

Multilingual AI-Driven Workflows on Ideation, Collaboration, and Linguistic Inclusion for Graduate Entrepreneurs in West Africa

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Publication Date: 2026/03/25

Abstract: The lack of African languages in mainstream Large Language Models (LLMs) creates a significant gap, making it harder for graduate entrepreneurs to fully use Artificial Intelligence (AI) for their business development. This study looks at how multilingual AI-driven workflows affect Ideation, Collaboration, and Linguistic Inclusion for Graduate Entrepreneurs in West Africa. Using an Agile Research Method, we created and tested Agiliter, a multilingual AI platform (English, French, and Igbo) designed with LLM-powered entrepreneurial workflows. We ran tests for six weeks with ten early-stage founders from Nigeria's South-South region. The quantitative data showed a high active participation rate of 65% and a strong preference for multilingual features, as seen in a 28% rate of French use among non-Francophone users for ideation tasks. The qualitative findings indicated that the automated multilingual workflow generation served as a crucial support system. It reduced the cognitive load of using English-only tools in resource-limited settings and encouraged sharing ideas across different regions. We conclude that a multilingual AI focused on specific fields can turn linguistic diversity from a barrier into an advantage for inclusive innovation in Africa. This paper offers a model based on evidence for building AI-driven entrepreneurial capacity in linguistically diverse emerging economies.

Keywords: Artificial Intelligence (AI), Linguistic Inclusion, Entrepreneurship, Multilingual Platform, West Africa.

How to Cite: Nsikak Thompson; Chidera Johnson; Michael Ukpeh; Okengwu U. A. (2026) Multilingual AI-Driven Workflows on Ideation, Collaboration, and Linguistic Inclusion for Graduate Entrepreneurs in West Africa. *International Journal of Innovative Science and Research Technology*, 11(3), 2053-2063. <https://doi.org/10.38124/ijisrt/26mar643>

I. INTRODUCTION

The fast growth of generative Artificial Intelligence (AI), especially Large Language Models (LLMs), is changing the global economy and creative sectors (World Economic Forum, 2023). These technologies provide new chances to make sophisticated tools more available, speed up product development, and simplify business processes. However, the advantages of this AI wave are not shared equally. A significant digital and language gap remains. Most commercial LLMs are primarily trained on languages with many resources, mostly English, which leads to the underrepresentation and poor performance in the majority of the world's languages (Bender, et al, 2021). This bias creates challenges for innovators in linguistically diverse and resource-limited settings.

West Africa, known for its dynamic economic growth and high graduate unemployment, is crucial for harnessing technology to promote self-employment and new ventures (World Economic Forum, 2023). Entrepreneurship is

increasingly seen as the main driver of sustainable economic growth in the region, but founders face many challenges, including strong language diversity (Ofosu-Appiah et al, 2025; Comrie, 2009). Countries like Nigeria and Ghana have hundreds of indigenous languages, often used alongside English or French as the languages of business, government, and education (Mashavira, & Chinyamurindi, 2024). This complexity creates obstacles in important entrepreneurial processes. For example, founders may find it hard to create market-relevant ideas in a dominant foreign language, and communication among founders, partners, and local communities suffers due to language barriers. Current AI tools tend to be limited to one language, which reinforces these barriers and restricts access to valuable resources for those who are not fluent in the training language (Adebara et al, 2022).

While there is increasing research on adopting AI in emerging markets, most studies look at larger policy issues or general adoption rates. There is a significant lack of understanding of the direct impact of AI workflows that

actively consider local language diversity to support important tasks like entrepreneurial idea generation and cross-cultural collaboration. We need to move beyond simple machine translation and explore effective multilingual interfaces that help ease language friction and provide fair access to advanced tools.

To fill this gap, this paper introduces Agiliter, a proof-of-concept multilingual AI platform that supports English, French, and Igbo. This platform integrates LLM-driven workflows aimed at helping graduate entrepreneurs with idea generation and business planning in West Africa. We report on an initial six-week study with 10 early-stage founders in the South-South region of Nigeria. The main goals are to measure how often the platform is used and to assess its effects on: 1) the cognitive load during the idea generation process, 2) the quality and range of collaboration across regions, and 3) the overall feeling of inclusion experienced by the entrepreneurs.

The rest of the paper is organized as follows: Section 2 describes the Agile Research Methodology and the structure of the Agiliter platform. Section 3 presents the data on usage and findings. Section 4 discusses what these findings mean for AI development in emerging economies. Lastly, Section 5 wraps up the study and suggests directions for future research.

II. REVIEW OF RELATED LITERATURES

Research on multilingual AI systems has grown significantly in recent years, providing strong insights into how these technologies affect idea generation, collaboration, and language inclusion for emerging graduate entrepreneurs in West Africa. This body of knowledge spans the advancement of language technologies, their use in education and social environments, and their importance in today's entrepreneurial ecosystems.

The technological foundations of multilingual AI are based on progress in Natural Language Processing (NLP). Early work such as that by Sennrich et al. (2016) showed significant improvements in machine translation accuracy and fluency. These advancements allow tools like Google Translate and DeepL to provide near-human language mediation. Over time, these capabilities have expanded. Li et al. (2022) highlighted how multilingual features in chatbots and virtual assistants have improved real-time interactions. Additionally, earlier research by Radlinski and Craswell (2009) laid the groundwork for cross-lingual information retrieval, allowing users to search for information beyond their native languages, which is crucial for entrepreneurs in international markets.

The growing interest in this area is clear from the bibliometric analysis by Judijanto and Vandika (2025), which showed a sharp increase in multilingual NLP publications since 2018, driven mainly by developments in deep learning architectures like mBERT and XLM-RoBERTa. Though this field has grown, they pointed out ongoing geographical gaps in research output, particularly with U.S.-based institutions

leading the way. On the technical side, Xiao (2020) emphasized the need for robust debugging and developer support to build and maintain multilingual translation systems.

Research has also demonstrated how multilingual AI can transform education and communication. Tojiboyeva (2024) provided a framework for the ethical use of AI among multilingual learners, highlighting its potential for personalized teaching, adaptive language support, and greater learner engagement. However, she cautioned against issues like algorithmic bias and unequal access. In a similar vein, Saddhono et al. (2025) argued that AI can enhance multilingual literacy and educational opportunities for marginalized and indigenous groups, an important consideration in linguistically diverse West Africa.

In digital learning contexts, Kennedy et al. (2023) looked at AI translation and subtitling for MOOCs, stressing the challenge of balancing accuracy with real-time needs. Santorelli and Catullo (2023) examined AI-assisted interpretation in global mobility, suggesting that real-time systems like Kudo improve language inclusion while challenging English's status as the dominant global working language. Similarly, Ding et al. (2025) created a multilingual AI educational platform to develop cross-disciplinary skills necessary for globalized fields like law and economics.

Beyond education, research has also focused on the strategic importance of multilingual technologies in regional growth. Piperidis et al. (2023) described the European Language Grid (ELG) as vital infrastructure aimed at standardizing language resources and promoting digital language equality. Such initiatives show how well-structured multilingual environments can boost collaboration across regions, which is key for innovation yet often limited by cultural and language divides and the complexities of building trust across borders.

