

Towards a Digital Platform for Scientific Valorization and Women's Empowerment: A Case Study in Bas-Mangoky, Ambatondrazaka, and Ankazomiriotra, Madagascar

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Abstract—This research examines the integration of digital educational communication in rural areas - a process often perceived as challenging due to technical limitations, geographic isolation, gender disparities, and context-specific barriers. However, our study, titled “Towards a Digital Platform for Scientific Valorization and Women's Empowerment: A Case Study in Bas-Mangoky, Ambatondrazaka, and Ankazomiriotra, Madagascar,” presents a more optimistic perspective. The central problem this research addresses is how to effectively leverage digital communication and education to empower rural women and support their entrepreneurial development. This inquiry is guided by two key research questions: How does digital communication influence the entrepreneurial mindset? And how can digital education and support strengthen the activities of women's associations? Conducted in collaboration with women's associations in the three regions mentioned, and supported by AFRICA RICE through the FOFIFA research center, the study was part of a rice processing initiative using a parboiling system to improve rice quality. Central to the research is the idea that digital communication and education can serve as powerful levers to empower rural women as agents of development in their communities. The methodology unfolded in two complementary phases. The first was a small-scale exploratory study aimed at evaluating the project's feasibility, assessing cost and time requirements, and designing a social communication strategy tailored to the realities of rural women. This phase also provided insights into their needs, levels of digital literacy, access to technology, and the socio-cultural constraints affecting their engagement. Building on these findings, the second phase involved the development and implementation of a large-scale survey and the creation of a digital platform adapted to the target context. This phase assessed the tangible impact of digital communication and educational interventions on women's empowerment. Key indicators included improved access to information, acquisition of practical digital skills, increased involvement in local initiatives, and the emergence of new socio-economic opportunities. The outcomes indicate a promising future for these pilot regions. Digital technology, when effectively integrated with education, offers significant potential for rural transformation. The research led to the development of a dedicated digital platform designed to disseminate research results and foster opportunities for women entrepreneurs. The platform enabled women to exchange knowledge, capitalize on research findings, and improve their quality of life.

Keywords— Digital platform, knowledge sharing, women's entrepreneurship, rural development, entrepreneurial mindset.

I. INTRODUCTION

Technology plays a crucial role in modern agriculture, offering numerous benefits to farmers globally. Information and Communication Technologies (ICT) facilitate communication among stakeholders, disseminate information, and improve agricultural services (Milovanović, 2014). According to a regional economic analysis, technology can be used for various purposes: to facilitate communication between stakeholders, circulate information among rural economic activities, and improve existing services these technologies enable farmers to access vital information on weather forecasts, market prices, and best practices, leading to informed decision-making and optimized farming operations. Precision farming technologies, such as GPS and GIS, help farmers optimize resource use and improve crop yields. Various communication tools, including internet, mobile phones, radio, and television, play significant roles in disseminating agricultural information (Chhachhar et al., 2014). Mobile phones, in particular, have reduced the gap between farmers and buyers, allowing direct communication and access to market prices (Chhachhar et al., 2014). Despite its potential, the implementation of IT in agriculture faces challenges and limitations (Milovanović, 2014).



Figure 1: Bas Mangoky- Ambatondrazaka Ankazomiriotra associations
(Source 2022)

The rapid advancement of digital technologies, particularly mobile phones, has become a significant driver of socio-economic development in rural areas of developing countries. Mobile ICTs provide access to vital services, information, and opportunities, contributing to improved living standards and empowerment, especially for women (Islam & Slack, 2016). These technologies facilitate access to healthcare, enhance security for girls' education, and create income-generating opportunities (Islam & Slack, 2016). Mobile phones enable strategic and low-cost e-applications for rural and remote areas, helping to bridge the digital divide (Badombena-Wanta & Sheybani, 2010). The proliferation of distributive and open technologies, lower delivery costs, and multiple sources of innovation have made technology more accessible to marginalized communities (Värzaru & Bocean, 2024). By leveraging mobile technology, rural areas can overcome challenges and promote economic progress, entrepreneurship, and overall quality of life (Musingafi & Zebron, 2014).

In an increasingly connected world, digital communication and access to technology are emerging as essential drivers of economic and social development, particularly for women's groups in Madagascar who often face multiple barriers to participation. This article proposes the development of a digital platform designed to showcase scientific research results and create concrete development opportunities for rural women entrepreneurs. The focus of this research is on how digital communication and education can help foster an entrepreneurial mindset among rural women. The following two research questions guide the investigation: *How does digital communication influence the entrepreneurial mindset? and how can digital education and support strengthen the activities of women's associations?*

To address these questions, the study introduces a practical and context-appropriate digital communication tool for education, intended to support and promote the work of female entrepreneurs. This study initiative is a part of the larger objective of supporting and spreading the work of women's organizations throughout Madagascar, namely in the Bas-Mangoky, Ankazomiriotra, and Ambatondrazaka regions. The proposed solution is designed to be simple, modern, and constructive—adapted to the specific social, technical, and economic realities of rural women in Madagascar. The overall objective is to create a digital platform that not only valorizes research results but also serves as a gateway to development opportunities for women's groups. By integrating communication, education, and entrepreneurship, this initiative aims to empower rural women and contribute to inclusive and sustainable local development (Jabbouri et al., 2024).

II. METHODS

In line with the research objectives, this study seeks to address the following key question:

- *How does digital communication influence the development of an entrepreneurial mindset?*

To explore how digital communication may stimulate entrepreneurship, particularly among rural women, we

adopted a research methodology that combines both qualitative and quantitative approaches. This mixed-methods design allows for a comprehensive analysis of practices, challenges, and opportunities related to the use of digital tools in entrepreneurial development. The investigation of digital communication's influence on entrepreneurial development is based on a mixed methodological approach. By combining qualitative insights with quantitative data, the study captures both the subjective experiences of rural women and measurable indicators, offering a holistic and in-depth understanding of the phenomenon. Data collection involved structured and semi-structured tools, including surveys, individual interviews, and focus group discussions with members of women's associations in the target regions. These tools provided a diverse range of information on digital practices, constraints, and perceived benefits associated with communication technologies in rural entrepreneurial contexts.



