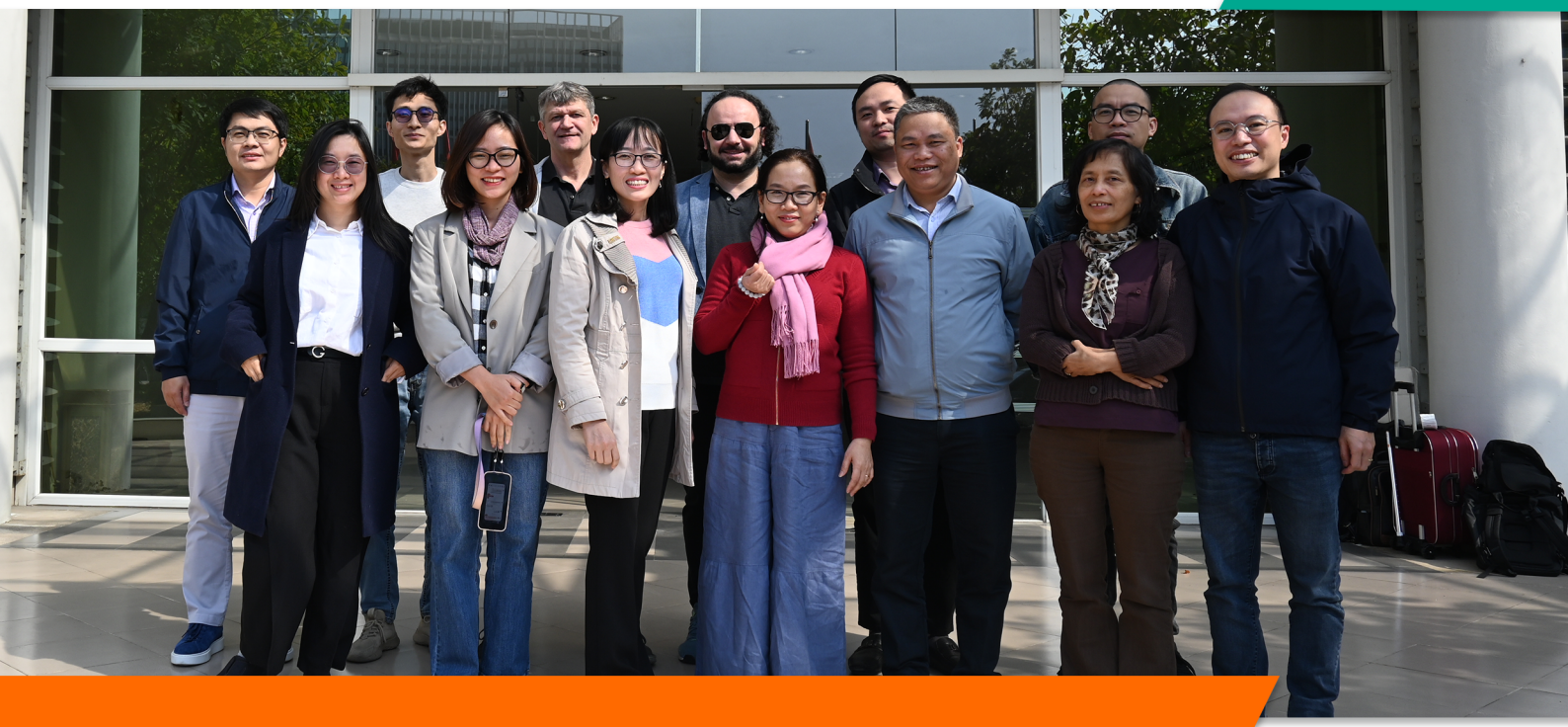
Alliance Bioversity & CIAT

CGIAR INITIATIVE ON Asian Mega-Deltas

2024



ASSESSING DELIVERY AND BUSINESS MODELS FOR HIGH IMPACT CLIMATE SOLUTIONS AT SCALE

The Case of Climate Information Services in Vietnam

This research was conducted as part of the CGIAR Regional Initiative Asian Mega-Deltas, supported by contributors to the CGIAR Trust Fund. CGIAR is a global research partnership for a food-secure future. Its science is carried out by 15 Research Centers in close collaboration with hundreds of global partners. www.cgiar.org

The Alliance of Bioversity International and CIAT thanks all donors and organizations globally supporting its work through their contributions to the CGIAR Trust Fund and other channels.