These challenges mainly affect young graduate entrepreneurs who, despite their innovative potential, usually work with limited resources and must be flexible in their strategies. AI technologies increasingly tackle these limitations by offering tools that improve competitiveness. Davenport and Ronanki (2018) noted AI's role in product development and efficiency, while Jordan and Mitchell (2015) emphasized its significance in data-driven insights. The entrepreneurial sector also benefits from AI in fundraising and decision-making, as seen in studies by Chen et al. (2020). Case studies show how tools like Google Translate, DeepL, and Amazon Translate help overcome communication hurdles, simplify collaboration, and provide access to international markets for emerging businesses.

Recent efforts to tailor multilingual AI for African users represent a major step towards inclusivity. Nlebem (2024) and Awarri's Multilingual Language Model illustrate attempts to create AI systems trained on indigenous Nigerian languages. These efforts are crucial for tackling issues of data scarcity, diverse languages, and the cultural nuances that shape communication among West African entrepreneurs.

Overall, the literature reviewed shows that multilingual AI could significantly enhance idea generation, collaborative innovation, and language inclusion for graduate entrepreneurs in West Africa. However, realizing its full potential depends on addressing ethical issues, decreasing research gaps, improving representation of local languages, and ensuring fair access across different socio-economic backgrounds.

help create Agilter as a scalable multilingual web application. The initial information gathering aimed to identify the main regional languages and evaluate how well Natural Language Processing (NLP) techniques, especially Large Language Models (LLMs), performed with these languages. This exploratory phase guided important design choices and ensured the system met the linguistic needs of West African users.

III. METHODOLOGY

➤ Research Design and Participants

The study used an Agile approach for research and development. It followed a design, build, and test cycle to