Figure 2: Contact and focus group with the presidents of the associations and some members (Source 2022)

- *How can education and digital support strengthen the work of women's associations?*

To address this research question, the following methodologies will be employed:

A qualitative approach will be used to understand the needs and impacts by conducting interviews with members and leaders of women's associations, alongside participant observation to directly examine how education and digital support currently function and how they could potentially be integrated. Document analysis will also be carried out to review activity reports, communication strategies, and other relevant materials produced by these associations, with the aim of gaining insight into their needs and practices. The collected data will undergo thematic analysis to identify specific educational and digital support needs, as well as to explore how these elements could enhance the associations' activities.

In addition, complementary methods will include questionnaire-based surveys and online surveys, as well as a quasi-experimental study that implements education and digital support programs for a selected group of women's associations. This study will measure indicators such as communication effectiveness (reach, engagement), capacity to mobilize resources (membership growth, funding), impact of their actions (e.g., number of beneficiaries reached, observed

changes), and the level of member engagement and participation. Quantitative online surveys have been conducted to assess the use of digital communication tools among these associations.

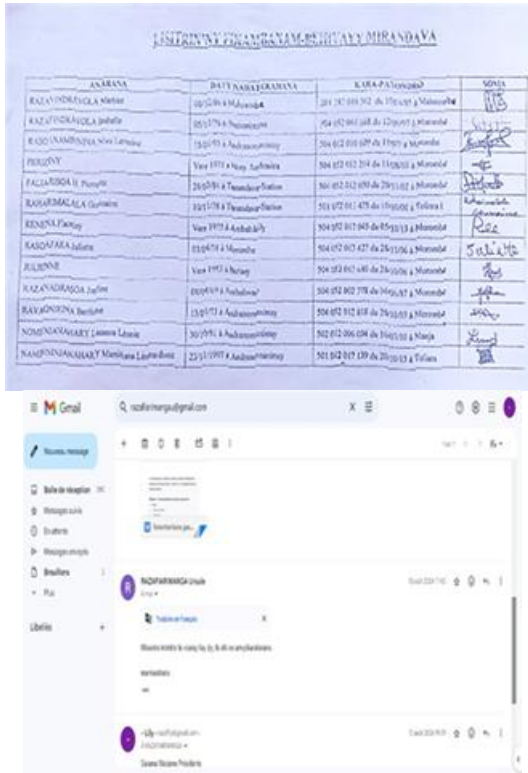


Figure 3: Online Survey (Email Source)

III. FINDINGS

Digital communication tools have now become an effective means of encouraging a spirit of initiative. By simplifying access to information, training, networks, and opportunities, they support the implementation of projects, particularly those led by women’s groups. This section examines the tangible impacts of their use.

3.1. Impacts of using communication tools

The use of digital communication tools such as social networks, messaging platforms, online forums promotes an entrepreneurial mindset by providing easy access to resources, professional networks, and opportunities for collaboration. The following indicators were observed:

3.1.1. Number of training sessions or workshops offered and attended

A tutorial on parboiled rice was designed, proposed, and disseminated among members to facilitate practical and accessible learning, taking into account their educational background, time constraints, and daily responsibilities. The online platform provides a space where women can connect, share ideas, and collaborate on joint projects. Facebook, in particular, facilitates connection, communication, and access to information.

All women in the associations participated in the training sessions through tutorials.

TABLE 1: Number of associations formed (Source 2024)

Designation	Facebook	Tutorial	Platform	Blog
Ankazomiriotra	10	10	10	
Bas Mangoky	14	14	14	
Ambatondrazaka	16	16	16	
Total	40	40	40	

3.1.2. Frequency of digital resource use for skill acquisition

The aim is to ensure that women entrepreneurs have access to reliable information tailored to their specific needs.

To effectively identify and measure the impact of our research, we will assess the reach of our initiative via the blog and the associations’ webpage. These platforms are intended to serve as showcases for the associations’ activities. Their consultation and access are designed to be highly practical and user-friendly- for example, via the following link: <https://edunumeriquerurale.blogspot.com/> or through the QR code leading to the page *Rural Women’s Associations, Actors of Development*.

This blog provides direct access to the history of parboiled rice in Madagascar and numerous valuable opportunities. For instance, it contains links to the websites of key partners such as EDGRND-SEVRN, Africa Rice, and the FOFIFA research center. The platform serves to highlight the usefulness and practicality of digital tools in rural areas. The following figures illustrate the interfaces of the platforms deemed appropriate for use by the associations.



Figure 4: Platform page and access QR code (IT-COM, 2024)

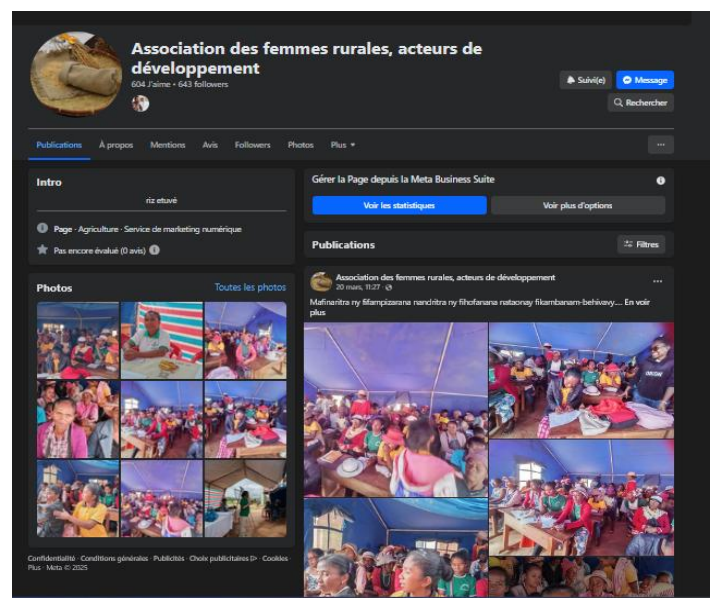


Figure 5: Interface of the Rural Women’s Associations page (Benadou, 2024)

Upon assessment of the platform, the table below reveals that the blog has attracted 1,009 visitors so far.