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Key Words:

Innovation, scaling, impact, strategy, digital, target, delivery, models

Citation:

Sartas, M., Le, T.T, Nguyen, H.M., Manh, L.T., Swaans, C. 2024. Assessing Delivery and Business Models for High Impact Climate Solutions at Scale: The Case of Climate Information Services in Vietnam. Hanoi (Vietnam). The International Center for Tropical Agriculture (CIAT).

EXECUTIVE SUMMARY

This report assesses optimal delivery and business models for scaling climate information solutions, specifically the Agro-Climatic Bulletin (ACB), in Vietnam. It synthesizes findings from workshops, expert feedback, and comparative analyses to provide actionable insights for decision-makers, investors, and R&D managers. The focus is on ensuring effective, sustainable, and impactful implementation of climate information services to support Vietnamese farmers.

Optimal Delivery/Business Models: The most effective models for scaling climate information solutions in Vietnam are the Blended Digital-Physical Support Model, the Public-Private Partnership (PPP) Model, and the Localized Content and Language Support Model. A Hybrid Subscription-Freemium Model is recommended for long-term sustainability. These models are not mutually exclusive, and their combined application will leverage their respective strengths to maximize impact.

- **Blended Digital-Physical Support Model:** Combines digital platforms (e.g., WeatherPlus app, Zalo) with in-person support from local experts, extension officers, and community meetings. This approach addresses varying levels of digital literacy and ensures that information is understood and trusted.
- **Public-Private Partnership Model:** Involves collaboration between government, private sector, and civil society to share resources, expertise, and investment. This is critical in Vietnam where the government plays a central role in agricultural development. This approach aligns with Vietnam's management structure and can ensure the affordability of climate information services.
- **Localized Content and Language Support Model:** Tailors climate information to local languages, styles, and agricultural practices, promoting cultural relevance and user engagement. This ensures that information is accessible and actionable for diverse communities.
- **Hybrid Subscription-Freemium Model:** A freemium model can provide basic weather forecasts for free while offering more detailed information and access to experts via subscription. This can generate a sustainable revenue stream for the ACB.

Why These Models are Optimal: These models address key challenges and opportunities in Vietnam, including diverse digital literacy levels, strong government involvement in agriculture, the need for culturally relevant information, and the need for sustainable financing. They ensure broad reach, effective understanding, and long-term viability of climate information services.

Less Suitable Models: Several other models were found to be less suitable for the specific context of the ACB in Vietnam.

- *Youth-Centric Engagement Model:* While crucial for long-term sustainability, it is not the most direct method for reaching existing farmers.
- *Data Monetization and Insights Model:* Although valuable, it may divert resources from the primary goal of delivering actionable information.
- *Mobile-First Approach:* A mobile-first approach is not sufficient by itself due to varying levels of digital literacy and infrastructure limitations.
- *E-commerce Integration Model:* More relevant for platforms directly facilitating the sale of agricultural products, rather than climate information.
- *Tiered Service Model for Different Farm Sizes:* Can create unnecessary complexity during the initial scaling process and is more suited for other types of services, not information.
- *Collaborative Community Model:* Requires expert input and government support to ensure scientific accuracy.

Strategic Integration: A key takeaway is the need to integrate these models strategically. For example, a blended model can incorporate localized content and language support, and partnerships can involve private sector companies and community groups. This allows for a holistic, context-specific approach that maximizes impact.