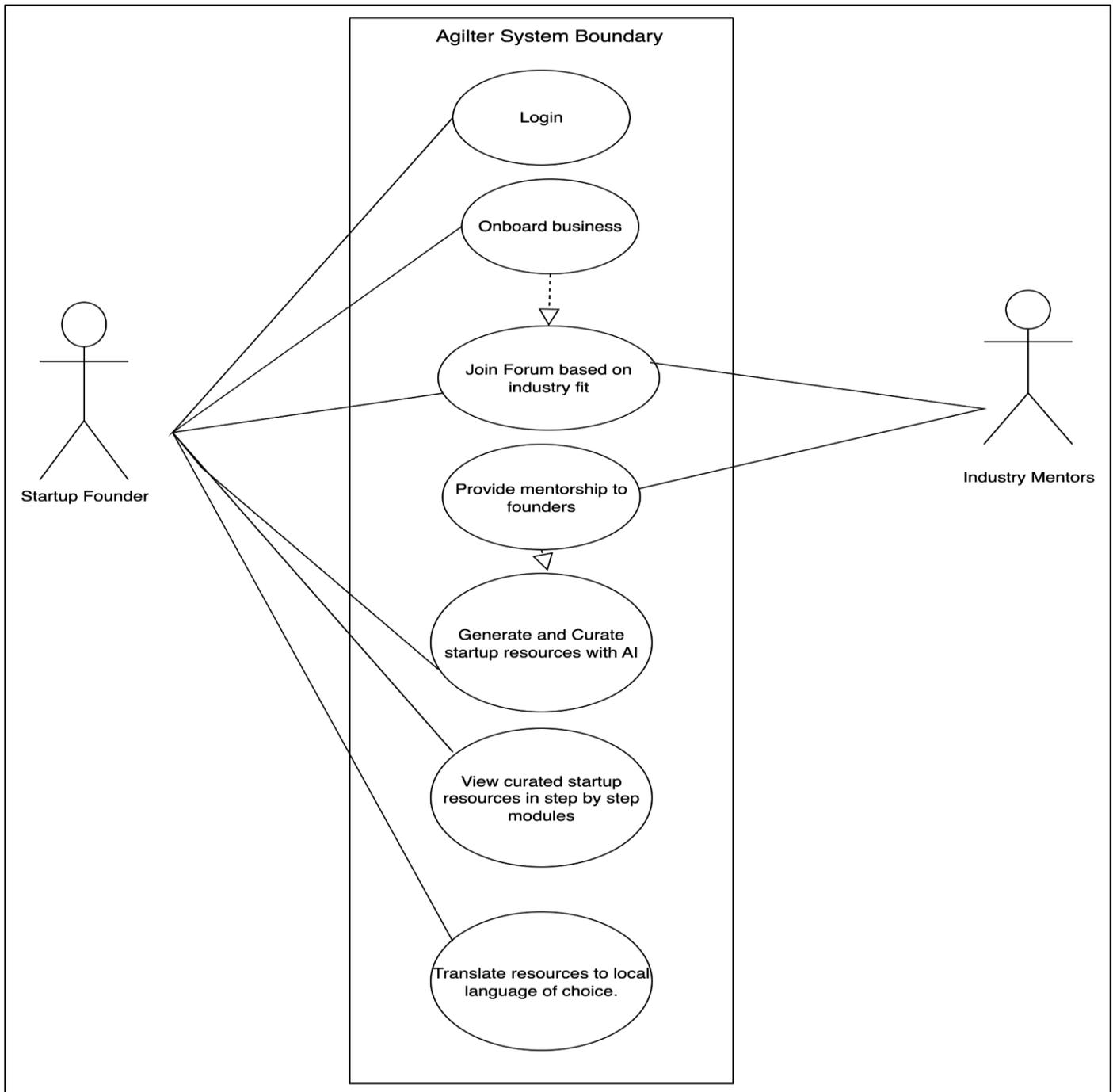


Fig 1 Use Case Diagram of Proposed Implementation of Project

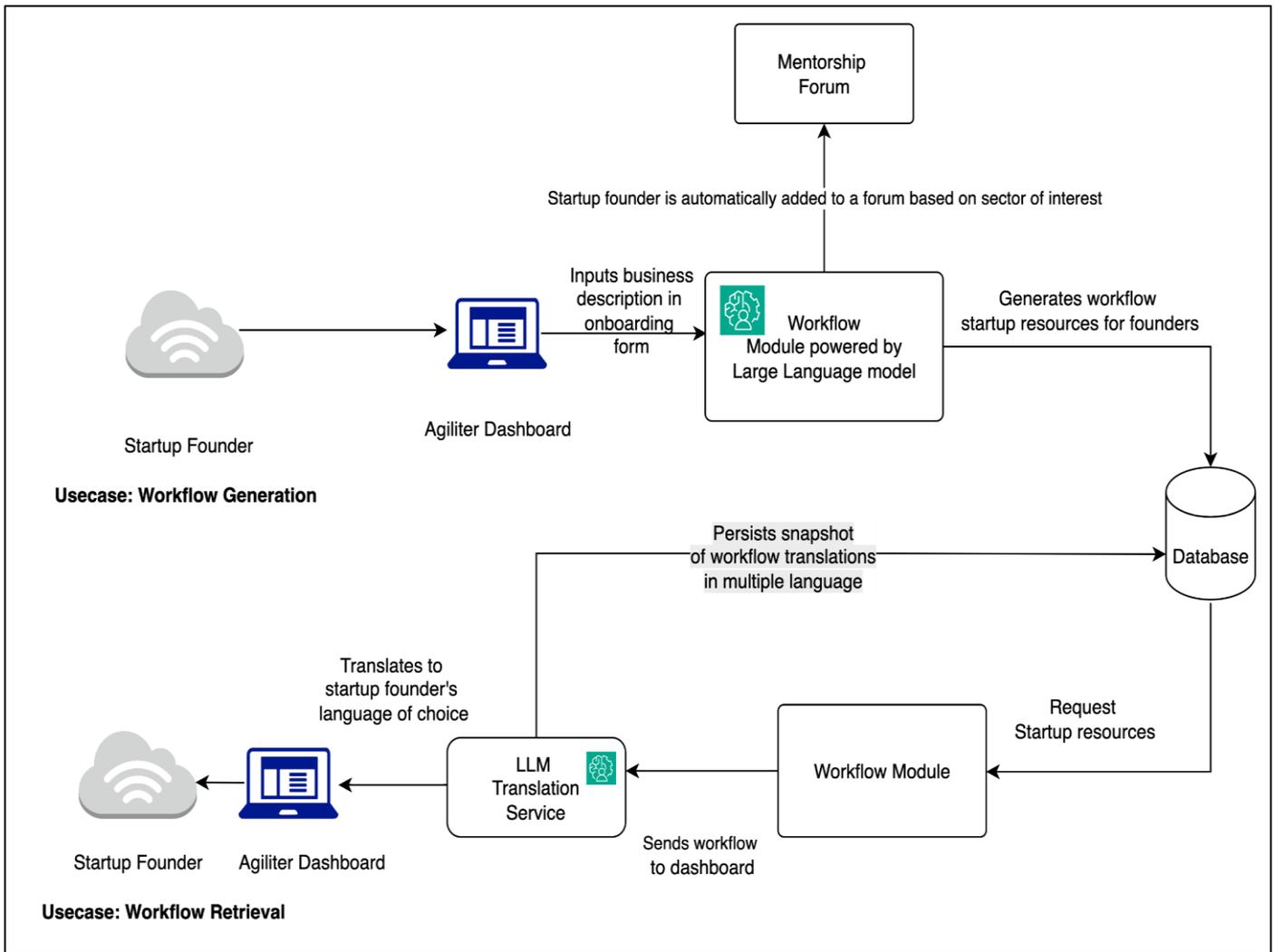


Fig 2 Architectural Diagram of Proposed Implementation of Project

Ten startup founders were intentionally selected to provide ongoing feedback about the difficulties of accessing organized entrepreneurial resources. Their input helped the research team break down the startup journey—from idea generation to launch—into seven practical stages, partly based on established models from global entrepreneurial hubs like Y Combinator and TechStars. Besides founder feedback, mentors with extensive experience in startup development provided expert views on how multilingual AI tools could aid cross-cultural collaboration and communication.

➤ *Tools and Procedures*

The platform was created using advanced AI technologies. OpenAI’s GPT-4o mini served as the central engine for real-time multilingual processing. This model enabled translation and automatically generated step-by-step workflows in English, French, and Igbo. Users could submit startup ideas in their preferred language, and the system would create a customized roadmap that they could view and track through an interactive dashboard, as shown in Figures 1.5 and 1.7 to 1.9 in the Appendix.

To facilitate collaboration, a self-hosted Rocket.Chat environment was integrated into the system structure.

Backend APIs were set up to automatically assign users to relevant industry-specific channels—like agritech or fintech—based on their startup profiles. This setup allowed founders to participate in focused peer discussions and receive tailored mentorship, as illustrated in Figure 1.10 of the Appendix.

IV. RESULTS AND DISCUSSION

➤ *Results*

• *Platform Performance and Multilingual Capabilities*

The Agiliter platform proved highly effective as a multilingual AI solution aimed at supporting idea generation, workflow creation, and cross-language collaboration among emerging African entrepreneurs. By integrating Natural Language Processing and Large Language Models, the system generated structured startup workflows and provided accurate real-time translations across English, French, and Igbo. These features allowed participants to express their ideas in their chosen languages while maintaining cultural nuances and clarity.

Figure 2 shows the user sign-up interface, which served as the gateway to the multilingual and collaborative environment. The following login interface, seen in Figure 3, illustrates the system’s accessibility and user-friendly design.

- *Workflow Generation and User Onboarding*

During the study, participants submitted their startup ideas through the platform and received AI-generated workflows tailored to their needs. The workflow generation interface is shown in Figure 4. This feature played a vital role in simplifying the early idea-generation process and reducing the reliance on English-only startup documents.

A guided onboarding system helped new users understand the platform's features and navigate their customized dashboards. Figure 5 shows this onboarding process, which allowed for a smooth transition from idea submission to workflow monitoring. The multilingual capabilities of Agiliter are evident in the workflow outputs displayed in Figures 6, 7, and 8. These workflows, generated in English, French, and Igbo respectively, demonstrate the system’s ability to maintain conceptual accuracy and cultural relevance across languages. Table 1 summarizes the primary multilingual performance indicators recorded during the study.