The blog has recorded a total of 1,009 page views, indicating consistent and genuine user engagement. The majority of visits originate from diverse sources such as Google, Facebook, and other blogs, reflecting effective dissemination and robust overall indexing.

TABLE 2: Blog consultation statistics (platform specifically for women’s groups and partners) (IT-COM, 2024)

Input	Pages views
android-app://com.google.android.googlequicksearchbox/	7
https://www.google.com/	7
https://accounts.google.com/	6
http://m.facebook.com/	8
https://www.blogger.com/	2
Autres	979
Total	1,009

3.2. Quality and relevance of resources for the specific needs of women entrepreneurs

According to data extracted from the platform, 76.4% of our subscribers are women, which leads us to confirm that the platform effectively engages and attracts a female audience.

An extraction was performed to analyze the gender statistics related to the activities of the associations.

3.3. Digital practices and the development of skills acquired through the platform

Beyond training on the parboiled rice production process, women require support in additional technical areas, particularly marketing and negotiation. Their personal achievements and creativity are notable, as illustrated in the figure below, including:

- Improvement of packaging;
- Addition of logos on packaging;
- Addition of contact information on the packaging

Resources must be carefully adapted to address the specific challenges faced in rural contexts, such as the marketing of local products and limited internet connectivity. Digital tools offer rural women critical opportunities to enhance their entrepreneurial activities and improve their socio-economic conditions. By facilitating communication, access to training, product commercialization, and networking with other entrepreneurs, these technologies have become indispensable in promoting local economic development and mitigating inequalities.

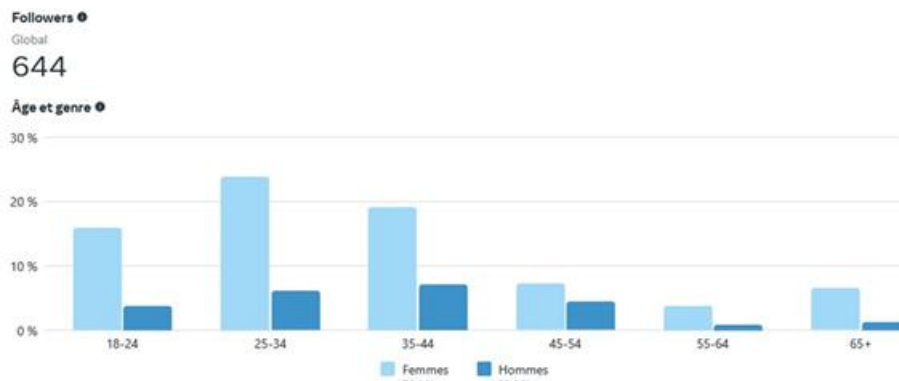


Figure 3: Classification of followers by gender (Benadou, 2024)



Figure 4 : Marketing progress (Source 2022)

As illustrated in the figure below, evidence suggests that provision of digital tools and foundational digital literacy significantly contributes to their advancement. Testimonies from women residing in isolated villages distant from urban centers highlight the substantial barriers encountered in the absence of such tools, raising concerns about how to effectively promote products and increase visibility.

Nonetheless, the availability of even a basic mobile phone enables these women to extend their market reach throughout Madagascar.

Technology has demonstrated to be effective, user-friendly, and efficient for associations, particularly when tools are chosen in alignment with their available resources and capacities.



Figure 5: Online sales



Figure 6 : Number of new followers on the association’s Facebook page (Benadou, 2024)

TABLE 3: Digital practice and acceptance of integration (Source, 2024)

Designation	Numbers	Practice
Bas Mangoky	18	18
Ambatondrazaka	10	10
Ankazomiriotra	16	16
Total	44	44

All women in the associations have embraced digital integration.

3.4. Increase in economic opportunities (employment, entrepreneurship, access to funding)

This can be measured using the following indicators:

3.4.1. The number of individuals engaging with their activities on professional social networks

A high number of new followers indicates that more people are discovering and showing interest in the page. This may result from the quality of the content, promotional efforts, or positive word-of-mouth. An increase of 653 followers demonstrates that the content remains relevant and appealing to the target audience. It serves as evidence that the publications align with the interests and expectations of the public.

3.4.2. Expansion of the professional network (number of connections and exchanges among users)

Active participation in online forums and discussion groups has led to a significant number of women finding partners, clients, or mentors through the platform.

3.4.3. Number of collaborations and projects initiated through digital platforms

The opportunities and collaborations established over the year have significantly contributed to the growth and improvement of associations’ activities. Moreover, future projects are already underway, particularly through participation in online networking events, where the use of digital platforms has sparked unexpected and promising responses.

The table demonstrates that the platform plays a key role in fostering economic, social, and media partnerships across the three localities, with tangible outcomes such as market access, support for school canteens, and the promotion of women through radio programs. This confirms that the platform is active, well-rooted at the local level, and serves as a catalyst for development opportunities.

