GREEN AND DIGITAL SKILLS ANALYSIS IN 4 AFRICAN COUNTRIES

BASED ON ONLINE JOB ADS DATA

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The dashboards and this report are accessible at:

- ACQF. Skills Data Focus – Green Skills. https://acqf.africa/skills-data-focus/green-skills
- ACQF. Skills Data Focus – Green Dashboard. https://acqf.africa/skills-data-focus/big-data-lmi-green-dashboard-africa

CONTENTS

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

The Green Transition will enable job creation and economic growth but requires adequate skills and competences. Moving towards a more sustainable way of living, producing and consuming has become a necessity to tackle climate change and its repercussions globally. ACQF and National Qualifications Frameworks have an important role to advance development of Green Skills.

Green skills – an important area of debate and policy action and which has become a priority in research (quantitative and qualitative) and social communication. Several international organisations are working on the analysis and taxonomies related to green jobs and skills.

Green skills are the "the knowledge, skills, values and attitudes needed to live, work and act in economies and societies that seek to reduce the impact of human activity on the environment".

Skills for the green economy consist of:

- **transversal skills**, linked to sustainable thinking and acting, relevant to all economic sectors and professions;
- **specific skills** needed to adapt or implement standards, processes and services to protect ecosystems and biodiversity and reduce energy, materials and water consumption;
- **highly specialised skills** needed to develop and implement green technologies such as renewable energy, wastewater treatment or recycling;

Skills for the green economy are also referred to as skills for green jobs, skills for the green transition or green skills.

In the dynamic job markets of Tunisia, Morocco, Kenya, and Egypt, the imperative to grasp and adapt to evolving skill requirements is more pressing than ever. This report is a deep dive into the power of data-driven insights through the prism of online job postings to chart the current contours and anticipate the future needs in digital and green skill sets across these nations. Drawing from an array of esteemed sources, we ensure a thorough sweep and high reliability of the data we collate, laying the groundwork for our conclusions.

The rapid pace of transformation within these job markets calls for a robust and nuanced approach to capturing and analysing skill-related data. Precise and trustworthy data are not just vital for pinpointing existing skill gaps; they are also predictive tools for anticipated changes within the occupational landscape. Insights suggest that by 2030, the skills required for employment will have shifted by 68%, reflecting a dynamic labour environment where investment in human capital becomes increasingly valuable. There is a clear trend towards a 'skills-first' hiring paradigm, which, as data shows, broadens the talent pool by 20%, raises female workforce participation by 24%, and boosts the engagement of Gen Z individuals by 10%. This shift towards skills rather than job titles emphasises the need to perceive professional roles as composites of essential skills and responsibilities.

Labour market policies in Kenya, Tunisia, Egypt, and Morocco are at a pivotal juncture as these nations strive to bridge the gap between qualifications and occupations, ensuring that the workforce is equipped with the requisite skills for emerging job markets. In Kenya, the focus has been on developing policies that facilitate the alignment of educational outcomes with market demands, recognizing the critical need for skills in driving economic growth and innovation. Tunisia, with its strategic emphasis on upskilling the workforce, has been working

on integrating vocational training with industry needs, thus enhancing job readiness among youth, and reducing unemployment rates.

Egypt's labour market policy includes initiatives to expand vocational and technical education, aiming to smooth the transition from education to employment, particularly in its rapidly growing industrial sectors. These efforts are complemented by investments in lifelong learning programs to ensure that the existing workforce can adapt to technological advancements. Morocco has placed significant emphasis on enhancing the employability of its graduates through a qualifications framework that aligns academic curricula with the competencies and skills needed in the labour market. The country's policy approach involves active engagement with private sector stakeholders to tailor training programs that directly respond to the dynamic requirements of the job market.

