

CONCEPT NOTE

THE AI-POWERED REFRACTED ECONOMIES CAREER GUIDANCE TOOL (ARC)

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1. INTRODUCTION: ADDRESSING A CRITICAL JUNCTURE FOR AFRICAN YOUTH

The African continent stands at a pivotal moment, brimming with youthful energy and potential, yet grappling with persistent challenges in translating this demographic dividend into widespread, dignified, and fulfilling livelihoods. Preparing young people for the future of work is not merely an economic imperative but a social and developmental necessity. The “Future Fit Young Africa” (FFYA) research program, spearheaded by the Human Sciences Research Council (HSRC), seeks to understand and address this complex landscape, investigating the crucial hard and soft skills young people across the continent require to thrive. Within this vital programme sits an innovative and potentially transformative intervention: the AI-powered Refracted Economies Career Guidance Tool (ARC).

ARC emerges from a critical need to reimagine career guidance for the specific realities of young Africans in five initial focus countries – South Africa, Kenya, Ghana, Ethiopia, and Senegal. Traditional approaches to career guidance, often imported from vastly different contexts, frequently fall short. They struggle to encompass the sheer diversity of African economies, particularly the significant role of the informal sector, and fail to adequately address the non-linear, often fragmented pathways that characterise the journey from education to work for the majority of the continent’s Youth. Furthermore, existing systems often lack the agility to keep pace with the rapidly evolving nature of work, influenced by technological advancements, globalisation, and shifting economic priorities.

This concept note details the vision, rationale, methodology, and anticipated impact of the ARC tool. It explains why Artificial Intelligence (AI) is not just a technological choice but a fundamental necessity for creating a truly responsive, contextualised, and empowering guidance system. It introduces the Refracted Economies Framework (REF) as a novel lens for understanding and valuing the full spectrum of economic activity in a way that resonates with Youth. Ultimately, ARC aims to be more than just a tool; it aspires to be a catalyst for expanding horizons, dignifying diverse work, and equipping young Africans with the insights needed to navigate their futures with confidence and agency.

2. THE IMPERATIVE: WHY TRADITIONAL CAREER GUIDANCE NEEDS REINVENTION IN AFRICA

The landscape young Africans navigate in search of meaningful work is marked by specific and profound challenges that underscore the inadequacy of conventional career guidance systems. Firstly, high rates of youth unemployment and underemployment persist across the continent, intertwined with the prevalence of informal labour and precarious working conditions. The informal sector, while providing livelihoods for millions, is often ignored or delegitimised by formal guidance systems, leaving a vast swathe of economic reality uncharted for young job-seekers. This omission not only limits perceived opportunities but also fails to recognise the skills and entrepreneurial spirit flourishing within these spaces.

Secondly, the transition from education to work is fraught with complexity. A significant skills mismatch often exists between what educational institutions offer and what the labour market demands, hindering economic development. Compounding this is the reality of varied educational exit points; fewer than 10% of young people across the continent complete tertiary education, and less than half finish secondary school. Career guidance must, therefore, be adaptable and relevant not just for university graduates but for the vast majority who leave the education system at earlier stages, equipped with different skill sets and facing different entry points into the world of work.

Thirdly, existing career guidance often lacks contextual relevance and fails to inspire. Limited imaginaries of possible futures can be perpetuated by guidance systems that use inaccessible jargon or rely on outdated occupational classifications like the International Standard Classification of Occupations (ISCO), which struggles to capture the dynamism of work, particularly informal or gig-based activities. Young people need frameworks that speak to their lived experiences, acknowledge their aspirations, and present possibilities in ways that are engaging and empowering. Understanding what constitutes ‘dignified work’ from a youth perspective is paramount.

Finally, the very nature of work is in flux. Digital innovation, the rise of Artificial Intelligence, big data, machine learning, the gig economy, and the increasing importance of sustainability are reshaping industries and skill requirements. Guidance systems must be agile and forward-looking, equipped to help Youth navigate not just current opportunities but also emerging trends and the skills needed for future resilience – encompassing not only technical (‘hard’) skills but also crucial ‘soft’ skills like agility, curiosity, critical thinking, and creativity. The ARC project arises directly from these pressing needs, seeking to provide a dynamic, relevant, and youth-centred alternative.

