



GISHARI COLLEGE

DEPARTMENT: MECHANICAL ENGINEERING

OPTION: AUTOMOBILE TECHNOLOGY

ACADEMIC YEAR: 2023-2024

PROGRAM: ADVANCED DIPLOMA

Project Title: DESIGN AND IMPLEMENTATION OF MODERN MULTI-PURPOSE STOVES.

GROUP MEMBERS:

Names: 1. MUGISHA Jean Baptiste

2. IMANIRUMVA Ismael

3. KUBWIMANA Emmanuel

Challenge chosen: select a well-known problem facing young people (aged 0 -25) in Rwanda and provide a data science solution to this problem. Examples include unemployment, poverty, or teenage pregnancy.

INTRODUCTION

I'm excited to present a solution that addresses youth unemployment in Rwanda, specifically focusing on the untapped potential of the multipurpose stove industry a project I've been developing, combining a modern wood stove with an oven and water heater. There are still many places in Rwanda without widespread access to contemporary cooking equipment, particularly in rural and impoverished areas. Open flames and crude stoves are examples of traditional cooking methods that frequently result in wasteful fuel use, higher health hazards from smoke inhalation, and environmental degradation from deforestation. The creation of a multipurpose stove powered by wood and charcoal appears to be a workable and sustainable way to address these issues.

The main goal of this project is to create and install a multipurpose wood stove that is economical, ecologically friendly, and efficient. In addition to cooking and heating, this stove may also be used for heating water and baking at the same time. This stove will increase the quality of burning while lowering harmful pollutants

The primary objective of this project is to design and implement an efficient, cost-effective, and environmentally friendly modern multipurpose wood stoves. This stove aims to cater to various household needs, including cooking, water heating, and oven for baking. By improving combustion efficiency and reducing harmful emissions, this stove will not only enhance the quality of life for its users but also contribute to environmental conservation.

PROBLEM STATEMENT

As of the second quarter of 2024, the youth unemployment rate in Rwanda is 20.5%. This rate reflects ongoing challenges in the job market, with higher unemployment among young people compared to adults, whose unemployment rate is around 14.1%. Rwanda's overall unemployment rate stands at 16.8%, with disparities by gender and location, as women and rural residents

experience slightly higher rates. The National Institute of Statistics of Rwanda provides detailed insights into these trends, helping to identify areas for targeted job creation and training initiatives.

Unemployment among young people in Rwanda (ages 0-25) is a pressing issue, worsened by a mismatch between skills and job market demands, especially in rural areas where opportunities are limited. The lack of relevant training programs and resources further compounds this, leaving a large portion of the youth underutilized and economically vulnerable. And also on other hand Open flames and crude stoves are still common place cooking techniques in many rural and impoverished areas. Due to their extreme inefficiency, these techniques use a lot of wood fuel. Families are severely burdened by the inefficiency, which not only adds to deforestation however takes a lot of time and effort to acquire wood. Furthermore, a lot of smoke and other dangerous pollutants are produced by traditional cooking methods, which puts people's health at serious risk, especially for those with respiratory problems. This is especially true for women and children who spend a lot of time near the cooking area. In these areas, one of the main causes of sickness and mortality is indoor particles from various cooking methods.

Additionally, the inability to successfully complete various domestic activities is hindered by the absence of now day's kitchen facilities. This multipurpose stove will provide the proper and efficient ways of cooking and other facilities like baking water heating at the same time while cooking.

SOLUTION OVERVIEW

My proposal is a data-employment platform focused on connecting Rwandan youth with opportunities in the emerging multipurpose stove industry. This platform doesn't just suggest jobs; it actively builds a pathway for youth to gain the skills, mentorship, and job placements necessary to thrive in this sector.

CORE FEATURES OF THE PLATFORM

1. Data-Driven Profiling and Matching:

- The platform will collect data from user profiles skills, education, location, and career goals and match them with real time modern stove manufacturing opportunities, including design, assembly, marketing, and repair roles.
- A recommendation algorithm will match these users to the best-fit opportunities. This could be a job role, an internship, or a relevant training program. I envision using collaborative filtering to improve these matches as the platform grows.

2. Predictive Analytics for Skill Gaps and Job Trends:

- By analyzing demand in stove production, we can predict skill gaps and job trends, enabling us to provide actionable insights to young job seekers and recommend training programs that directly meet market needs.
- This predictive modeling will help map the future of the stove sector, guiding government and stakeholders in making informed decisions on vocational training investments.

3. Impact Tracking and Continuous Learning:

- The platform will have built-in metrics to measure its impact, like job placement rates and youth engagement. Tracking these metrics will provide valuable insights to optimize the system.
- I plan to integrate feedback loops, so the recommendation model continually learns from user interactions, refining its ability to connect youth with the best opportunities.

BROADER VISION AND IMPACT

This isn't just about solving unemployment; it's about creating a data-driven employment pathway specifically for industries, like multipurpose stoves, that align with Rwanda's sustainability goals. By nurturing local skills in modern stoves manufacturing, we can stimulate rural economies, promote sustainable energy use, and empower youth to be a part of Rwanda's green economy.