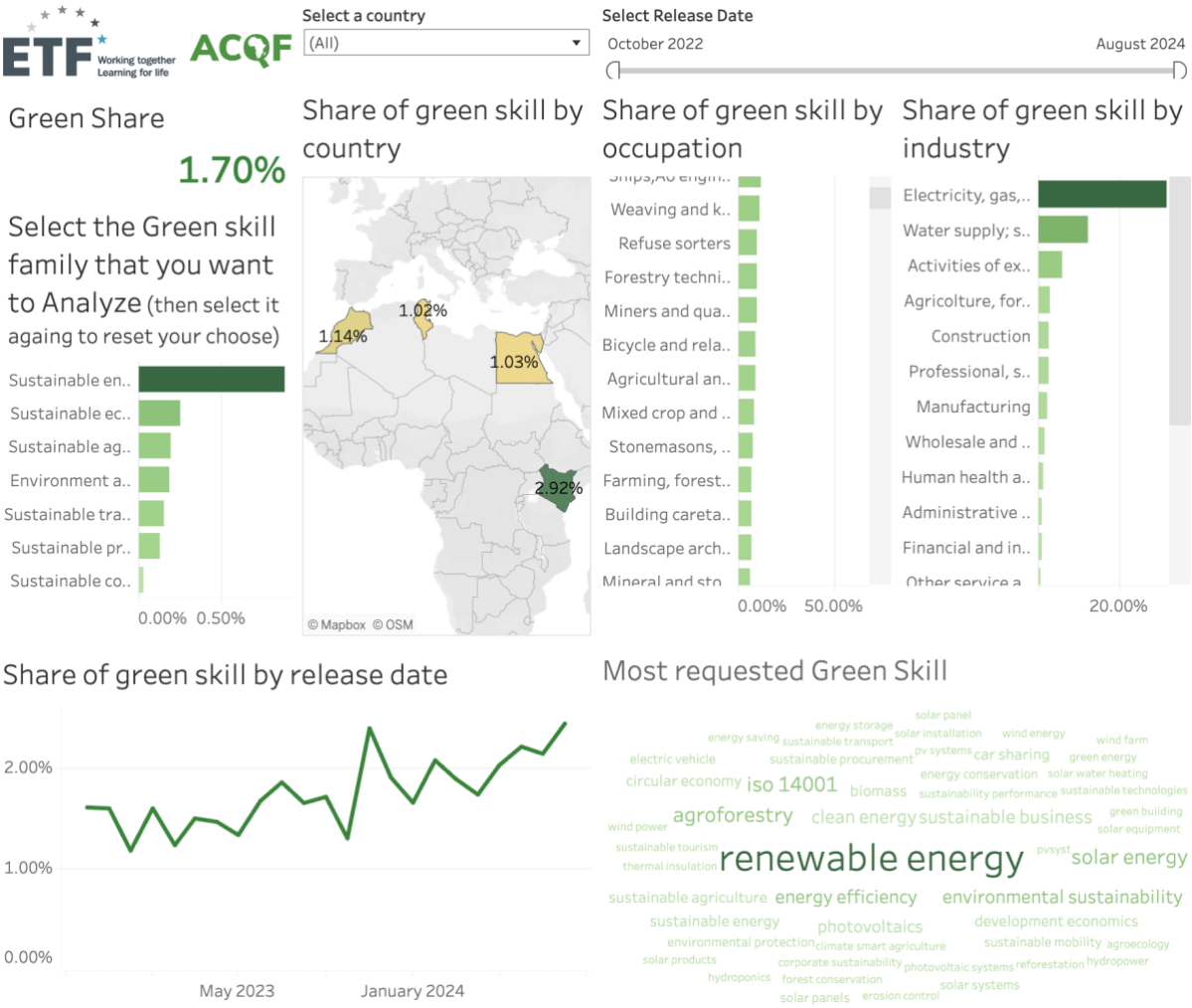
Across all four countries, the common thread is the strategic development of a skills policy that not only prioritises the relevance of qualifications but also fosters a culture of continuous learning and skills development. These policies reflect a commitment to transforming the labour market landscape, enabling each nation to compete more effectively on a global stage and ensuring economic resilience in the face of changing labour dynamics.

With a lens on the digital and green skill shares, this report delves into their representation in job postings within the African nations. Understanding the spread and demand for these skill areas will equip stakeholders to strategically navigate upcoming transitions, preparing a workforce that is adept and responsive to the emerging contours of a digital and eco-conscious economic landscape.

Figure 1 provides an overview of the job market across the four African countries of interest, revealing that a total of 1,059,059 unique job vacancies were identified after the initial collection of 4,091,209 vacancies. The deduplication process is fundamental to ensuring an accurate representation of labour demand, eliminating duplicate postings that could otherwise distort market analysis. Among the countries studied, Kenya exhibits the highest share of green skills within its job market, with 2.92% of postings requiring green competencies. This highlights Kenya's advancing transition towards sustainability-focused employment.

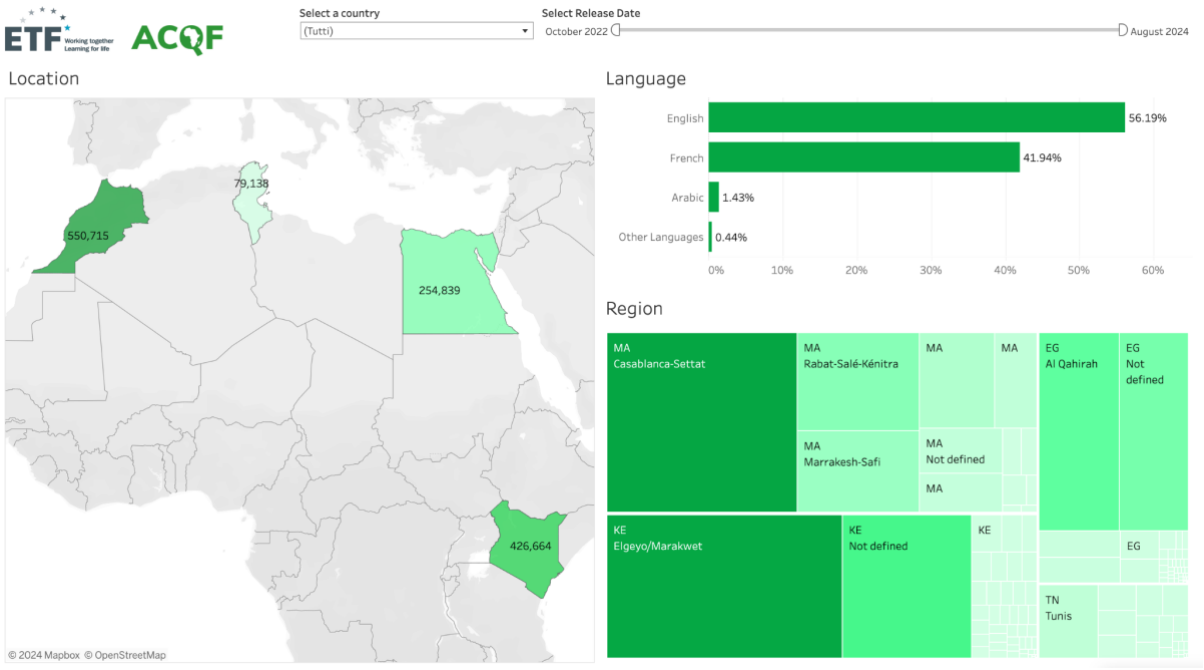
Morocco and Tunisia follow, with 1.14% and 1.03% green skill shares, respectively, while Senegal shows a slightly lower demand at 1.02%. The demand for green skills across these countries demonstrates varying stages of adopting green transitions, with Kenya showing the greatest progress. The occupations and industries with notable green shares are primarily concentrated in sectors related to electricity, gas, water supply, and agriculture—industries where sustainability is becoming increasingly crucial.