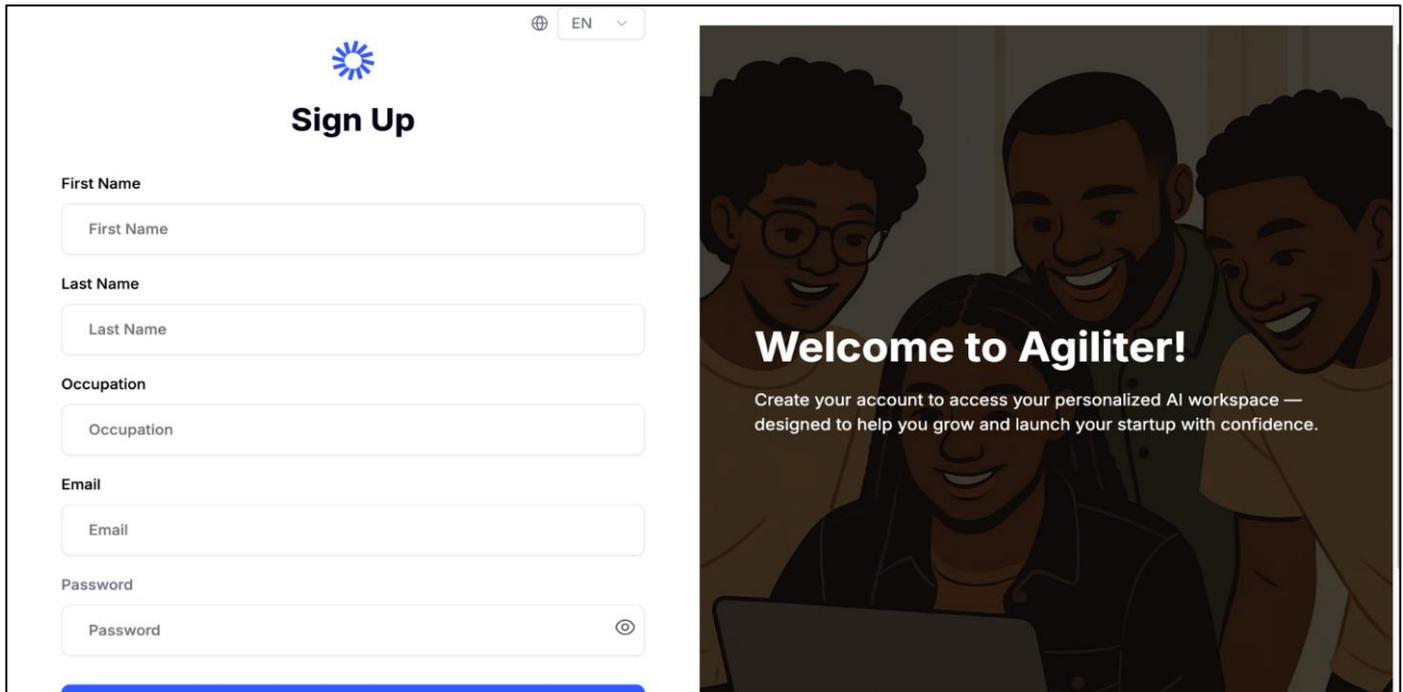


Fig 2 Sign-Up Interface

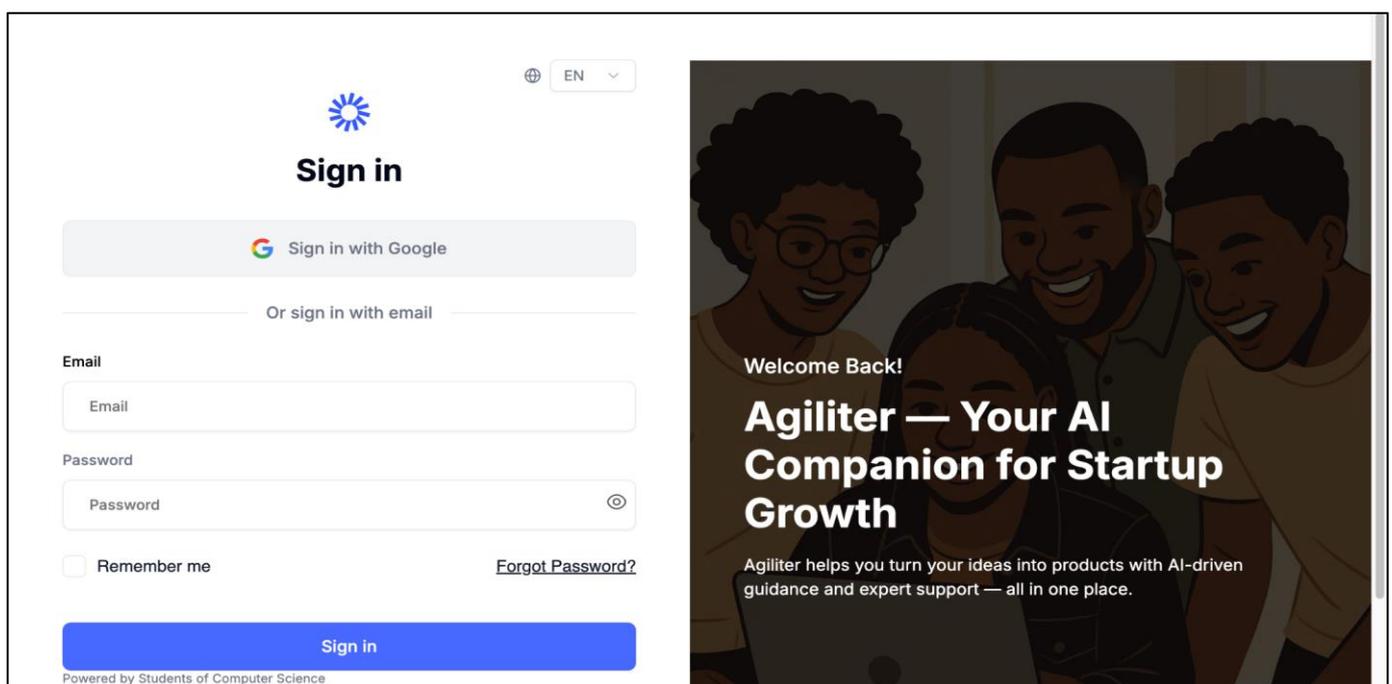
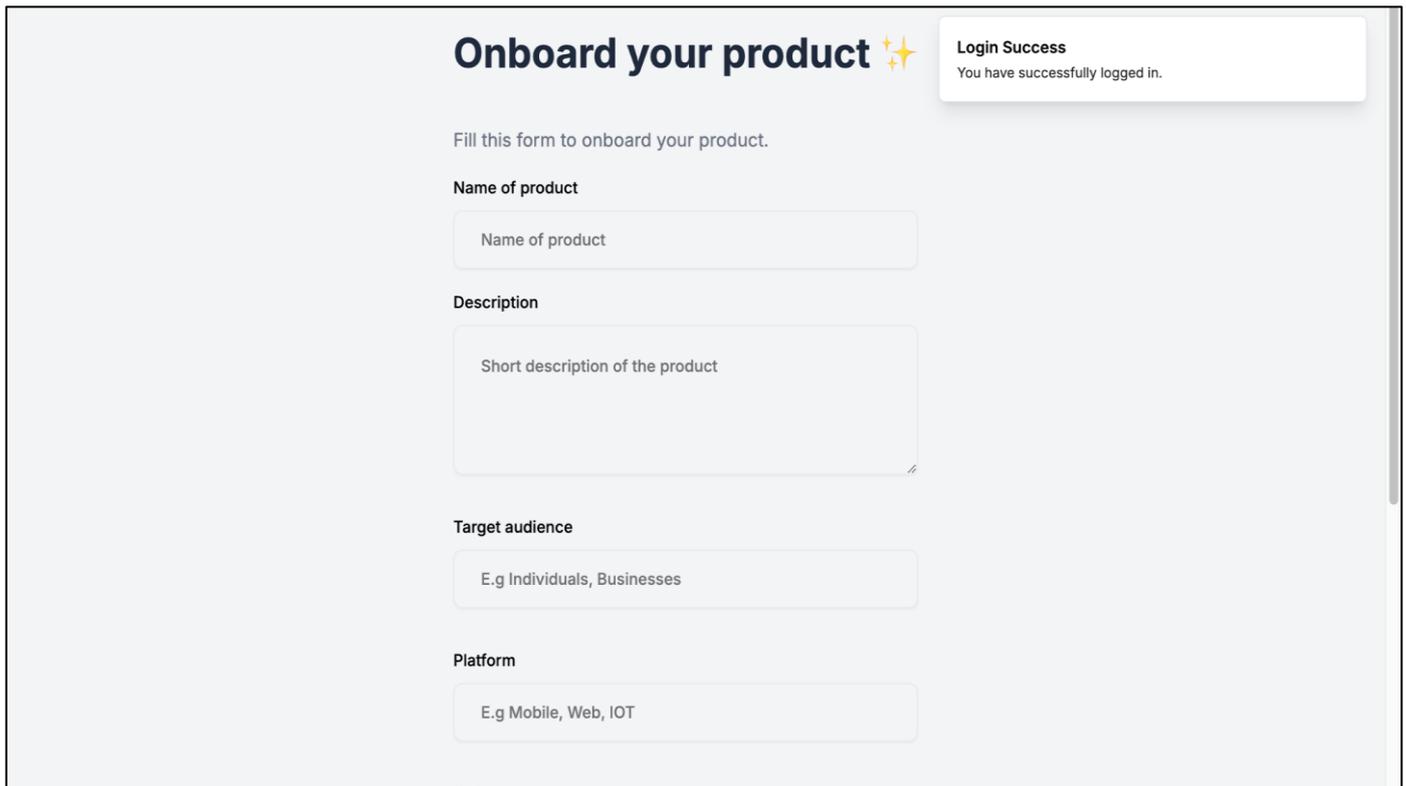


Fig 3 Login Interface



Onboard your product ✨

Login Success
You have successfully logged in.