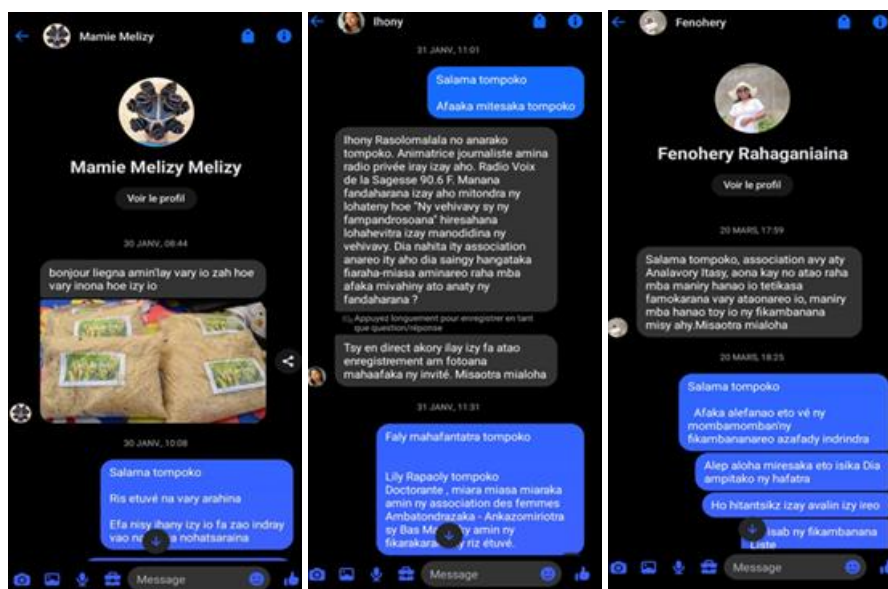


Figure 7 : New partnership opportunities among associations (Fikambanam-behivavy Analavory) and radio stations (Sagesse Radio 90.6 FM « Ny vehivavy sy ny fampandrosoana »). (Benadou, 2024)

TABLE 2: Networking and opportunities via the platform (Source, 2025)

Designation	Ambatondrazaka	Ankazomiriotra	Mangoky	Observations
FIA	1	1	1	International sales
FIER MADA	1	1	1	National sales
ASSOCIATION	1	1	1	Exchange opportunities
PAM	-	-	1	School canteen
SCORE	-	-	1	Supplier
Radio Sagesse 95.6 Fm	1	1	1	Program: Women and Development (<i>Ny vehivavy sy ny fampanandrosoana</i>)

3.4.4. Indicators of entrepreneurial spirit

- Visibility of research outputs (number of views, downloads, shares)

According to data exported from the platform regarding visits to the Facebook page, over 1,100 individuals had visited the page by early April. This volume of visits indicates a significant level of interest and attracts a considerable audience, presenting an opportunity to convert these visitors into subscribers or clients.

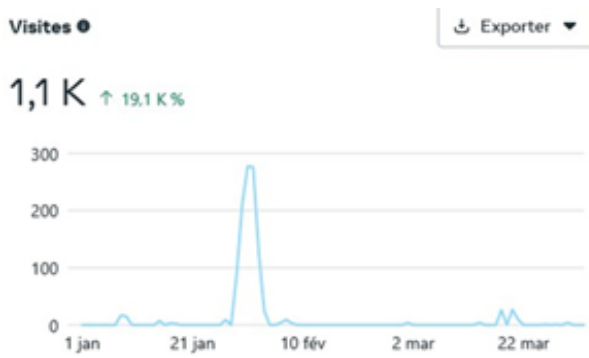


Figure 8 : Number of page views (Benadou, 2024)

- User feedback on the relevance and usefulness of the content

The associations have recognized the importance of communication and digital tools, which motivate them to progress further. A comparison of their levels of engagement and enthusiasm reveals their creativity and entrepreneurial spirit. Notably, beyond using digital media during events, the creation of logos and business cards originates from their own initiatives.



Figure 9: Group logo / Business card / Packaging style / Sales support (Source, 2024)

To statistically confirm their levels of innovation and future creativity, refer to the table below illustrating their entrepreneurial mindsets.

The progression level of entrepreneurial mindsets highlights the positive impact of support that encourages the adoption of more modern professional practices.

TABLE 3 : Comparison of entrepreneurial mindsets (binary values: 0 or 1) (Source, 2024)

Designation	Ambatondrazaka		Ankazomiriotra		Bas Mangoky	
	Before	After	Before	After	Before	After
Email	0	1	0	0	0	0
Messenger	1	1	1	1	1	1
Sales and Marketing	0	1	0	1	1	1
Digital Tools	0	1	0	1	1	1

- Increase in economic opportunities (employment, entrepreneurship, access to funding)
- Growth in revenue for member association enterprises

Although members remain discreet about their revenue figures, some information was obtained through the president of Bas Mangoky to help measure this phenomenon.

TABLE 6: Bas Mangoky association production and revenue over 3 years, adjusted for a 1,000 Ar price increase in 2025 (Source, 2025)
Calculation formula: selling price × quantity sold

Designation	2022	2023	2024	2025	Observation
Production (tonnes)	100	200	200	500	Production issues in 2024 due to an oversupply of base rice
Production Increase (tonnes)	-	100	0	300	Production recovery
Production & Sales (tonnes)	100	200	0	500	-
Selling Price (Ariary)	5,000	5,000	5,000	6,000	-
Revenue (Ariary)	500,000	1,000,000	0	3,000,000	-
Profit (Ariary)	0	500,000	0	2,000,000	-

The table demonstrates a marked progression in the association's activity between 2022 and 2025, characterized by a significant increase in both production volume and revenue, despite a complete interruption in 2024. The year 2025 represents a substantial recovery, with record levels of turnover and profit, indicating a successful relaunch and improved operational efficiency.