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



The data further indicates an upward trend in the green skill share from May 2023 to August 2024, underscoring a growing recognition of environmental skills as a key component of the labour market. The most requested green skills, such as renewable energy, agroforestry, and energy efficiency, reflect the emphasis on the transition to cleaner and more sustainable energy sources. For labour market analysts and policymakers, this data provides critical insights for guiding workforce development and investment in skills training, especially in sustainability-related domains.

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



Embracing skills-based hiring is key to tapping into the immense potential that a skilled workforce offers, recognizing that skills are increasingly becoming the new currency in today's labour market. This paradigm shift not only echoes global labour trends but also heralds a new era of socio-economic growth across Tunisia, Morocco, Egypt, and Kenya, each of which stands to gain from harnessing this momentum towards a sustainable, digital, and green economy.

Online job postings are an invaluable trove of data, offering a real-time barometer of labour market dynamics across these diverse African economies. They provide an immediate picture of employer demands, revealing the specific skills, job roles, and qualifications that are in high demand. Delving into this rich source enables researchers, policymakers, and educators across these nations to pinpoint industry trends, skills deficits, and the evolving landscape of job requirements—insights that are more immediate and granular than what is typically available through traditional labour surveys and reports. These postings not only capture the evolving priorities within the labour market but also serve as indicators of economic vitality, pinpointing sectors that are on an upward trajectory or those facing downturns. This data-driven strategy enhances the synergy between educational offerings and the labour market, guiding the development of curricula that meet the direct needs of the economy.

Leveraging online job postings for labour market analysis is indispensable in developing a workforce that is agile, skilled, and well-prepared. It's instrumental in nurturing economic advancement and in tailoring education and training to be both relevant and forward-looking for Tunisia, Morocco, Egypt, and Kenya. Table 1 categorises job postings from Tunisia, Morocco, Kenya, and Egypt across three key sectors: Agriculture, Manufacturing, and Services. Tunisia displays the lowest number of job postings in each sector compared to the other countries, with its highest number in Services at 44,222. Morocco shows a significant leaning towards Manufacturing with 55,201 postings, which is more than double the number of postings in Services at 402,154. Kenya exhibits a relatively balanced distribution between Manufacturing and Services, with 27,700 and 303,498 postings, respectively. Egypt has its highest number of postings in the Services sector at 173,175, while Manufacturing also remains substantial at 22,635. Several factors contribute to the differences in job postings among these countries:

1. Economic structure: Each country has different economic drivers and levels of industrialization. For example, Morocco's large number of manufacturing job postings may be due to its established industrial sector. Similarly, Kenya and Egypt's high numbers in Services indicate a more service-oriented economy.
2. Market size and labour force: The size of the country's labor market and the workforce can influence the number of job postings. Morocco and Kenya, for instance, may have larger or more dynamic labour markets in certain sectors, leading to more postings.

Regarding the relatively low numbers in agriculture, there are a couple of potential reasons:

1. Informal employment: Agriculture in many countries is characterized by informal employment, which may not be captured in online job postings. Small-scale and family-run operations dominate the sector and may not advertise online for vacancies.
2. Urbanization and industrialization: There is a global trend of urbanization and a shift towards service and manufacturing economies, often resulting in a proportionate decrease in agricultural employment opportunities, at least in the formal sense that would be advertised online.

In summary, while agricultural postings are lower perhaps due to the nature of the sector and how its jobs are filled, the substantial postings in Manufacturing and Services reflect the diverse economic landscapes and labour demands of these North and East African countries.

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

	Country			
Category Sector	Tunisia	Morocco	Kenya	Egypt
Agriculture	450	2,112	2,396	247
Manufacturing	9,668	55,201	27,700	22,635
Not defined	94	4,585	5,096	11,787
Services	44,222	402,154	303,498	173,175

2. LANGUAGES AND LOCATIONS

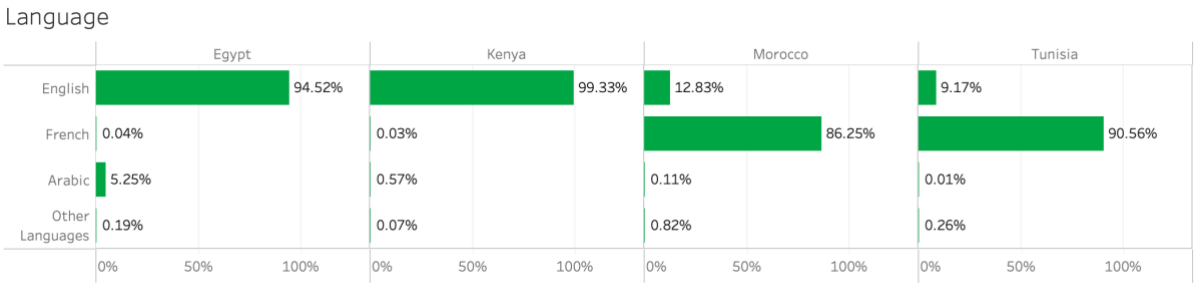
The data presented in Figure 2 and Figure 3 indicates the language distribution of job postings in Egypt, Kenya, Morocco, and Tunisia.