Leveraging Existing Infrastructure and Expertise: The existing network of Technical Working Groups (TWGs) in the ACB approach, is a crucial asset for dissemination and capacity building. Efforts should be made to enhance the capacity of commune-level staff to serve as local focal points for dissemination and support. The merger of the Ministry of Natural Resources and Environment with the Ministry of Agriculture and Rural Development presents opportunities for providing affordable or free climate information services.

Investment Opportunities: The Public-Private Partnership Model can unlock opportunities for both public and private investment, particularly through partnerships with input suppliers, technology firms, and buyers. A hybrid subscription-freemium model can generate revenue for more detailed services, while not excluding access to basic services for all farmers. The private sector is most interested in models that can generate revenue and increase added value for farmers.

Continuous Improvement: A feedback loop should be established to ensure continuous improvement of the ACB. User preferences should be studied to understand if they prefer Zalo groups or individual recommendations via apps. The development of a small unit focused on user experience within the technical team can be considered to ensure continuous feedback and iterative design improvements.

Implications for Decision Makers, Investors, and R&D Managers:

- **Decision Makers:** Prioritize the Blended Digital-Physical Support Model, Public-Private Partnership Model, and Localized Content and Language Support Model when designing climate information strategies. Leverage existing government structures and policies. Invest in local capacity building and ensure culturally relevant content. Create a clear framework for collaboration between government, private sector, and civil society.
- **Investors:** Focus on models that demonstrate scalability, sustainability, and a clear path to impact. The Hybrid Subscription-Freemium Model offers a potential return while ensuring access to climate information for all farmers. Explore opportunities to partner with both public and private sector entities. Invest in projects that integrate digital technologies with community engagement and local expertise.
- **R&D Managers:** Prioritize user-centered design and integrate feedback loops to continuously improve the ACB. Invest in research to understand the specific needs of diverse farming communities and develop tailored content and dissemination strategies. Ensure that climate information is scientifically accurate, easily understood, and actionable. Explore innovative financing models to ensure long-term sustainability of the services. The integration of water management recommendations in the ACB is also crucial.

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1. INTRODUCTION

Vietnam's agricultural sector is highly vulnerable to the impacts of climate change, facing increasing risks from sea-level rise, extreme weather events, and altered precipitation patterns. These challenges significantly impact the livelihoods of millions of smallholder farmers who depend on agriculture for their sustenance and income. In response, there is an urgent need to enhance the resilience and adaptive capacity of the agricultural sector through the effective delivery of climate information services.

This report focuses on identifying and assessing the most effective delivery and business models for scaling climate information solutions in Vietnam, with a specific focus on the Agro-Climatic Bulletin (ACB). The ACB is a crucial tool for providing farmers with timely, accurate, and actionable information on weather patterns, climate risks, and optimal agricultural practices. The central goal is to ensure that these services reach the broadest possible audience, including vulnerable and low-income groups, and are implemented in a way that is both sustainable and impactful.

The research and analysis are based on findings from a series of workshops, expert consultations, and a review of existing business and delivery models, all within the context of the CGIAR Initiative on Asian Mega-Deltas (AMD). The AMD initiative aims to develop resilient and inclusive deltas that can adapt to climate stressors, with a specific focus on the Mekong Delta region in Vietnam.

Key challenges in scaling climate information services in Vietnam include:

- ***Diverse user needs:*** Farmers in Vietnam have varied needs, technological literacy, and access to resources. Any model must be adaptable to these diverse circumstances.
- ***Infrastructure limitations:*** Access to digital technology and internet connectivity can be limited in some rural areas.
- ***Need for localized content:*** Climate information needs to be culturally relevant and communicated in local languages for effective understanding and adoption.
- ***Financial sustainability:*** Many farmers, particularly rice farmers, have limited profit margins and may not be able to pay for climate information services, requiring innovative funding models.
- ***Effective collaboration:*** Scaling climate information services requires the active participation of various stakeholders, including government agencies, private sector companies, research institutions, and civil society organizations.