- Number of projects initiated or strengthened through available resources

The availability of context-appropriate and functional resources has contributed to the reinforcement of institutional capacities and the consolidation or initiation of strategic partnerships within the associations.

- Strengthening women's confidence and autonomy in their entrepreneurial initiatives

A notable shift in mindset has been observed, marked by the disappearance of fear related to mobility and active participation in international events. This evolution reflects a gradual overcoming of socio-cultural constraints, such as the traditionally imposed role of women as primary caregivers and the reluctance to step outside the rural comfort zone. Many have transitioned into professional roles within the agro-industrial sector, demonstrating increased self-assurance and agency in pursuing their entrepreneurial ambitions.



Figure 10 : Participation in the FIA (International Agriculture Fair) (Source 2022)

The table below presents the national and international participation of the associations over a three-year period, with full financial autonomy achieved since 2023.

The autonomy of the associations is evidenced by their active participation in major national events such as FIA and FIER MAD, as well as by their roles as trainers and mentors for other associations.

Active engagement in online forums and discussion groups has facilitated numerous women in establishing partnerships, securing clients, and gaining mentorship opportunities through the platform.

3.4.5. Indicators of skills development

- Number of online training sessions completed by association members (with on-site support)

The associations are well trained in digital tools, with widespread use of Messenger and Facebook for both internal and external communication. This reflects a high level of digital empowerment, enabling the associations to be more connected, visible, and responsive.

TABLE 4: Participation in Events and Progress Reflecting Their Empowerment (One-Year Observation) (Source 2023)

Désignation	Ankazomiriotra	Bas Mangoky	Ambatondrazaka	Observation
Year	2023			Year of full empowerment of the associations
FIA	1	1	1	-
FIER MADA	1	1	1	-
Trainer	1	1	0	Both presidents became trainers for other associations during the DEFIS project.
Total	3	3	2	Seven indicators demonstrating the autonomy of the associations

TABLE 8: Number of associations trained and types of digital training methods employed (Source 2024)

	Ankazomiriotra	Bas Mangoky	Ambatondrazaka	Observation	Total beneficiaries
Number of members	10	18	16	-	44
Mail usage	4	4	4	Representatives	12
WhatsApp usage	4	4	4	Representatives	12
Messenger usage	10	18	16	-	44
Facebook usage	10	16	16	-	112

- Assessment of acquired skills (self-evaluations, certificates)

TABLE 5: Assessment of Acquired Skills (Source 2024)

Designation	Ankazomiriotra	Bas Mangoky	Ambatondrazaka	Indicator
Use of Messenger	2 (Exchange and sales)	2 (Exchange and sales)	2 (Exchange and sales)	Online practice
Marketing (Packaging improvement)	2 proposals	2 proposals	1 proposal	Packaging style aligned with storage standards
Negotiation	3 (Africa Rice – CFFAMMA)	3 (Africa Rice – DEFIS – PAM)	2 (Africa Rice – agricultural supplier)	Increase in partners
Communication	Trainer	Trainer	0	Sales and partnership development



Figure 11 : Collection of exchanges within the time of an SMS (Benadou, 2024)

TABLE 10: Evolution of partnerships for the three associations (Source 2025)

Designation	2022	2023	2024	2025
Personnel	Each product beneficiary	Each product beneficiary	Each product beneficiary	Each product beneficiary
Regional	Tana - Toliara - Antsirabe - Ankazomiriotra - Ambatondrazaka - Bas Mangoky	Tana - Toliara - Antsirabe - Ankazomiriotra - Ambatondrazaka - Bas Mangoky	Tana - Toliara - Antsirabe - Ankazomiriotra - Ambatondrazaka - Bas Mangoky	Tana - Toliara - Antsirabe - Ankazomiriotra - Ambatondrazaka - Bas Mangoky
Associations				Maherisoa Fanantenana VMI Mpiaro Soafaniry AMS Vonina Mirindra
International	FIA - FIER MADA	FIA - FIER MADA	FIA - FIER MADA	FIA - FIER MADA
Enterprises			SCORE	SCORE
Projects			PAM	PAM

The support provided to beneficiaries contributes to strengthening their skills in key areas such as negotiation and communication, enhancing their economic and social empowerment, and qualifying them to serve as coaches in their respective communities.

3.4.6. Indicators on Communication Facilitation

These Indicators include the frequency of virtual meetings and workshops conducted by each association, as well as the effectiveness of their use of messaging and collaboration platforms.

Exchanges with the associations confirm the importance of digital tools in their daily lives. According to their testimonies, they no longer feel isolated and are now able to send information in the time it takes to write a simple SMS (Figure 14).

3.4.7. Indicators of funding and partnership opportunities

- Number of partnerships established through digital platforms

Taking the case of the Bas Mangoky association and the evolution of partnerships gained since the adoption of digital tools.

The evolution of partnerships demonstrates a progressive inclusion of local, regional, and international actors over the years. The introduction of new partners such as SCORE and PAM reflects successful diversification and a significant strengthening of local projects in 2025.

- Amount of funds raised through online fundraising campaigns

Women benefit from raising funds through digital campaigns such as advertisements, videos, and photos. Online platforms provide rich tools (photos, videos, testimonials) to concretely illustrate the impact of the association’s work and the needs of rural women. These emotional narratives can evoke empathy and motivate support for the cause.

Note: We can assess the revenue growth of the MIRADAVA association over the past three years, noting that despite a rise in rice prices in 2024, sales increased due to awareness efforts, visibility, and especially the digital influence of the platform. Between 2022 and 2025, rice prices evolved, with a notable increase in parboiled rice prices in 2025. This period reflects production stagnation in 2024 caused by water issues, followed by a rebound in 2025. Improved visibility of parboiled rice through digital tools and

online sales contributed to a steady increase in the customer base.