For Egypt, the dominant language in job postings is English, constituting 94.52% of the total, while Arabic, the official language, is used in only 5.25% of postings. French and other languages have a minimal presence. This reflects Egypt's orientation towards international business and the demand for English-speaking professionals in the job market.

In Kenya, English usage in job postings is overwhelmingly prevalent at 99.33%, with other languages barely represented. This aligns with Kenya's official language status for English and indicates that the job market highly values English proficiency. Morocco shows a significant distribution between French at 86.25% and English at 12.83%, with Arabic making up just 0.11%. The strong presence of French in job postings aligns with Morocco's historical ties to France and the use of French as a language of business. Tunisia has a similar distribution to Morocco, with a predominant use of French in 90.56% of job postings and English in 9.17%. This suggests a job market geared towards French-speaking candidates, although there's also a substantial requirement for English, likely in sectors that deal internationally.

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 analysing the language preferences for job searches across different countries using Google Trends searchers, one might observe notable differences reflecting each region's unique linguistic landscape, historical ties, and economic relationships. For instance, in a country with a strong historical and economic connection to the English-speaking world, job searches in English may dominate the trends, signalling a workforce oriented towards international commerce and industry sectors that operate in English. On the other hand, in regions with closer ties to Francophone countries, French feature more prominently in job-related searches, indicating local market dynamics that favour French language skills, possibly due to colonial history, educational influence, or trade patterns. Countries with diverse linguistic backgrounds might show more varied search patterns, with job seekers possibly alternating between local languages and English or French, depending on the sectors they are

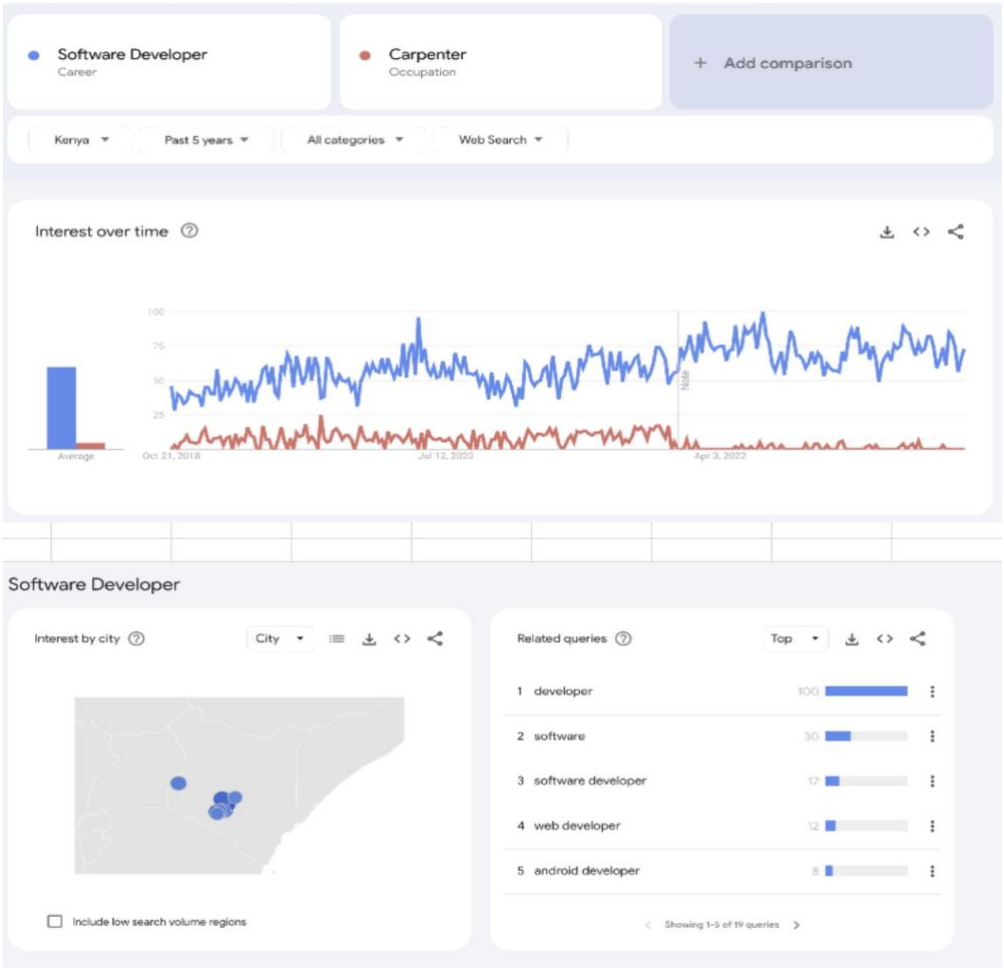
targeting, such as tourism, technology, or local government. Online search can offer real-time insight into these patterns, revealing not just the preferred languages for job searching but also the cultural and economic shifts that influence these preferences.