Fill this form to onboard your product.

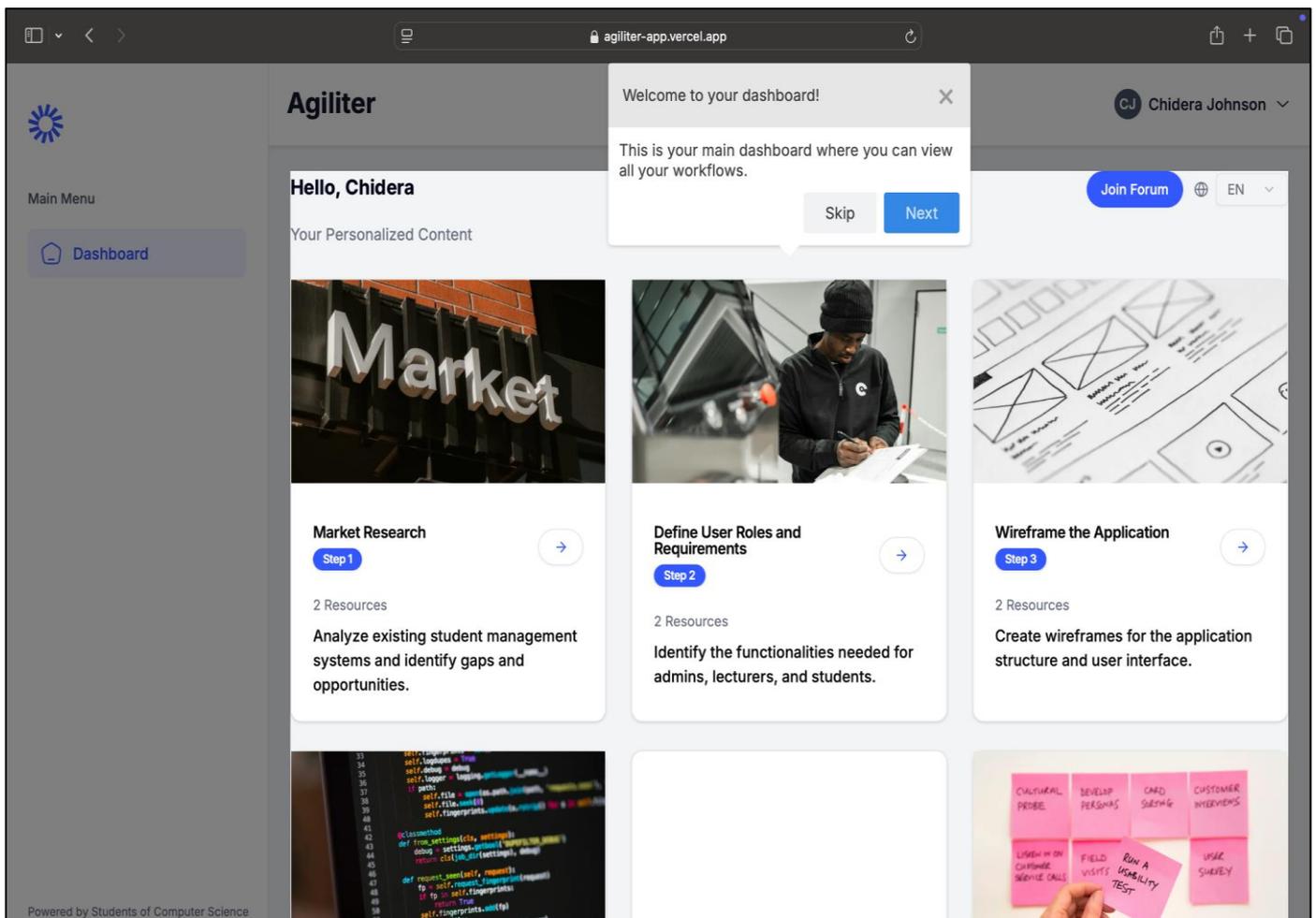
Name of product
Name of product

Description
Short description of the product

Target audience
E.g Individuals, Businesses

Platform
E.g Mobile, Web, IOT

Fig 4 Workflow Generation Interface



agiliter-app.vercel.app

Welcome to your dashboard!

This is your main dashboard where you can view all your workflows.

Skip Next

Agiliter

Chidera Johnson

Join Forum EN

Hello, Chidera

Your Personalized Content

- Market Research** (Step 1)
2 Resources
Analyze existing student management systems and identify gaps and opportunities.
- Define User Roles and Requirements** (Step 2)
2 Resources
Identify the functionalities needed for admins, lecturers, and students.
- Wireframe the Application** (Step 3)
2 Resources
Create wireframes for the application structure and user interface.