This report seeks to address these challenges by:

1. Assessing various delivery and business models.

This assessment includes a detailed analysis of the Hybrid Subscription-Freemium Model, Public-Private Partnership Model, Youth-Centric Engagement Model, Data Monetization and Insights Model, Integration with Existing Agricultural and Non-Agricultural Systems Model, Tiered Service Model for Different Farm Sizes, Value-Added Services Model, Mobile-First Approach, Collaborative Community Model, Localized Content and Language Support Model, E-commerce Integration Model and Blended Digital-Physical Support Model.

2. Identifying the most suitable models for scaling the ACB in Vietnam.

The selected models, include the Blended Digital-Physical Support Model, Public-Private Partnership Model and Localized Content and Language Support Model. Additionally, the Hybrid Subscription-Freemium Model is recommended for long-term sustainability.

3. Providing practical recommendations for decision-makers, investors, and R&D managers.

These recommendations aim to guide the effective implementation of climate information services and ensure a sustainable, inclusive, and impactful approach to supporting Vietnamese farmers.

Key principles guiding this report include:

Scalability: The selected models must be capable of reaching a large number of farmers across diverse geographical and socioeconomic contexts.

Sustainability: The chosen approaches must be financially viable in the long term and should minimize dependency on external aid.

Inclusivity: The focus must be on reaching vulnerable groups and promoting equitable access to climate information services.

Impact: The models should directly contribute to improving the resilience and productivity of smallholder farmers, ultimately reducing their vulnerability to climate change impacts.

Collaboration: A multi-stakeholder approach, with active collaboration among government, private sector, and civil society, is essential.

The structure of this report will proceed as follows:

- A detailed assessment of various delivery and business models, drawing on case studies and examples from diverse contexts.
- A comparative analysis of these models to identify the best fit for the specific context of the ACB in Vietnam.
- A set of recommendations for decision-makers, investors, and R&D managers, outlining specific actions for the implementation and scaling of climate information services.

2. METHODOLOGY

There is little knowledge on methodologies that can be utilized for identifying high performance delivery/business models that are simple and actionable to use in the complex agrifood sectors within low and middle income countries. Therefore, we use a custom framework that postulates that high performing delivery/business models ensure that the digital solutions using the models achieve effective demand from the stakeholders in the impact sectors. In other words, the models enable the digital solutions i) to be interesting enough for high influencers[1] in the sector to promote the solutions, ii) to attract large-ticket investment commitments and iii) to fit into existing delivery models (Figure 1) .

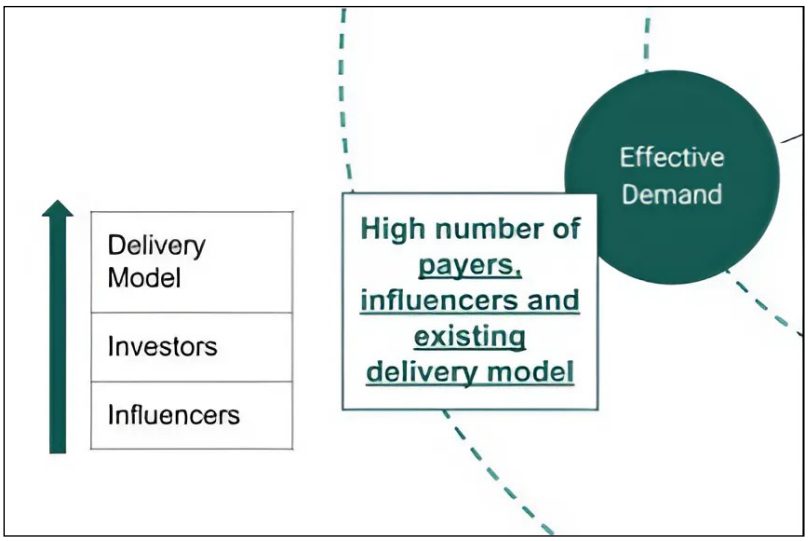

Figure 1. Delivery/Business Models (should) ensure that the solutions attract influencers, investors and fits into existing delivery systems.