Language usage in job searches can indeed vary significantly based on the location and the nature of the occupation. Here are a few examples that illustrate this trend:

- Carpenters in North Africa: In countries like Morocco or Egypt, the search queries for occupations such as carpenters may predominantly appear in Arabic on local job platforms or Google searches. This could be because such trades are often learned and practised within local contexts where the native language prevails, and the job market for these skills may not be as globalised, relying more on local clientele and word-of-mouth for opportunities.
- Software Engineers in Kenya: For a highly technical and internationally connected field like software engineering, job seekers in Kenya are likely to use English in their search queries. English is the primary language of instruction in Kenyan education, particularly in higher education and technical fields, which aligns with the global tech industry's predominant use of English.
- Tourism and Hospitality in Tunisia: Searches related to tourism and hospitality jobs in Tunisia may commonly be conducted in both Arabic and French. This can be attributed to the bilingual nature of the country and the significant number of French-speaking tourists. The need to cater to a diverse group of international visitors makes multilingual capabilities highly valuable in these searches.
- Academic Roles in Egypt: Academic job searches in Egypt may often be conducted in English, especially when it comes to higher education roles that require publishing in international journals or teaching in programs where the medium of instruction is English.
- Healthcare Professionals in Morocco: In Morocco, healthcare professionals might search for job opportunities in French due to the historical prevalence of French in the medical education system and the fact that many medical terminologies are adopted directly from French.

These examples illustrate how the choice of language in job search behaviour can be influenced by the skill level of the occupation, the industry's global reach, and the local linguistic context. Understanding these patterns is vital for job platforms and employers to target their job postings effectively and for job seekers to increase their visibility in their job market.

Figure 4 – Compare Google Search in African countries.



3. OCCUPATION ANALYSIS

Table 2 presents the distribution of unique job postings across various occupational categories as defined by ESCO Level 1 in Egypt, Kenya, Morocco, and Tunisia. In Egypt, the largest category is 'Professionals' with 49.20% of job postings, indicating a significant demand for skilled professional workers. 'Technicians and associate professionals' also constitute a substantial share with 17.37%. These figures point to an economy with a high demand for skilled labour.

Kenya showcases a similar trend, with 'Professionals' leading at 42.83% and 'Managers' at a notably high 21.22%. This could reflect a developing economy where management and professional roles are crucial for growth. Morocco, on the other hand, has the highest percentage of 'Clerical support workers' at 14.44% and a significant percentage of 'Professionals' at 31.92%, suggesting a diverse job market with both administrative and professional skill demands. Tunisia has the highest percentage of job postings for 'Clerical support workers' at 15.95% compared to the other countries and a substantial need for 'Technicians and associate professionals' at 25.67%. The prominence of clerical roles could be indicative of a service-oriented economy.

Elementary occupations account for the smallest percentage across all countries, which might suggest a lower demand for such jobs or a potential underrepresentation in online job postings.

The differences in occupational demands likely reflect each country's economic structure, levels of education, and industrial focus. Egypt and Kenya's high demand for professionals could be a sign of economies oriented towards sectors like technology, finance, and services. The significant presence of clerical and support roles in Morocco and Tunisia might indicate a larger service sector that relies on administrative functions. These numbers provide valuable insights for understanding labor market dynamics and the economic focus of each country.

Table 2 – Occupation vs Countries – ETF database – Lightcast elaboration

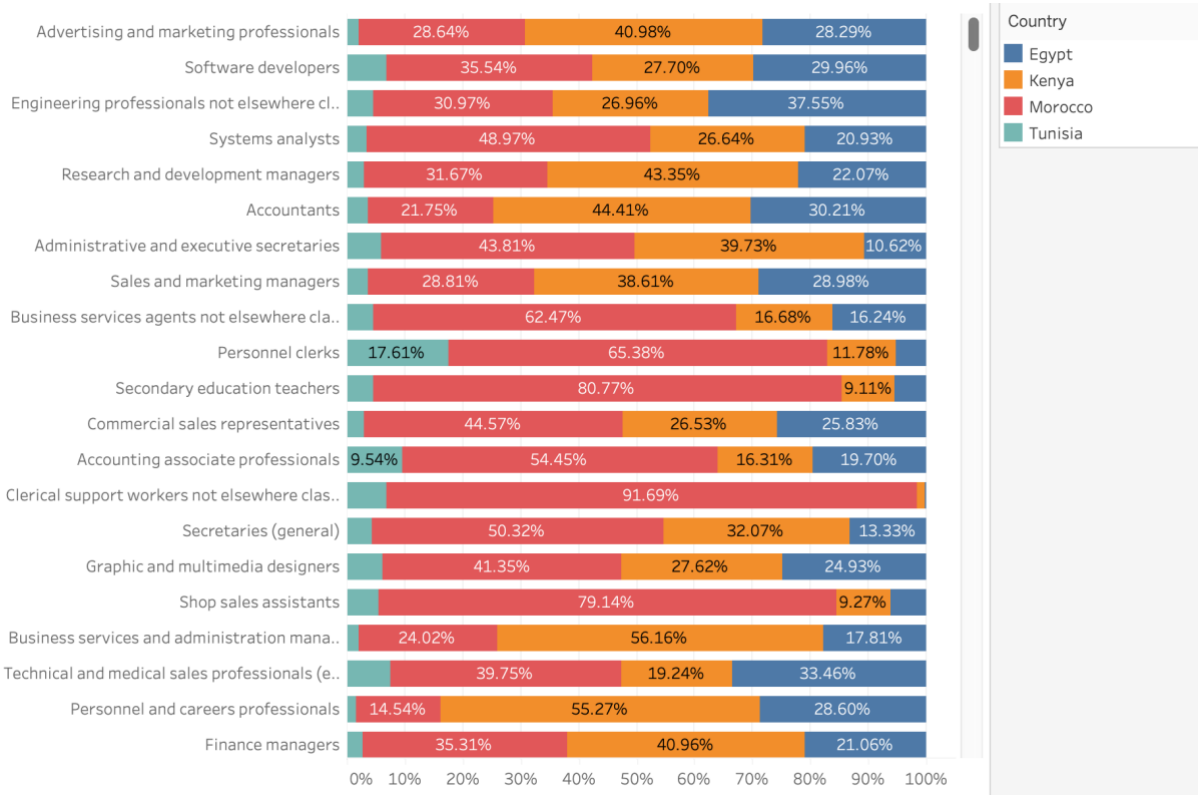
Occupation (level 1)