Powered by Students of Computer Science

Fig 5 User Onboarding Interface

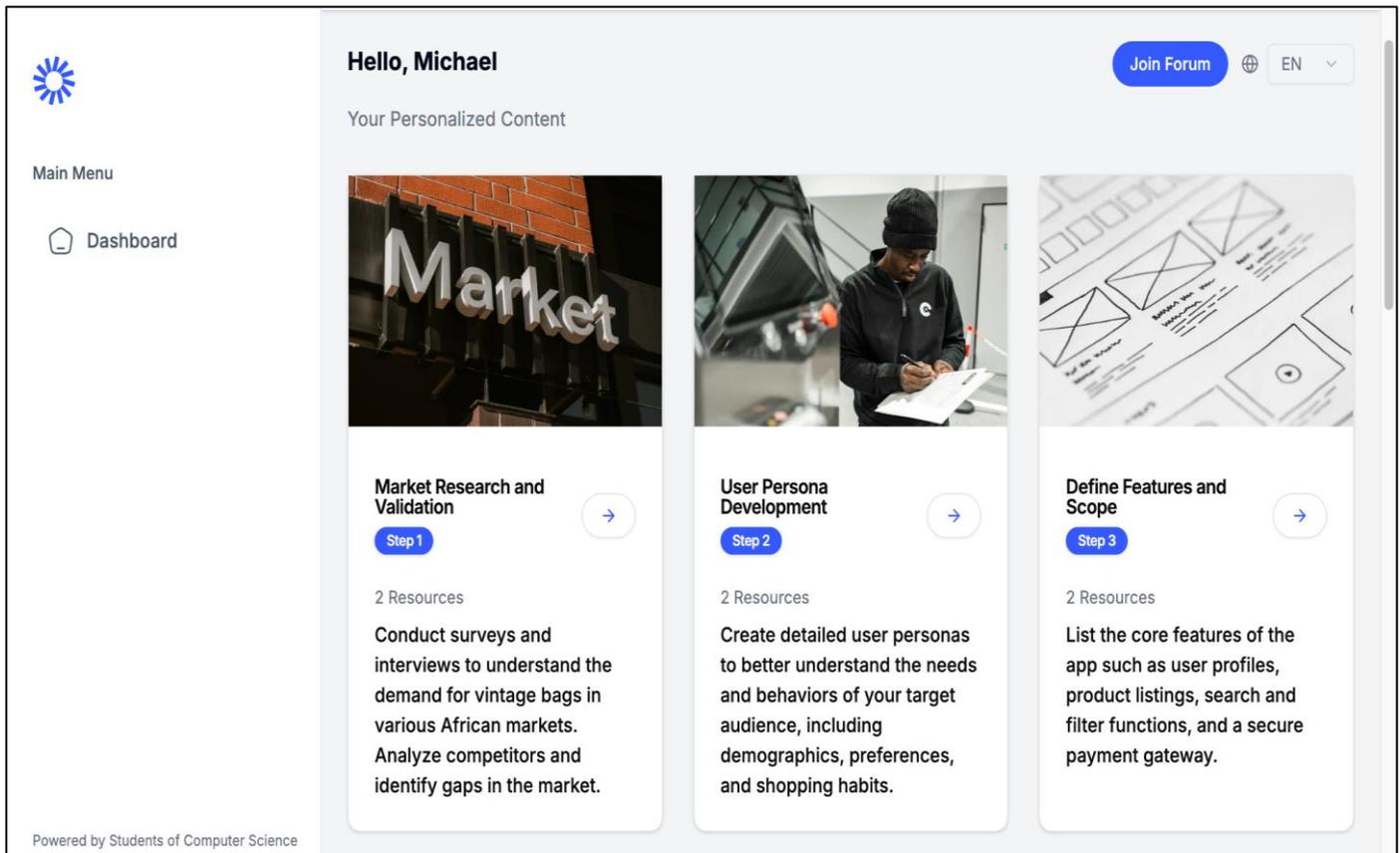


Fig 6 Workflow Output in English

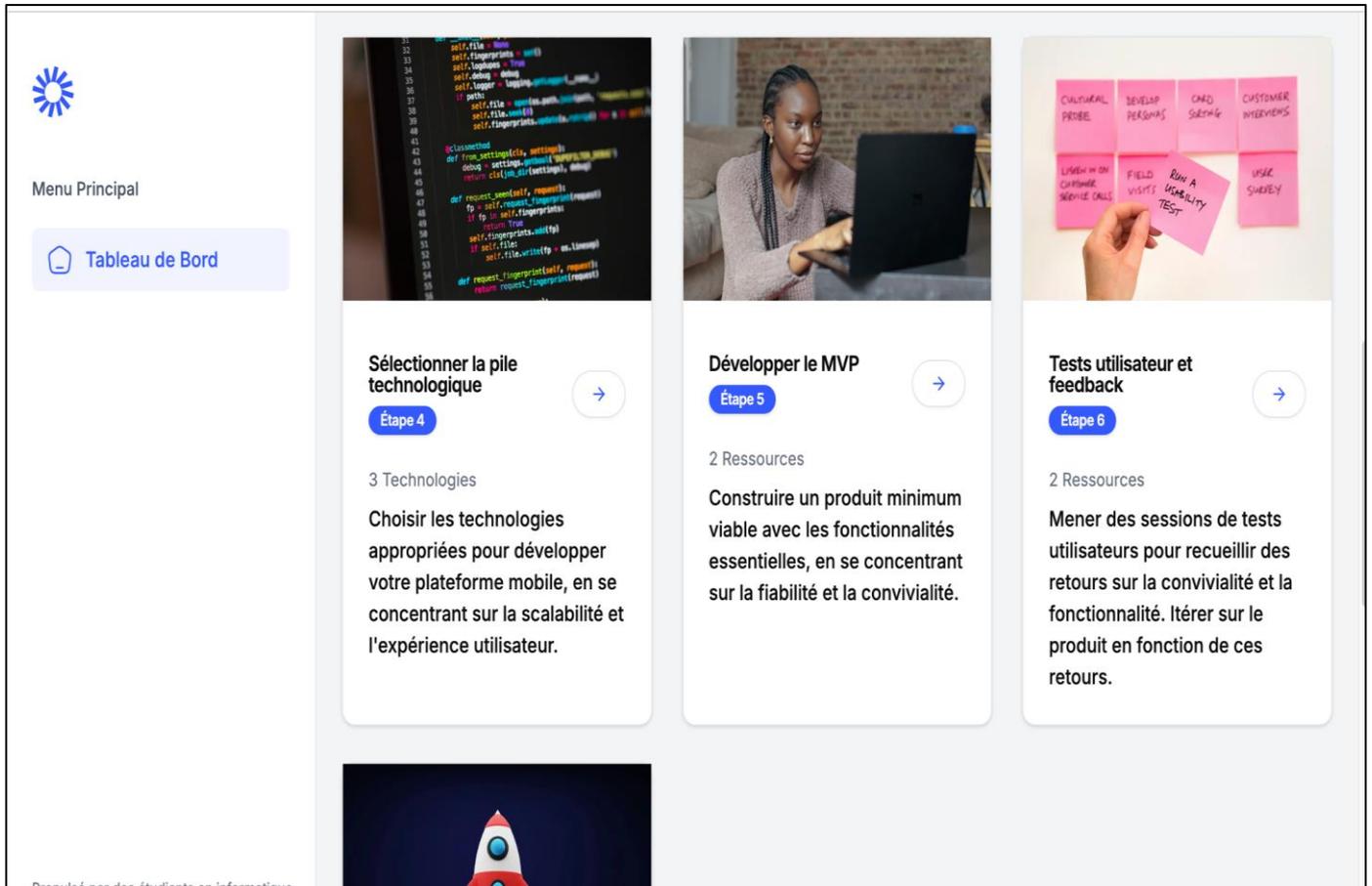


Fig 7 Workflow Output in French

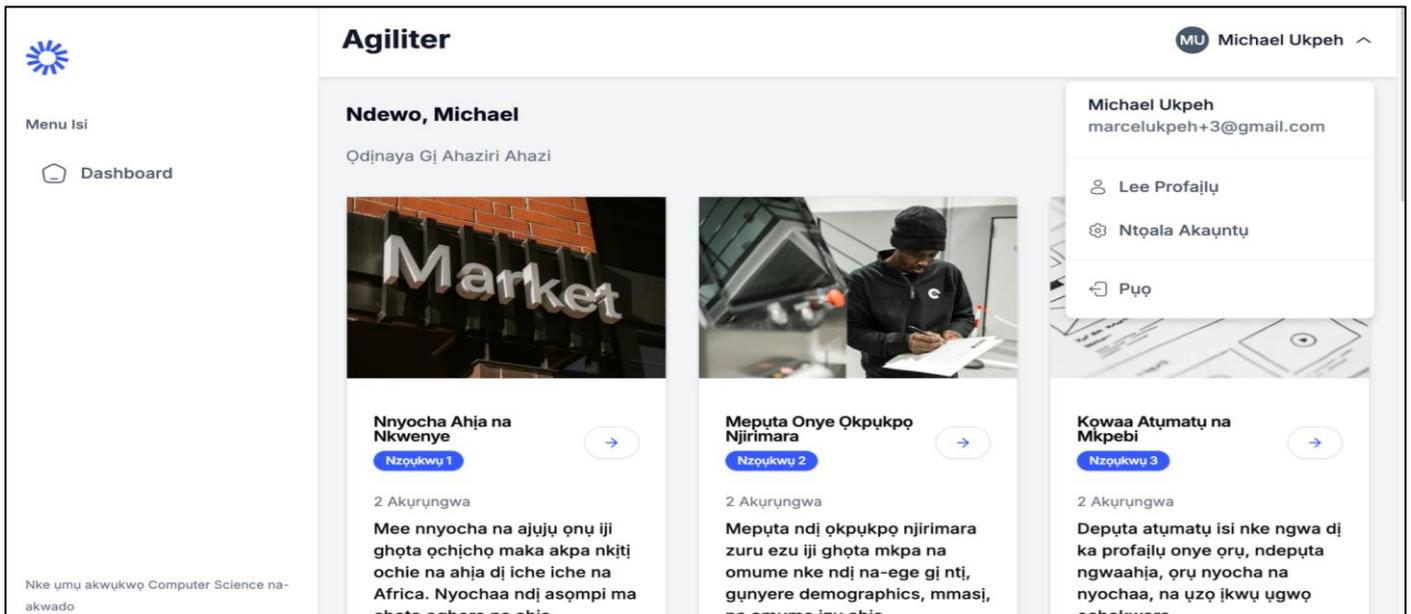


Fig 8 Workflow Output in Igbo

Table 1 Multilingual AI Capabilities and User Outcomes

Feature	Description	Outcome
Supported languages	English, French, Igbo	Full workflow and translation support
Meaning retention	Cultural and semantic accuracy	High user satisfaction
Workflow relevance	Roadmap clarity and usefulness	Consistently relevant across languages
Linguistic inclusivity	User comfort in native language	Increased confidence and natural expression

• *Community Engagement and Cross-Linguistic Collaboration*

The integrated Rocket.Chat forum greatly contributed to promoting multilingual collaboration. The platform automatically placed participants into industry-specific channels, creating focused spaces for mentorship and peer

interaction. Figure 9 shows the collaborative forum environment, where conversations flowed naturally across languages.

Engagement metrics are displayed in Table 2, showing the high level of participation and cross-language interaction within the community.

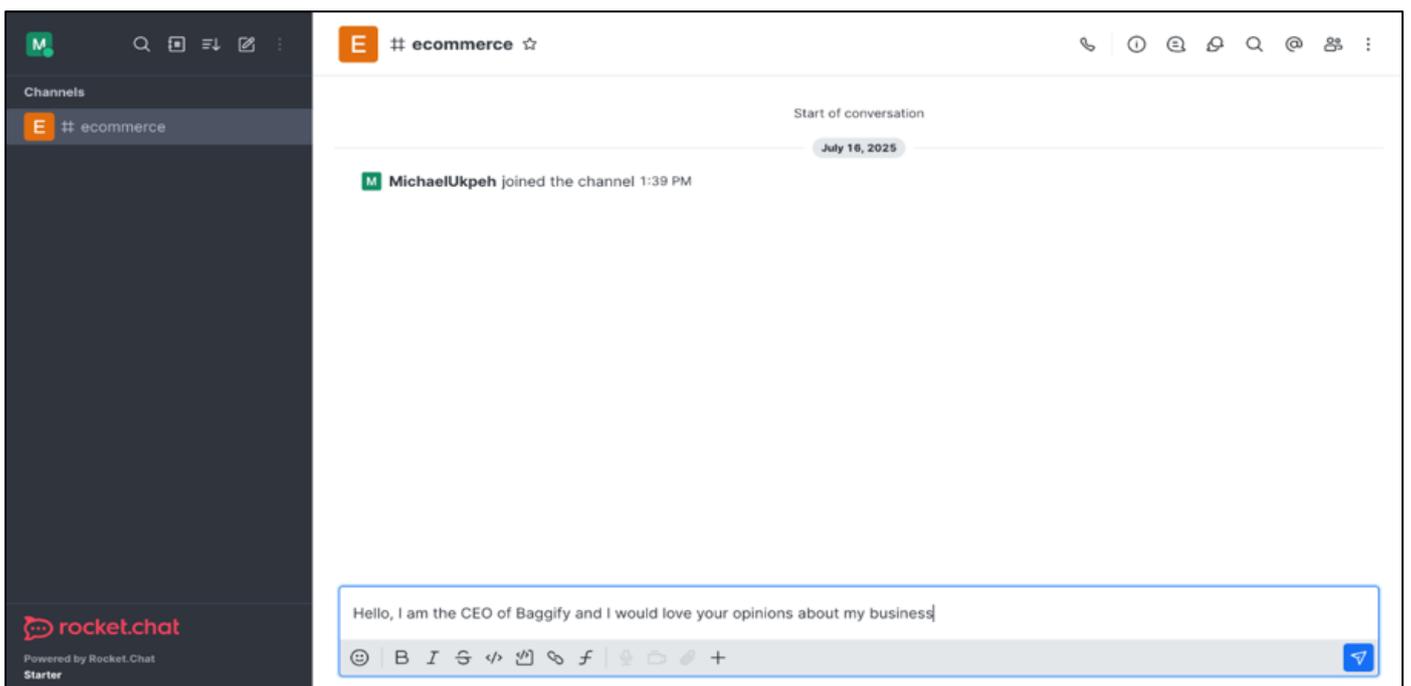


Fig 9 Rocket. Chat Community Forum

Table 2 Community Engagement Metrics

Metric	Value	Interpretation
Active participation rate	65%	Majority of users interacted consistently
Sector channels	7	Covered major startup verticals
Average posts per active user	12	Indicated sustained peer exchange
Cross-language interactions	Frequent	Demonstrated multilingual collaboration

- User Progression and Entrepreneurial Development**
 Personalized dashboards allowed participants to track their journey from idea development to prototype creation.