Delivery and business models should be designed to do more than just bring a solution to market–they must actively ensure that the solution attracts key influencers and investors, while also integrating seamlessly into existing delivery systems.

Attracting Influencers and Investors: A robust delivery or business model should include strategies to engage influencers–individuals or organizations that have the power to shape opinions and drive adoption within the target market. By aligning the solution with the interests and values of these influencers, the model increases the likelihood of endorsements, which can significantly boost the solution's visibility and credibility. Simultaneously, the model should be structured to appeal to investors by demonstrating clear value propositions, scalability potential, and a well-defined path to profitability. This involves outlining how the solution addresses a critical need, its competitive advantages, and the expected return on investment.

Integration into Existing Delivery Systems: For a solution to be effective and widely adopted, it must fit within the existing infrastructure and delivery mechanisms of the target market in our case, Rwanda. The model should account for the current systems in place–whether they are technological, logistical, or organizational–and ensure that the solution can be implemented without causing major disruptions. This could involve adapting the solution to complement or enhance existing processes, thereby making it easier for stakeholders to adopt and utilize the solution. A well-integrated model reduces friction, enhances user experience, and accelerates the adoption rate.

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1 *Influencers are the people who have the ability to change the decisions of stakeholder the solutions being scaled in the specific context. They can be politicians, input suppliers, religious leaders, youtube celebrities etc. Influencers change based on the solutions to be scaled and the context they are being scaled.*

3. ASSESSMENT OF DELIVERY/ BUSINESS MODEL OPTIONS

In Section 3, the report delves into the development and application of a custom framework designed to identify and select high-performing delivery and business models. This framework is built on the premise that such models are crucial for ensuring that the digital solutions developed are not only effective but also meet the specific demands of stakeholders across various impact sectors. The framework guides the selection process by evaluating the potential of different models to drive stakeholder engagement and achieve desired outcomes. The results of this evaluation are then summarized in Table 1, which highlights the context-specific models that are most suitable for the intended digital solution in Rwanda.

3.1 Hybrid Subscription-Freemium Model - TaniHub in Indonesia

Model description

The Hybrid Subscription-Freemium Model is a business strategy that combines free basic services with premium paid features. This model aims to attract a large user base by offering essential services at no cost, while generating revenue through the sale of additional, enhanced features. The freemium aspect draws users in, allowing them to experience the core functionalities of a product or service without any initial financial commitment. As users become more engaged and see the value in the service, they are encouraged to upgrade to a subscription plan that offers advanced capabilities, exclusive content, or enhanced support. This approach not only helps in building a broad user base but also creates a sustainable revenue stream by converting a portion of free users into paying customers.

Case Example: TaniHub in Indonesia

An example of the hybrid subscription-freemium model within the agricultural sector is the platform TaniHub in Indonesia, which operates as a digital marketplace for agricultural products. TaniHub connects farmers directly with consumers, businesses, and other stakeholders, offering a basic service for free while providing premium features for a fee. This model allows TaniHub to attract a broad user base by offering essential services at no cost, while generating revenue through premium offerings that enhance user experience and provide additional value.

For instance, TaniHub offers farmers the ability to list their products on the platform for free, enabling them to reach a wider market. However, premium services such as advanced analytics, marketing support, and logistics optimization are available for a fee, providing added benefits to those willing to invest in these enhancements. This approach initially helped TaniHub to maintain a sustainable business model by balancing free access with monetized premium features, thereby increasing both user engagement and revenue potential.

While TaniHub is a concrete example from the agricultural sector, it's important to note that the freemium model is widely used in other sectors as well. Companies like Spotify, Dropbox, and Slack have successfully implemented this model by offering basic services for free and charging for premium features, which has allowed them to scale rapidly and sustain their operations.