	Country							
	Egypt		Kenya		Morocco		Tunisia	
Esco Level 1	%	Unique postings	%	Unique postings	%	Unique postings	%	Unique postings
Clerical support workers	8.21%	17,040	7.81%	26,210	14.44%	66,703	15.95%	8,578
Craft and related trades workers	2.03%	4,220	2.64%	8,868	3.07%	14,164	2.80%	1,507
Elementary occupations	0.50%	1,035	0.46%	1,557	4.43%	20,486	2.75%	1,479
Managers	16.09%	33,409	21.22%	71,210	8.69%	40,166	7.65%	4,113
Plant and machine operators, and assemblers	1.03%	2,137	1.01%	3,379	1.61%	7,437	1.38%	742
Professionals	49.20%	102,185	42.83%	143,730	31.92%	147,454	34.39%	18,491
Service and sales workers	5.51%	11,437	4.20%	14,091	13.08%	60,435	9.36%	5,032
Skilled agricultural, forestry and fishery work..	0.06%	133	0.14%	470	0.08%	355	0.05%	27
Technicians and associate professionals	17.37%	36,076	19.69%	66,079	22.69%	104,820	25.67%	13,804

Figure 5 presents the distribution of certain occupations across four countries: Egypt, Kenya, Morocco, and Tunisia. These occupations include a variety of roles, from advertising and marketing professionals to finance managers, with a colour-coded representation indicating the proportion of each occupation within the job market of these countries. In the field of systems analysis, Egypt stands out with a high percentage of 48.97%, suggesting a strong focus on this area within the country's job market. On the other hand, Kenya shows a particularly high percentage of secondary education teachers at 80.77%, indicating a significant emphasis on educational roles within its labour market.

Morocco demonstrates a notable proportion of personnel clerks at 65.38%, which could reflect a well-established administrative sector. Meanwhile, Tunisia appears to have a substantial representation of accounting associate professionals at 54.45%, pointing to the importance of this profession in its economy. Interestingly, clerical support workers not elsewhere classified are most prevalent in Morocco at 91.69%, followed by Egypt at 62.47%, suggesting a strong demand for clerical and administrative roles in these countries. In contrast, the percentage is lower in Kenya and Tunisia.

Figure 5 - Top occupations



4. GREEN AND DIGITAL SKILLS

In the analysis of digital and green policy across Egypt, Tunisia, Morocco, and Kenya, it is evident that each country has taken tailored approaches to integrate these crucial areas into their broader economic and education strategies, reflecting their unique developmental stages and priorities.

Egypt has been advancing its digital policy through initiatives like the 'Digital Egypt' plan, aiming to digitise public services and promote digital literacy. There's a concerted effort to update the curricula in both school and higher education to include ICT skills, complementing the push for digital transformation. Green policy in Egypt is also on the rise, with the country investing in mega projects like the Benban Solar Park[1]. The education system is being adapted to include sustainable development concepts and renewable energy technologies, aiming to align with the government's strategy to increase renewable energy sources in the energy mix.

Tunisia has a strong focus on digital economy development, with policies that support innovation and entrepreneurship, particularly in ICT. The government has made strides in incorporating digital skills into the educational system, emphasising the need for students to graduate with competencies that match the digital job market. On the green front, Tunisia has been promoting sustainable agriculture and energy through its Solar Plan (2015-2021)[2] and is working on integrating green skills into vocational and higher education to support this sector.

[1] https://www.afdb.org/en/success-stories/egypt-benban-model-clean-energy-production-africa-60169

[2] https://www.giz.de/en/worldwide/60432.html

Morocco has established itself as a regional leader in green policies, notably through the Moroccan Solar Plan[3] and the establishment of the Noor Ouarzazate Solar Complex, one of the world's largest solar power plants. Education reforms have been implemented to support this, encouraging studies in environmental sciences and renewable energy. The country's digital strategy, 'Maroc Digital 2020', aimed to accelerate digital transformation and included measures to ensure that digital skills are taught from an early age, preparing a workforce adept at leveraging technology for economic growth.