Many users noted that the structured workflows simplified the complexities of the early startup process. Table 3 summarizes the user progression patterns observed during the study.

Table 3 User Progression Statistics

Development Stage	Percentage of Users Completing Stage	Notes
Idea submission	100%	All participants engaged with the workflow generator
Workflow generation	100%	Each user produced at least one multilingual roadmap
Community interaction	65%	Consistent with forum participation metrics
Prototype development attempt	48%	Nearly half progressed toward early-stage prototyping

- Cultural and Innovation Impact**
 A key benefit of the Agiliter platform is its ability to support linguistic diversity in entrepreneurial practice. Participants felt a stronger sense of belonging when brainstorming and collaborating in their native languages. Using indigenous languages, especially Igbo, eased communication anxiety and encouraged more genuine expression. These findings show that culturally considerate AI systems can significantly broaden entrepreneurial participation in linguistically diverse regions.

The ability of Agiliter’s multilingual workflows to generate real-time idea outputs in native and global languages showcases the potential of large language models (LLMs) for inclusive innovation. Similar findings in the literature reveal that LLMs can facilitate knowledge creation and lower cognitive barriers when users engage in their preferred language (Caswell & Zhao, 2023). The high user engagement in this project also supports evidence suggesting that models tailored for local languages tend to enhance technology adoption, trust, and usability (Adebara & Abdul-Mageed, 2022). By supporting Igbo—a less commonly spoken language—this project pushes for culturally grounded AI systems that reflect Africa’s linguistic diversity (Orife et al., 2020).

