrid courses on climate and digital tools for young learners
Manufacturing	Energy-efficient production	Smart systems, industrial automation (Industry 4.0)	Factories optimising energy use through digital control systems

Some policy recommendations:

1) Mainstream Twin Transition Skills into Education Systems: Integrate green and digital topics into curricula at all levels (TVET, higher education, secondary).
    a) Prioritise interdisciplinary skills: e.g., digital tools for green energy management, or sustainability in ICT operations.
    b) Encourage project-based learning and collaborations with industry to simulate real-world challenges.
2) Incentivise Skills Development in Strategic Sectors
    a) Provide subsidies, tax credits, or grants for companies investing in upskilling/reskilling workers in green/digital areas.
    b) Support training for mid-skilled roles such as installers, analysts, or technicians where transitions are most intense.
3) Enhance Labour Market Intelligence and Forecasting
    a) Continue to invest in real-time LMI systems based on job postings and online profiles to track skills shifts.
    b) Develop green and digital skill indexes to monitor gaps by region, occupation, and education level.
4) Promote Inclusive Access
    a) Ensure digital and green training is available outside capital cities and to underrepresented groups (e.g., women, rural youth).
    b) Develop portable credentials and micro-certifications to support alternative career pathways.
5) Foster Partnerships with Industry and International Actors
    a) Encourage collaboration between governments, employers, international development partners, and educational institutions.
    b) Use public-private partnerships to co-design responsive training programs and facilitate apprenticeships.

The green and digital transitions are not separate challenges - they are joint opportunities. Africa has a unique chance to leapfrog legacy systems and shape a labour market that is sustainable, inclusive, and future-proof. But this requires bold investment in people, systems, and institutions. Embedding green and digital skills across the workforce is not just a policy imperative - it is a strategic necessity.

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