3. HARNESSING AI FOR RESPONSIVE AND CONTEXTUALISED GUIDANCE

The decision to build ARC using Artificial Intelligence is a direct response to the complexities and dynamism outlined above. AI is not merely an add-on; it is the enabling technology required to create a guidance system that is truly fit-for-purpose in the diverse and rapidly evolving African context. Several factors make AI indispensable:

MANAGING UNPRECEDENTED DATA INTEGRATION:

ARC’s power lies in its ability to synthesise information from an exceptionally wide array of sources. This includes structured data like quarterly Labour Force Surveys from national statistics offices across five countries, semi-structured data like job specifications scraped from formal online platforms (such as Career Junction, EthioJobs, Fuzu, Jobberman, EmployDakar) and informal classifieds (like Gumtree and newspapers), educational pathway requirements for different qualifications, and rich qualitative data from youth digital stories and institutional case studies. Manually processing, analysing, and cross-referencing this volume and variety of data to generate coherent, timely guidance would be practically impossible. AI algorithms are uniquely capable of handling this complexity, identifying patterns, and extracting meaningful insights.

ENABLING DEEP PERSONALISATION AND CONTEXTUALISATION

Africa is not monolithic. Economic conditions, cultural nuances, educational systems, and labour market dynamics vary significantly between and within countries. AI allows ARC to move beyond generic advice. By processing user-specific inputs (location, skills, interests, aspirations) alongside country-specific data, the system can generate personalised narrative guidance that resonates with the individual’s circumstances and the realities of their local environment. AI can tailor suggestions based on the specific characteristics of work prevalent in a region, as defined by the Refracted Economies Framework.

CREATING AN AGILE, CONTINUOUSLY LEARNING SYSTEM

The world of work does not stand still. New jobs emerge, skill requirements change, and economic priorities shift. A static guidance tool quickly becomes obsolete. ARC is designed around a “data flywheel” concept, where the AI engine continuously learns and improves as it ingests new data. Weekly automated updates incorporating the latest job postings, user feedback, expert input, and insights from ongoing research ensure that the guidance remains current and relevant. This inherent adaptability, powered by AI, is crucial for providing advice that reflects contemporary opportunities rather than historical trends. Different AI architectures like Retrieval Augmented Generation (RAG), Knowledge Graphs, or Fine-Tuning are being evaluated to optimise this learning process for accuracy and coherence.

ILLUMINATING THE INFORMAL ECONOMY

AI-driven tools, such as the proposed ‘Open Deep Research’ component, enable the systematic analysis of job opportunities advertised through less formal channels often missed by traditional labour market information systems. This capability is vital for mapping and legitimising the vast landscape of the informal economy, presenting it to young people as a space of genuine opportunity and potential pathways.

SCALABILITY AND ACCESSIBILITY

While acknowledging the digital divide, an AI-powered tool offers the potential to reach a far wider audience of young people across dispersed geographies than traditional, resource-intensive, face-to-face counselling allows. Considerations like mobile-first design and potential offline functionality aim to maximise this reach.

While embracing AI, the project remains acutely aware of the ethical considerations, including data privacy (evaluating cloud vs. on-premises processing), potential biases in algorithms, and the responsible use of technologies like web scraping. A dedicated research brief will document the ethical stance and decisions made, ensuring transparency and accountability.

4. THE REFRACTED ECONOMIES FRAMEWORK (REF): A NEW LENS FOR LIVELIHOODS

Traditional economic models, whether based on broad sectors (Primary, Secondary, Tertiary) or hierarchical occupational classifications (like ISCO), often fail to capture the lived reality and potential of work for young Africans. They can seem abstract, fail to adequately represent the informal sector, and may inadvertently limit how Youth perceive viable pathways. Recognising this limitation, the ARC tool is built upon the innovative Refracted Economies Framework (REF).