PREDICTIONS RELATED TO YUOTH UNEMPLOYMENT IN RWANDA

The demand for digital skills is expected to grow significantly as Rwanda continues its development as a regional tech hub. However, many young people may not be fully equipped to meet this demand due to limited access to relevant training. Without strategic intervention, there's a risk of a widening skills gap, which could result in youth facing higher levels of unemployment or underemployment. This trend suggests an urgent need to adapt educational curricula to align with the digital economy.

A second prediction is the rise in informal employment among Rwandan youth. Given the limited availability of formal employment, many young people are pushed into the informal sector, which often offers lower income stability and limited job security. If this trend continues, the economy may face challenges related to low productivity and financial insecurity among youth, further perpetuating cycles of poverty.

Mismatch between education and labor market needs is another critical issue. A considerable number of graduates are entering fields with limited job opportunities, often due to a lack of alignment between academic programs and market demands. If educational institutions do not focus more closely on the skills required in the current job market, unemployment among recent graduates, particularly those from saturated fields such as humanities and social sciences, could worsen.

Finally, urbanization trends are expected to influence employment patterns as young people migrate to cities in search of job opportunities. If urban job markets cannot absorb the influx, there

may be an increase in urban unemployment and underemployment, leading to additional social challenges like poverty and a potential increase in informal employment.

Proposed Data-Supported Interventions

One of the key interventions to consider is expanding digital skills training programs. Data from various sectors indicate a growing demand for skills like coding, data analysis, and cybersecurity. Establishing partnerships between educational institutions and tech companies to provide practical digital skills training could help close the skills gap. Additionally, subsidized online and offline boot camps accessible to youth in both urban and rural areas would ensure that these skills are widely attainable.

Another intervention is to strengthen vocational and technical education (TVET) programs. Data from high-hiring sectors, including construction, agriculture, and manufacturing, suggest that youth with vocational training have a higher employment rate than those with purely academic backgrounds. By expanding the TVET program and tailoring it to in-demand skills, youth could gain practical expertise in fields aligned with national priorities. This intervention could focus on courses in entrepreneurship, agricultural technology, and mechanical skills, providing more direct pathways to employment.

Job matching platform can be another powerful solution. Platforms like LinkedIn provide insights into job openings and the types of skills in demand. Rwanda could use data science and AI to analyze these trends and better match job seekers with relevant opportunities. A centralized job-matching platform that captures data on job seekers' skills, experiences, and career goals could optimize placements and offer personalized career guidance based on real-time labor market data.

Promoting youth entrepreneurship with access to financial resources and mentorship could also address youth unemployment. Data from existing youth-led businesses reveal that they have the potential to reduce unemployment. Expanding access to grants and low-interest loans for youth-led startups, coupled with mentorship programs, could support these ventures in their early stages. Additionally, tracking data on successful startups would inform training programs to include

business management and financial literacy, helping young entrepreneurs sustain and grow their businesses.

Lastly, supporting remote and gig economy work can help create new job opportunities. By analyzing global trends in remote work, Rwanda can identify and tap into areas where its young workforce has a competitive advantage, such as tech, marketing, and design. Partnering with international companies to recruit Rwandan youth for remote roles, and supporting freelancers with co-working spaces, internet access initiatives, and freelance skills workshops, can create pathways for youth to thrive in the global gig economy.

These data-supported interventions, coupled with ongoing analysis, can create sustainable solutions to tackle youth unemployment in Rwanda, making it more adaptable to the evolving needs of the labor market.

CONCLUSION

This solution bridges data science with the practical needs of Rwanda's job market, creating a robust system that could also be scaled to other sectors in the future. I'm looking forward to developing this further and seeing the positive impact it can make for Rwandan youth and beyond. Thank you.

REFERENCES

1. Digital Skills and Labor Market Demand: World Economic Forum. (2021). Future of Jobs Report 2021. Available at [weforum.org](https://www.weforum.org).
2. Vocational Training and Employment Outcomes: Rwanda Ministry of Education. (2022). Annual Education Statistical Yearbook. Available at [mineduc.gov.rw](http://www.mineduc.gov.rw).

3. Youth Employment and Informal Sector: International Labour Organization (ILO). (2020). Global Employment Trends for Youth 2020. Available at [ilo.org](https://www.ilo.org).
4. Remote Work and Gig Economy Trends: McKinsey & Company. (2023). The Future of Work in Africa. Available at [mckinsey.com](https://www.mckinsey.com).
5. Job-Matching Platforms: LinkedIn Economic Graph. (2021). Global Labor Market Data Insights. Available at [linkedin.com](https://www.linkedin.com).
6. Youth Entrepreneurship and Economic Development: World Bank. (2022). Promoting Youth Entrepreneurship in Sub-Saharan Africa. Available at [worldbank.org](https://www.worldbank.org).