TABLE 6: Earnings over the past three years from digital integration, expressed in Ariary (Source 2024)

Designation	2022	2023	2024	2025	Observation
Production	100	200	200	500	Issue observed in 2024 due to water abundance
Production increase	-	100	0	300	Production catch-up
Gain (Ariary)	-	500,000	0	3,000,000	Gain catch-up

The importance of digital tools, platforms, and awareness campaigns lies in their ability to educate the public about the specific challenges faced by rural women and the critical need for their empowerment. These tools can be strategically designed to raise awareness, foster understanding, and promote inclusive development by highlighting the realities and contributions of women in rural areas.

3.4.8. Indicators of effectiveness and impact

- Number of successful projects resulting from digital education and technological support

TABLE 7 : Effectiveness of technological support over a one-year period (Source 2024)

Designation	Association	Regional	International	Observation
Sales Project		FIER MADA	FIA	
Outreach Project		FIER MADA	FIA	
Women's Solidarity Project	Land acquisition for agricultural use	FIER MADA	FIA	Negotiation with Fokontany president regarding cultivable land
Association Fund System	Monthly contribution of 20,000 Ar	-	-	-
	Percentage earned per kilogram of parboiled rice	-	-	-
Job Offers	Positions for materials manager and accountant	-	-	-
Opportunity Project	Between associations	Other associations	Clients	Partners
Total	4	3	3	

The table illustrates that sales, outreach, and women's solidarity projects are effectively supported through partnerships with local, regional, and international stakeholders such as FIER MADA and FIA. The involvement of associations in internal financial management and the creation of local employment opportunities reflects a growing empowerment within the communities.

- Assessment of project impact on the community (improvement of living conditions, empowerment)

Participation in major economic events such as FIER Mada and FIA reflects the growing visibility and initiative of the associations. A notable milestone was reached in September 2023, when members independently rented a booth at the FIA for 2 million Ariary, without any financial support from Africa Rice. This act underscores both their motivation and financial autonomy. The use of digital tools has significantly facilitated communication and coordination among associations, allowing them to share information, plan collectively, and strengthen their collaboration from a distance.

The table below presents the treasury data and collective financial efforts of members for the years 2022 and 2023, focusing on three associations: Bas Mangoky, Ambatondrazaka, and Ankazomiriotra.

The evolution of their activities and financial management over the past three years illustrates a strong sense of integration and mutual support. This dynamic has been greatly reinforced by digital technologies, enabling the associations to collaborate more efficiently and reach a new level of operational maturity.

Although funds dedicated specifically to event participation are not yet included in their formal budgets, the determination and commitment of members—strengthened by targeted support in areas such as accounting, marketing, negotiation, and communication—have led to behavioral change and successful independent management of their participation at such events.

There were no financial contributions from external partners in 2021 and 2022. However, in 2023, the associations independently mobilized 2,000,000 Ariary to participate in FIA. This development reflects a notable progression in financial autonomy, demonstrating the associations' growing capacity to self-finance their involvement in major events and to manage resources without external dependence.

TABLE 13: Evolution of Their Event-Related Treasury in Ariary (Source 2024)

Treasury Item	FIA	FIER MADA	Total	Funding Source
Année 2021	0	0		Africa Rice
Année 2022	0	0		Africa Rice
Année 2023	2,000,000	0	2,000,000	Associations

IV. DISCUSSIONS

This research explores the influence of digital communication on the entrepreneurial mindset and the role of education and digital support in strengthening the work of women's associations in Madagascar. The results highlight complex and interdependent dynamics, opening promising

avenues for the promotion of entrepreneurship and women's empowerment through digital means.

4.1 Influence of Digital Communication on the Entrepreneurial Mindset

The findings suggest that digital communication exerts a significant influence on the entrepreneurial mindset at several levels:

4.1.1 Information and communication technologies as a tool for women's empowerment and social transformation in Africa

ICTs have become central pillars of both development and women's empowerment across Africa. Empirical studies demonstrate that the spread of ICTs—particularly mobile phones, broadband, and internet access—has positively influenced women's economic engagement in sub-Saharan Africa (Efobi et al., 2018). ICT diffusion has also been linked to increased political empowerment among African women (Ongo Nkoa et al., 2022). Nonetheless, significant challenges persist, particularly in rural settings where many women remain excluded from digital infrastructure. This digital exclusion underscores the urgent need for gender-sensitive ICT policies that promote equitable access and meaningful participation (M. K. Joseph & Andrew, 2009). Despite these barriers, numerous African women have demonstrated resilience and ingenuity in adopting digital tools to advance their socio-economic status, although much remains to be done to ensure ICTs become genuine instruments of empowerment (Ochieng, 2002).

In Madagascar, this dynamic is particularly salient. The present study confirms that digital platforms—especially those designed around local realities—offer unprecedented access to knowledge, entrepreneurial models, and professional networks. They serve not only as repositories of information but also as catalysts of creativity and ambition. The success of the online course on parboiled rice manufacturing and the blog of the associations demonstrate this. Both tools have facilitated the transfer of practical knowledge to 44 rural women. The widespread use of QR codes and the recording of 1,009 visits to the blog further reflect the increasing digital engagement and visibility of women-led initiatives in Madagascar's rural zones.

4.1.2 Expanding Professional Networks and Combating Informal Sector Marginalization

According to the World Bank in 2019, women in Africa experience some of the highest unemployment rates globally, with 6.7% in Sub-Saharan Africa and up to 18.1% in North Africa and the Middle East. Entrepreneurship thus emerges as a vital pathway to overcome joblessness, ensure household financial stability, and access fair economic remuneration. Despite earning, on average, 15 to 30% less than men, African women are increasingly recognized as a strong economic force. Although often limited to the informal sector, they make significant contributions to household income and national GDP (Iodice & Yourougou, 2016).