The REF proposes a heuristic taxonomy using intuitive, colour-coded categories to delineate different spheres of economic activity. This framework aims to be more youth-friendly and conceptually fluid, opening up possibilities rather than imposing rigid classifications. The colours include established descriptors and newly assigned labels:

- **Orange:** Creative, cultural, and leisure activities (arts, media, sports, tourism)
- **Green:** Environmental sustainability (renewable energy, conservation, recycling)
- **Blue:** Water-resource-based activities (fishing, maritime transport, coastal tourism)
- **Lavender:** Caring and helping professions (healthcare, social work, education support)
- **Yellow:** Public and social services (government, education, NGOs)
- **Bronze:** Extraction and cultivation (mining, agriculture, forestry)
- **Iron:** Manufacturing, production, distribution, infrastructure, construction, transport
- **Gold:** Finance, assets, and consulting (banking, insurance, fintech)

- **Platinum:** Technology and Innovation (IT, AI, software development)

The power of the REF lies in several key aspects:

- **Dignifying All Work:** By grouping activities based on common features or purpose (e.g., Lavender encompasses both domestic work and formal healthcare), the REF assigns value and recognises skills across the formal-informal spectrum. It challenges hierarchies that often marginalise essential work.
- **Expanding Imaginaries:** Naming economies like the “Orange Economy” explicitly alert young people to opportunities in creative fields, encouraging them to consider how passions might translate into livelihoods. It helps them see possibilities beyond conventional ‘jobs’.
- **Facilitating Pathway Thinking:** The REF allows young people to see themselves as part of a broader sector with potential for movement and growth, irrespective of their entry point. Guidance can focus on navigating *within* and *between* these colour-coded economies.
- **Integrating Key Characteristics:** The framework allows for overlaying crucial characteristics of work onto each colour-coded economy – analysing dimensions like skill level (advanced vs. minimal training), formality (regulated vs. unpaid), elasticity (AI-enhanced vs. automatable), sustainability (eco-friendly vs. resource-depleting), nature (knowledge vs. physical), orientation (public vs. private), mode (permanent vs. gig), and qualities like creativity, compliance, dignity, and meaningfulness. This provides a richer, multi-dimensional understanding of opportunities.

The REF is not intended to replace all other economic analyses but to provide a complementary, youth-centric lens specifically for career guidance, making the complex world of work more navigable and relatable.

5. METHODOLOGY: WEAVING TOGETHER DATA, TECHNOLOGY, AND HUMAN EXPERIENCE

The development and implementation of ARC follows a carefully structured, multi-stage process grounded in participatory principles and iterative refinement:

- **Foundational Research and Framework Refinement:** The project begins with comprehensive reviews of existing knowledge on youth skills needs, the history of skills discourse in Africa, the changing nature of work, best practices in career guidance (especially from the Global South), and the characteristics of work across different sectors. This foundational work informs the refinement of the REF itself.
- **Infrastructure Setup:** Establishing the necessary technical backbone involves procuring a high-performance R&D workstation with significant GPU processing power capable of handling large AI models like DeepSeek and setting up the initial architecture.
- **Data Integration and AI Development:** This core phase involves creating robust data pipelines to ingest and process the diverse data streams – LFS data, job listings (via scraping tools like Open Deep Research and potentially purchased data), transition point requirements for education, anonymised digital stories, case study findings, and the REF taxonomy itself. The AI models are developed and trained during this stage, focusing on generating accurate, coherent, and contextually relevant narrative guidance segmented by Refracted Economies and location. The technical architecture (RAG, Knowledge Graph, Fine-Tuning) and interface model (Agent vs Chatbot) are finalised.
- **Centring Youth Voices:** A crucial component involves amplifying youth perspectives. Digital storytelling workshops will be conducted with 100-120 young people across the five countries, deliberately including diverse identities (gender, disability, location). Participants will create short

videos documenting their skills, journeys, aspirations, challenges, and sources of guidance. These powerful narratives will not only provide invaluable qualitative data for the AI but will also be integrated into the tool itself, offering peer-to-peer insights and relatable pathways.

- **Institutional Insights:** Complementing the youth stories, 10-12 in-depth case studies of educational and training institutions or innovative skills development initiatives (e.g., focusing on the circular or blue economies or specific occupational shifts like mechatronics) will be conducted across the countries. These studies, involving interviews with experts and site visits, will explore how skills (including soft skills) are understood, taught, and aligned with future job prospects and changes in work. Findings will feed into the AI's knowledge base.
- **Validation, Piloting, and Refinement:** The generated guidance narratives and the tool's interface will be validated with country partners. Extensive pilot testing will then occur, engaging country partners and the Youth Advisory Group to gather feedback on usability, accuracy, relevance, and user experience in diverse contexts. This feedback is critical for the iterative refinement of the tool, the AI models, and potentially even the REF framework itself (leading to REF 2.0).
- **Deployment and Awareness:** The final stage involves deploying the refined ARC tool, likely on a public-facing platform, accompanied by documentation and training materials. Awareness-building activities will introduce the tool to young people and relevant institutions.