- Planned System Expansion**
 Based on user feedback, the next phase of Agiliter will include advanced tools that support the entire startup lifecycle. Future developments will feature AI-generated Lean Canvas and Business Model Canvas templates, market validation through automated insights, rapid prototyping with no-code solutions, and formal business support via regional compliance platforms. More African languages will be added, with ongoing collaboration with language experts to ensure cultural and contextual accuracy.

The community development aspect of Agiliter, particularly its automated forum through Rocket.Chat, aligns with research on the importance of peer support networks for entrepreneurial growth in areas with limited institutional resources. Previous studies confirm that African founders often rely heavily on informal mentorship and peer learning due to weak formal support systems (Khavul et al., 2022). The automatic assignment of users to sector-specific forums mirrors the collaborative nature of African entrepreneurial ecosystems. Real-time knowledge exchange can enhance survival rates and early-stage innovation (Graham, 2020). The 65% participation rate suggests that automated onboarding lessens barriers and enhances social cohesion, supporting the idea that well-structured online communities improve entrepreneurial learning outcomes (Chatterjee & Kumar, 2021).

- Discussion of Findings**
 The findings of this study show that the Agiliter project supports global evidence indicating that multilingual AI systems can widen access to digital services, reduce exclusion, and improve user autonomy in linguistically diverse settings. Previous studies highlight that language accessibility is a major factor in digital participation, especially in resource-limited areas (Bird, 2022; Nekoto et al., 2020). By enabling workflows in English, French, and Igbo—and planning to expand into Spanish, Portuguese, and Swahili—Agiliter aids ongoing efforts to close Africa’s multilingual digital gap. This aligns with research showing that entrepreneurs in Africa often struggle to access startup knowledge because most resources and training materials are produced in non-African languages (Ogunyemi & Aigbavboa, 2021).

The observed limitations of Rocket.Chat, especially its lack of dynamic message translation, reflect broader critiques in the literature about the shortcomings of existing communication platforms for multilingual collaboration (Kementchedjhieva et al., 2023). The proposed AI-powered multilingual forum aligns with new developments in real-time translation and conversational AI designed for cross-language communication (Jiao et al., 2023). By adding

automatic language detection, caching, and AI moderation, the proposed system follows current best practices in multilingual natural language processing and safety measures (Zhang et al., 2023). Research reveals that real-time translation can significantly improve collaborative performance and cross-cultural interaction in online communities (Škorić et al., 2022), suggesting that Agiliter's planned forum could greatly boost inclusivity and regional integration.

The Mentor–Mentee Assessment Framework proposed for Agiliter's next development phase also aligns with findings in AI-assisted learning analytics and entrepreneurial capacity building. Digital mentorship programs perform better than unguided self-learning when feedback loops are data-driven, adaptable, and personalized (Cunningham & Craig, 2020). Using NLP to summarize mentor notes has been shown to lighten administrative burdens and improve knowledge retention among early-stage founders (Guzman & Stern, 2015). Furthermore, focusing on measurable indicators and tracking over time connects with research advocating for evidence-based evaluation in entrepreneurship support programs (Liguori et al., 2019). In areas like Africa, where mentorship shortages are prevalent (Williams & Kedir, 2021), this framework has potential for scalable mentorship across languages.

The study found several challenges that match existing empirical observations. The difficulty in scaling AI systems to additional African languages reflects the ongoing lack of high-quality training data for African NLP (Alabi et al., 2022). Similar studies emphasize the need to work with language experts to ensure contextual and cultural accuracy (Nekoto et al., 2020). Engagement challenges are also common in digital communities operating under resource constraints. Factors like internet costs, device limitations, and spotty connectivity affect sustained participation (Sambuli et al., 2022). Still, the unexpectedly high completion rate for French-language workflows (28%) aligns with research indicating a strong demand for Francophone digital entrepreneurship tools across West and Central Africa (Lehmacher & Solis, 2023).

In summary, this discussion reinforces that Agiliter's multilingual, AI-driven, community-oriented design adheres to global best practices while addressing local barriers. It contributes to ongoing scholarly calls for AI systems that support local languages, promote equitable access, and strengthen collaborative innovation systems in the Global South. The findings provide evidence that culturally aligned AI technologies can significantly increase participation, speed up workflow creation, and improve entrepreneurial outcomes for young African founders.

V. CONCLUSION AND RECOMMENDATIONS

The findings of this study demonstrate that multilingual, AI-driven platforms hold significant potential for advancing entrepreneurial inclusion and innovation in Africa. The Agiliter platform serves as evidence that when early-stage founders are empowered to articulate ideas,

access resources, and collaborate in their preferred languages, participation increases and entrepreneurial confidence is strengthened. By integrating real-time workflow generation across English, French, and Igbo, together with automated community mapping through industry-specific forums, the platform effectively addressed long-standing linguistic barriers that often exclude many African founders from mainstream startup ecosystems. The strong uptake of multilingual workflows—particularly the unexpected level of French-language adoption—highlights the unmet demand for culturally aligned digital tools that go beyond translation to support meaningful ideation and collaboration.

The results further show that AI-driven community automation can catalyze peer support and cross-sector interaction in contexts where professional networks are typically fragmented. However, the limitations identified in forum translation, scalability of additional languages, and sustaining active engagement indicate the need for continued refinement. These challenges do not diminish the platform's value; rather, they highlight the complexity of designing technology that mirrors Africa's linguistic diversity while maintaining technical precision and usability. The project's emerging architectural plans, including a custom multilingual forum with dynamic, per-message translation, provide a promising direction for achieving more seamless interaction across language groups.

Given these insights, it is recommended that future development efforts prioritise expanding the platform's linguistic coverage to additional African languages such as Yoruba, Hausa, Kiswahili, and Amharic, supported by collaborations with local linguists and regional institutions. The proposed multilingual forum should be further pursued to overcome the structural limitations of existing communication tools and to ensure that users can participate fully in their chosen languages. Enhancing the AI-driven mentor–mentee assessment framework with predictive analytics and longitudinal tracking will also strengthen evidence-based support for founders and improve program accountability for incubators and policymakers.

Strategic partnerships with universities, government innovation agencies, and entrepreneurial hubs are strongly encouraged to deepen adoption and enrich the platform's knowledge base. Training initiatives and digital literacy programs should accompany platform expansion to sustain engagement and ensure equitable access for founders with varying levels of technical proficiency. Continued research is necessary to examine the long-term impact of multilingual AI support on startup outcomes, including innovation quality, regional market integration, and business survival rates.

Overall, the study concludes that multilingual AI platforms such as Agiliter can provide a transformative foundation for inclusive digital entrepreneurship in Africa. By bridging linguistic divides, strengthening collaborative communities, and offering personalized, data-informed guidance, such systems can contribute to a more connected and culturally representative entrepreneurial ecosystem. The continued evolution of Agiliter has the potential to shape the

next generation of African innovators who can think, build, and compete confidently without linguistic disadvantage.

➤ *Data Availability*

The data presented in this study are available on request from the corresponding author.

➤ *Conflict of Interest*

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

➤ *Funding Source*

This research received funding from OBREAL Global Association of African Universities and Symbiosis International University

ACKNOWLEDGEMENTS

The authors would like to thank the Commonwealth Secretariat, OBREAL Global Association of African Universities and Symbiosis International University for their support, guidance and funding of this work.

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