Kenya has been a frontrunner in digital policy in Africa with its 'Digital Kenya' blueprint, fostering a digital economy and supporting the growth of tech startups. Education policies have increasingly emphasised ICT literacy, introducing digital content in schools, and encouraging partnerships with tech companies for hands-on learning. In terms of green policy, Kenya's Vision 2030[4] outlines a commitment to environmental sustainability, and this is reflected in the integration of green skills into educational curricula, particularly in the areas of sustainable agriculture and renewable energy.

Across all four countries, the link between policy, education, and qualifications systems is clear. The emphasis on ICT in education policies reflects the digital agenda, while green policies are leading to a greater focus on environmental education and sustainability. The qualifications systems are evolving to include certifications and degrees that reflect the new competencies required by both digital and green economies. This alignment is crucial in ensuring that the emerging workforce is not only qualified but also relevant and competitive in the global market.

Figure 6 presents the world cloud of the green skills in the African countries. It emphasises the various elements associated with renewable energy and environmental sustainability, central themes in current global discourse. The prominence of the term "renewable energy" indicates its significance as a focus area, with related terms like "solar energy," "photovoltaics," and "wind power" underscoring the diversity of sources within this sector. Surrounding phrases like "clean energy," "energy efficiency," and "sustainable business" suggest a comprehensive approach that includes not only the production of energy from renewable sources but also its efficient use and the integration of sustainability into business practices. "ISO 14001" stands out, highlighting the importance of international standards in environmental management systems, which are crucial for companies looking to embed environmental considerations into their core operations. "Agricultural" terms, including "sustainable agriculture," "agroecology," and "agroforestry," reflect the sector's critical role in sustainability, showcasing the intersection between farming practices and environmental stewardship.

The inclusion of "sustainable transport," "electric vehicle," and "car sharing" indicates the transportation sector's role in a greener future, while "green building" and "thermal insulation" speak to the construction industry's efforts in reducing environmental impact.

The chart touches on broader concepts like "development economics," "corporate sustainability," and "circular economy," highlighting the systemic changes necessary to foster a sustainable economic model. Overall, this visual arrangement of terms conveys the multifaceted nature of the sustainability field, touching upon technology, policy, and the shifting paradigms of economic development towards a more ecologically responsible

[3] https://ledsgp.org/app/uploads/2016/07/Implementation-of-Moroccos-solar-energy-plan-Faouzi-Senhaji-.pdf

[4] https://vision2030.go.ke/

framework. It also subtly suggests areas where educational and vocational training should focus to prepare the current and future workforce to engage with these emerging sectors.