This gendered division of labor remains entrenched in formal employment systems. As noted by Joseph et al. (2020), structural inequalities continue to restrict women's formal participation, while the informal economy—where women are

overrepresented—offers both flexibility and precarity. In Madagascar, for example, rural women face similar structural barriers, yet they demonstrate remarkable entrepreneurial resilience. Women’s associations in Bas Mangoky, Ambatondrazaka, and Ankazomiriotra—originally informal groups engaged in local agricultural processing—have strategically embraced digital tools to enhance product quality, visibility, and outreach. These groups now drive innovation in their local economies, using platforms such as Facebook, training blogs, and online partnerships to transform subsistence activities into viable, income-generating ventures.

The COVID-19 pandemic further exposed the fragility of women’s livelihoods in the informal economy, aggravating income instability and reinforcing economic gender disparities (Zhanda et al., 2022). As highlighted by Gebrehiwot (2020), while women constitute the majority in many African countries, their participation in formal economic sectors remains significantly lower—estimated at 63% for women compared to 94% for men in some regions. In this context, ICTs play a crucial role in reversing marginalization and enabling women’s access to broader opportunities. Professional digital platforms such as association blogs, Facebook pages, and online forums facilitate direct networking among entrepreneurs, potential funders, and clients. These virtual spaces not only foster knowledge exchange and mentorship but also generate practical outcomes in terms of partnerships, visibility, and collaborative projects. In Madagascar, this was demonstrated through the formation of over ten new partnerships across the three localities. As illustrated in Table 4, these collaborations range from international trade fairs (FIA, FIER MADA) to school canteen programs and local radio initiatives, including the “*Ny vehivavy sy ny fampanandrosoana*”¹ program on Radio Sagesse. This confirms the power of ICTs to expand professional networks and more firmly embed women within their communities’ development fabric.

At the heart of these dynamics lies the imperative to treat gender not as a marker of vulnerability, but as a transversal axis of inclusive development. Supporting women’s initiatives—without compromising their social roles—requires tools adapted to their realities. Digital tutorials and asynchronous resources offer precisely this flexibility, empowering women to learn, innovate, and connect while maintaining their household and caregiving responsibilities.

4.1.3 Marketing Strategies and Digital Visibility in Rural Madagascar

Digital communication tools provide efficient and cost-effective means to promote products, target specific audiences, and build recognizable brand identities. One of their most valuable features lies in enabling real-time interaction with customers, which facilitates immediate feedback, product adaptation, and innovation.

In Madagascar, marketing strategies are increasingly recognized as a decisive factor in the success and longevity of small and medium-sized enterprises (SMEs). A study of 125 Malagasy SMEs found that many failures stem from poor

alignment with consumer expectations and insufficient market knowledge (Andrianony et al., 2023). Similarly, targeted communication strategies have proven effective beyond the formal sector; in traditional fishing communities in the southwest of the country, social marketing has successfully encouraged sustainable behavior change (Andriamalala et al., 2013).

The evolution toward digital marketing has profoundly transformed the communication landscape. As traditional media such as television, radio, and newspapers lose influence, e-marketing has emerged as a user-centered, integrated approach that capitalizes on digital connectivity to engage consumers effectively (Hasan, 2011). Internet-based platforms now facilitate “one-to-one” marketing through fine segmentation, interactive engagement, and personalized services. These platforms also serve as reliable sources of product information, customer support, and decision-making assistance, helping to foster customer trust and brand proximity (Schwab, 2000).

Findings from the current study confirm this trend in rural Madagascar. Women’s associations across regions such as Bas Mangoky, Ambatondrazaka, and Ankazomiriotra have adopted digital tools to enhance product presentation, inserting logos, contact details, and improving packaging. They also expanded their marketing efforts by using videos, blog posts, and social media platforms. These strategies—initiated and executed by the women themselves—led to a measurable boost in engagement, including an increase of 653 Facebook followers and stronger audience interaction through digital content. Such results highlight the transformative potential of digital visibility in driving product appeal, building consumer trust, and increasing market reach.

4.1.4 Skills Development and Continuous Learning through Digital Platforms

Numerous online learning resources—such as MOOCs, webinars, and tutorials—facilitate the acquisition and enhancement of essential entrepreneurial skills, including digital marketing, financial management, and online sales. These digital tools are especially valuable in rural contexts where access to formal training programs remains limited or nonexistent. In Madagascar, such digital learning platforms have become a pivotal tool for empowering rural women. They offer flexible training formats that allow learners to progress at their own pace, overcoming geographic and time-related constraints. Through these platforms, women have been able to build competencies in areas such as e-commerce, financial literacy, communication, and product marketing—skills essential to sustaining and expanding local entrepreneurial activities (UNESCO, 2018). This form of lifelong learning strengthens women’s economic autonomy while fostering innovation and sustainable business development.

Initiatives launched by organizations like UN Women and FAO have demonstrated the importance of incorporating digital tools into rural training programs, contributing to both economic inclusion and social empowerment (FAO, 2019). Beyond technical training, these programs promote leadership, creativity, and initiative among participants, enabling them to

¹ “*Ny vehivavy sy ny fampanandrosoana*” means “*Women and Development*”.

engage more effectively in community development projects (Bahçelerli et al., 2025).

However, the benefits of digital learning are not uniformly distributed. In Madagascar, as in other developing contexts, the digital divide—marked by limited internet connectivity and infrastructure disparities—remains a significant obstacle. Students from low-income or remote communities often face compounded barriers that prevent full participation in online education (Pettalongi et al., 2024).

Despite these challenges, the present study confirms tangible progress in skill development among women's associations engaged in digitally supported learning. Self-assessment forms and qualitative feedback revealed improved proficiency in the use of digital communication platforms such as Messenger and WhatsApp for coordination and marketing. Furthermore, the women reported enhanced capacities in packaging, pricing, and negotiation techniques. These advancements—detailed in Table 9—highlight the effectiveness of localized and practical digital training in equipping women to manage and scale their economic initiatives.