Throughout this process, the project adheres to principles of emancipatory and participatory research, fostering egalitarian partnerships with researchers and young people, respecting local contexts, and ensuring the research benefits the communities involved. Country Partners, including academics, postdoctoral fellows, and research assistants, will facilitate collaboration and capacity development.

6. ANTICIPATED IMPACT: EMPOWERING A GENERATION

The AI-powered Refracted Economies Career Guidance Tool (ARC) holds the promise of significantly impacting the landscape of opportunity for young Africans. Its potential extends beyond simply providing information; it aims to empower, inspire, and facilitate more effective navigation of the complex journey towards dignified and fulfilling work.

- **Transforming Career Navigation:** By offering guidance that is deeply contextualised, personalised, and reflective of both formal and informal economies, ARC can fundamentally change how young people explore and plan their futures. It provides insights relevant to their specific educational background and local environment, moving beyond generic advice.
- **Broadening Horizons and Aspirations:** The Refracted Economies Framework, coupled with insights from diverse data sources, will expose Youth to a wider spectrum of potential livelihoods than they might otherwise consider. By giving visibility and legitimacy to sectors like the creative (Orange), care (Lavender), or sustainability (Green) economies and mapping pathways within them, ARC can foster new aspirations and encourage entrepreneurial thinking.
- **Bridging the Information Gap:** Particularly for Youth outside major urban centres or those operating within the informal sector, access to reliable labour market information and guidance is often scarce. ARC aims to bridge this gap, providing data-driven insights into skills in demand, emerging trends, and potential pathways, directly addressing the limitations of traditional systems.
- **Enhancing Agency and Navigational Capacity:** Drawing on concepts like Swartz's 'navigational capacities', ARC seeks to equip Youth not just with information but with the understanding needed to make informed choices and navigate structural barriers. By integrating peer stories and diverse pathways, these examples foster a sense of possibility and shared experience.
- **Supporting Policy and Institutional Planning:** While primarily youth-facing, the aggregated, anonymised data and insights generated by ARC can also provide valuable information for

policymakers, educational institutions, and skills development organisations. It can highlight skills gaps, track emerging trends, and inform the design of more relevant training programs, contributing to systemic improvements.

- **Contributing to Economic Development:** Ultimately, by facilitating a better match between young people's potential and the opportunities within their economies (both existing and emerging), ARC contributes to tackling the critical challenges of youth unemployment and underemployment, fostering greater economic participation and potentially driving innovation across various sectors.

7. CONCLUSION: A VISION FOR FUTURE-FIT AFRICAN YOUTH

The AI-Powered Refracted Economies Career Guidance Tool represents a bold step towards reimagining how African Youth are supported in their quest for meaningful livelihoods. It acknowledges the limitations of past approaches and embraces the potential of cutting-edge technology – AI – not as a panacea but as a powerful enabler for creating a guidance system that is dynamic, data-rich, context-sensitive, and youth-centred. The integration of the innovative Refracted Economies Framework offers a new vocabulary and vision for understanding work in Africa, one that dignifies diverse contributions and illuminates a wider array of possibilities.

The journey to develop and deploy ARC involves navigating significant technical complexities, substantial data integration challenges across diverse national contexts, and critical ethical considerations surrounding data use and potential algorithmic bias. However, the project's commitment to participatory methods, iterative refinement based on user feedback, collaboration through Partnership Hubs, and transparent documentation provides a strong foundation for addressing these hurdles.

If successful, ARC will be more than just a technological artefact. It will be a continuously evolving resource, powered by the synergy of AI and human experience, designed to adapt alongside the economies and aspirations of the continent. It embodies a vision where every young African, regardless of their background or educational exit point, has access to guidance that helps them understand their potential, see the opportunities around them, and navigate their unique path towards a dignified and fulfilling future. The potential impact on individual lives, community development, and the broader economic trajectory of the continent makes the ARC initiative a critical investment in a future-fit young Africa.