Figure 6 – Green skills word-cloud

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

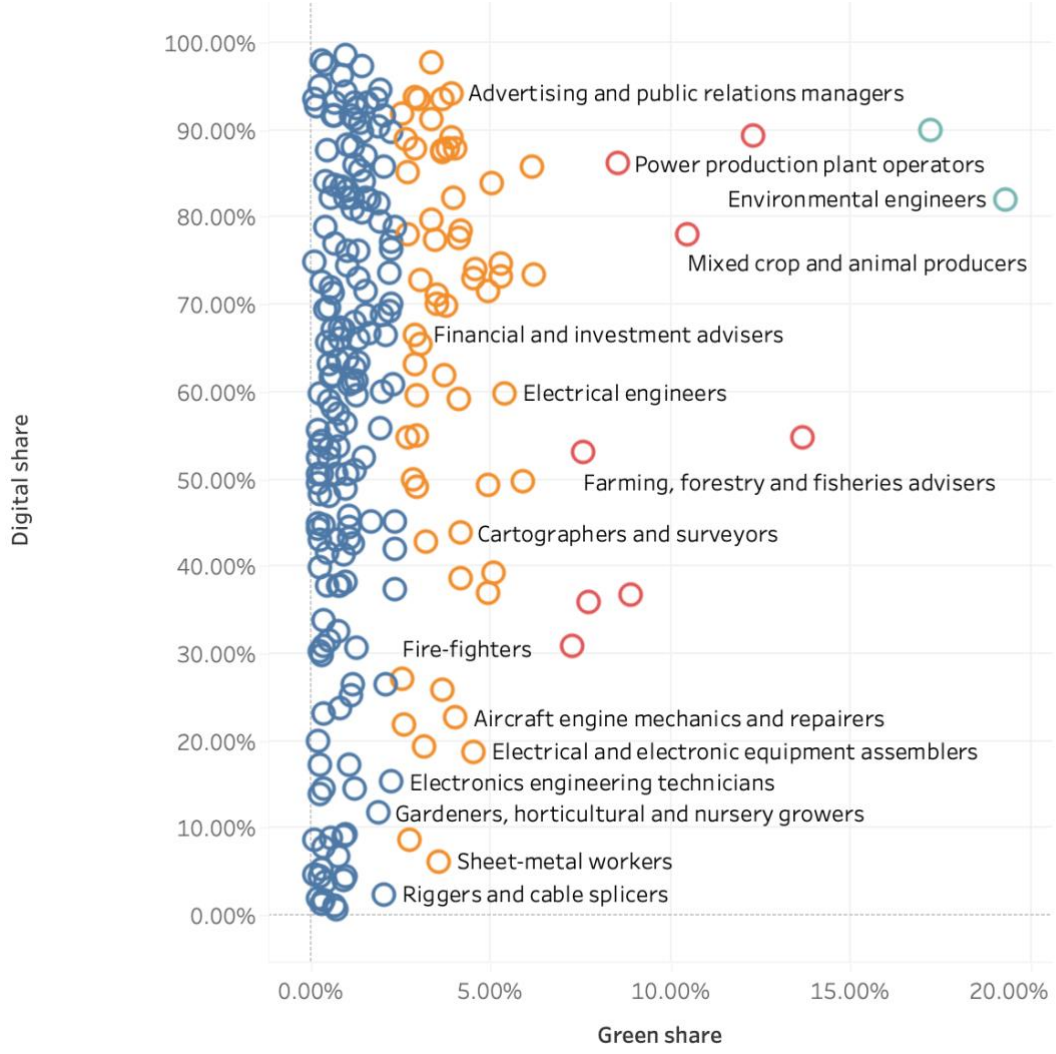


Figure 7 presents a scatter plot to show the relationship between the 'Digital Share' and 'Green Share' of various occupations. The 'Digital Share' is plotted on the y-axis, ranging from 0% to 100%, and indicates the extent to which digital tools are integrated into the job. The 'Green Share', plotted on the x-axis, also ranges from 0% to around 20%, representing the degree to which the occupations contribute to environmental sustainability. The graph is

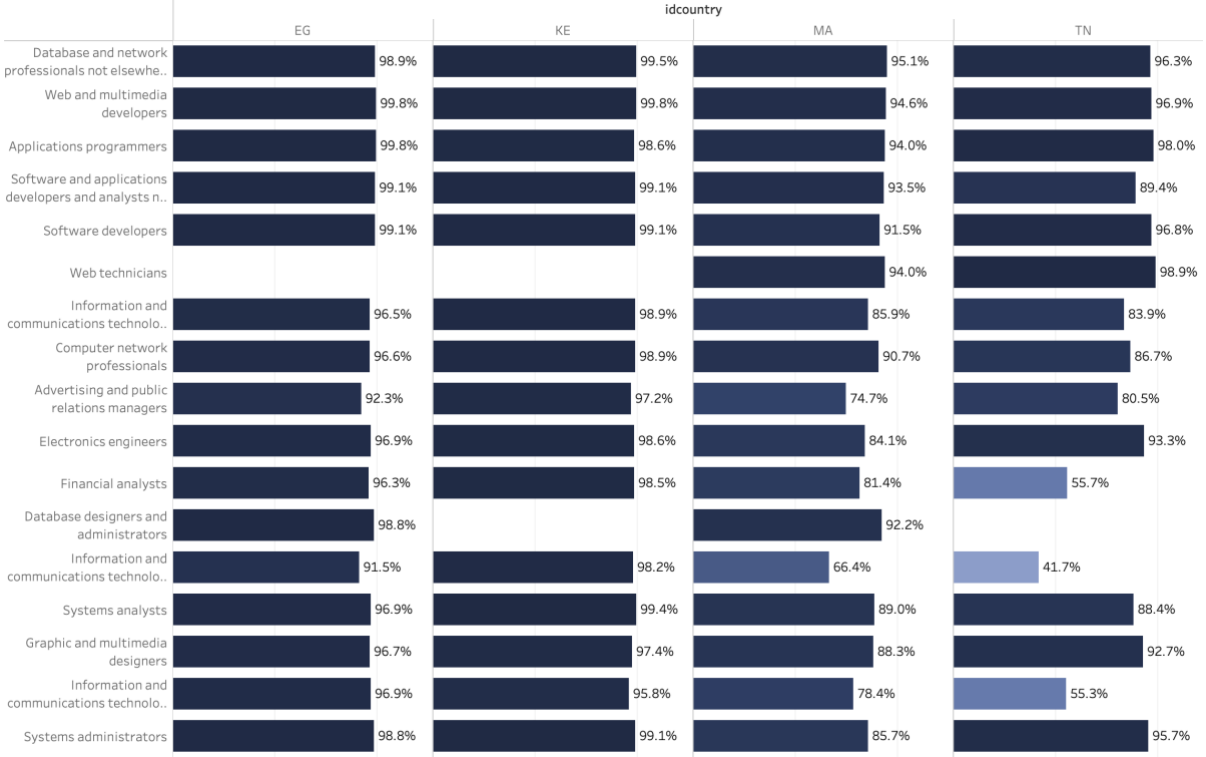
populated with the ISCO 4 occupations of jobs spread across different values of digital and green shares. Professions like 'Advertising and public relations managers' score high on the digital share but have a moderate green share. In contrast, 'Mixed crop and animal producers' have a lower digital share but a higher green share, which might reflect the nature of agricultural work being less digital but more directly related to the environment.

Interestingly, there's a cluster of occupations with high digital shares but varying green shares, which suggests that even within digitally intensive professions, the extent of environmental impact varies.

The scatter plot does not show a clear correlation between the two shares; instead, it presents a broad view of where each occupation stands in terms of its digital and environmental dimensions. It might be used to analyse or discuss trends in employment, technology adoption, sustainability practices across different fields, or even to strategize educational and policy initiatives aimed at increasing the digital and green competencies of the workforce.

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.

Figure 8 – Digital share across African countries – ETF database – Lightcast elaboration



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