4.2 Strengthening Women's Associations through Education and Digital Support

The following analysis highlights the transformative potential of education and digital support in enhancing the impact and scope of women's association.

4.2.1 Improved Communication and Coordination

Digital tools facilitate both internal and external communication within associations, enabling better coordination of activities, faster dissemination of important information, and more effective member mobilization (Salamon et al., 2017). Messaging platforms like WhatsApp and Messenger, as well as online project management tools and social networks, significantly optimize operational efficiency. These digital technologies provide rural women with new opportunities for participation, communication, and collective decision-making (UNESCO, 2021). As Benkler (2008) emphasizes, digital networking allows for broader collaboration, quicker mobilization, and more impactful collective action. In the Malagasy context, women's associations in rural areas such as Bas Mangoky, Ambatondrazaka, and Ankazomiriotra have adopted digital communication to increase the frequency of virtual meetings, accelerate information circulation via SMS and Messenger, and improve their collective capacity to respond to development challenges. These tools help overcome geographic and logistical barriers inherent in rural Madagascar, fostering stronger collaboration and more agile decision-making among association members.

4.2.2 Expanded Reach and Visibility

Digital networks enable social actors to enhance their visibility and extend their influence (Castells, 2015). For women's associations, digital tools facilitate reaching wider audiences, raising awareness about their missions, recruiting new members, and building partnerships with other organizations and institutions (Akser, 2015). The creation of

websites, active use of social media, and engagement in online events further amplify their presence.

In Madagascar, this digital transformation is evident in the sharp increase in blog views and platform consultations recorded among women's groups. Their autonomous participation in national events like the FIA demonstrates an emerging digital presence and growing public legitimacy. Karpf (2012) notes how such digital shifts reshape communication strategies by accelerating and targeting visibility, which is crucial for grassroots movements to gain broader recognition and support.

4.2.3 Skills Development and Empowerment

Access to online training on topics such as leadership, project management, digital marketing, and advocacy is essential in strengthening women's competencies and enhancing their capacity to carry out initiatives effectively. UNESCO (2018) highlights how digital technology access improves professional skills and empowerment, especially for vulnerable groups like rural women. Continuous learning opportunities through digital platforms reinforce technical and managerial skills, contributing to economic autonomy and community development.

In Madagascar, targeted programs implemented by organizations such as UN Women and FAO have integrated digital tools into rural training curricula, resulting in measurable progress. Self-assessment and qualitative feedback indicate significant gains in using communication apps like Messenger and WhatsApp for coordination and marketing, as well as enhanced knowledge of product packaging, pricing, negotiation, and sales. These improvements, captured in training outcome data (Table 9), reflect the transformative potential of localized digital learning to support sustainable entrepreneurial growth (World Bank, 2021; FAO, 2019; Bahçelerli et al., 2025).

Moreover, digital technologies foster mutual support networks among rural associations, encouraging experience sharing and collaborative projects (Rotman et al., 2012). This collaborative digital environment helps build confidence and entrepreneurial mindsets, enabling women to innovate, access funding, and participate in regional economic events.

4.2.4 Advocacy and Mobilization

Digital platforms provide spaces where women's associations can amplify their voices, conduct awareness campaigns, and mobilize public and political support. through social media, online petitions, and virtual events, these groups increase the reach and impact of their advocacy. rural women in Madagascar use digital tools to share their experiences, raise public awareness about their living conditions, and pressure policymakers to address their concerns (Bandura & Mclean, 2024). Despite challenges of geographic isolation, digital technologies enable rapid mobilization and coordination even in remote areas. they improve information flow and community engagement, thus enhancing the impact of local initiatives and extending their reach nationally and Internationally (Tufekci, 2017).

However, inequalities in internet access, digital literacy, and concerns about security and data protection remain significant barriers. it is critical to tailor digital education and

support to the socio-economic and cultural realities of women's associations to ensure inclusive participation. testimonies from Malagasy women confirm that even basic access to smartphones and connectivity can break social isolation, increase visibility, and catalyze project initiation, underscoring digital empowerment as both a practical tool and a pathway to structural Transformation.

V. CONCLUSION

This research highlights the critical role of digital communication and education in fostering entrepreneurial spirit among rural women's associations in Madagascar. By facilitating access to resources, networks, and training, digital tools enable women to develop essential entrepreneurial skills, improve product quality, and enhance their economic participation. The case of rice parboiling in partnership with AFRICA RICE and FOFIFA demonstrates how digital integration can significantly improve value chains—reducing post-harvest losses, improving product quality, and increasing efficiency—thereby contributing to local economic development. The study also underscores the importance of combining technological innovation with capacity building and mindset shifts. Digital literacy, continuous training, and tailored support are essential for overcoming traditional barriers and encouraging women to move beyond routine tasks towards innovative, market-oriented entrepreneurship. Furthermore, digital tools help associations improve communication, coordination, and visibility, amplifying their impact at local and national levels. Looking forward, the development of a dedicated digital platform tailored to the specific needs of rural women's groups could further strengthen their market access, networking, and knowledge-sharing capacities. However, ensuring equitable access to digital technologies and providing ongoing, context-sensitive training remain critical challenges. Recommendations emphasize the need for sustained support to motivate and train women in digital tools and entrepreneurial skills, expansion of digital education in rural schools, and public investment in infrastructure and platforms that empower women economically and socially. This research opens important questions: How can digital platforms be designed to maximize inclusivity and usability for rural women with diverse literacy levels? What multi-stakeholder approaches can best support the scaling up of digital empowerment in rural Madagascar's agricultural sector?

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