Key Investors

Typical investors in the Hybrid Subscription-Freemium Model are often venture capitalists, private equity firms, and angel investors who are attracted to the scalability and potential for high returns associated with this model. These investors are typically interested in companies that can demonstrate a large user base, even if the majority are non-paying users, because the freemium model allows for significant market penetration and brand recognition. The potential for converting a portion of these users into paying customers and the ability to generate additional revenue through ads or data monetization are key factors that appeal to investors. Furthermore, investors look for companies that have a clear path to profitability and a strong value proposition that can differentiate them from competitors in the marketplace.

In the case of TaniHub, a leading digital marketplace for agricultural products in Indonesia, key investors include prominent venture capital firms and strategic investors who see the potential in the agricultural technology sector. TaniHub has attracted investment from firms such as Openspace Ventures and Intudo Ventures, which are known for investing in technology-driven startups with strong growth potential in Southeast Asia. These investors are drawn to TaniHub's ability to connect farmers directly with consumers and businesses, thereby increasing efficiency and reducing costs in the agricultural supply chain. The company's innovative approach to integrating technology with traditional agriculture, combined with its scalable business model, makes it an attractive investment opportunity in the rapidly growing agri-tech sector.

Key Influencers and Promoters

Typical influencers and promoters of the Hybrid Subscription-Freemium Model include industry experts, tech bloggers, and social media influencers who have a strong online presence and credibility within the target market. These individuals play a crucial role in generating buzz and awareness about the product by sharing their experiences and reviews with their followers. They often highlight the benefits of the freemium model, such as the low barrier to entry and the opportunity to try out basic features for free, which can attract a large user base. Additionally, these influencers can help build trust and credibility for the brand by providing authentic and relatable content that resonates with potential users. Their endorsements can significantly impact the perceived value of the premium features, encouraging users to upgrade.

TaniHub's key influencers and promoters in Indonesia include government figures, celebrities, and strategic partnerships with large organizations. One notable endorsement came from President Joko Widodo, who mentioned TaniHub during the 2019 presidential debate as an example of Indonesia's Industry 4.0 future. This high-profile mention significantly boosted TaniHub's visibility and credibility, helping it become a household name in the agritech space.

Additionally, TaniHub has utilized celebrity endorsements to increase its reach and influence. Celebrities can effectively leverage their large followings to promote TaniHub's services, thereby enhancing its brand image and attracting more users to the platform.

Moreover, TaniHub has formed strategic partnerships with organizations such as the World Bank Group and Microsoft, which have played a crucial role in promoting the platform and expanding its reach. These partnerships not only provide TaniHub with additional resources and expertise Such collaborations help TaniHub to tap into broader networks and access new markets, further establishing its presence in the agricultural sector in Indonesia

Its Fit into Existing Delivery/Business Landscape

Despite early successes in investments and promotion, TaniHub could not find a business model that fits into the existing delivery landscape over the longer term. TaniHub is facing significant financial difficulties and is effectively bankrupt. The company has experienced a series of challenges that have led to its downfall. TaniHub initially gained traction during the COVID-19 pandemic by capitalizing on the disruption of traditional supply chains, but it struggled to maintain its market position once normalcy returned. The company faced high operational costs, especially in logistics and marketing, which led to the closure of its B2C services in March 2022. Despite efforts to focus on its B2B segment, TaniHub could not overcome its financial burdens. Legal troubles, including loan defaults through its TaniFund unit, further compounded its issues, leading to the revocation of TaniFund's business license by the Financial Services Authority of Indonesia (OJK) in May 2024.

The situation for TaniHub deteriorated as it faced allegations of potential fraud and was unable to meet the financial management requirements set by the OJK. The company was entangled in payment issues with numerous investors, resulting in significant financial losses for many. TaniHub's ambitious expansion plans, which included investments in logistics and warehousing, ultimately led to unsustainable operational costs. As of the latest reports, the main TaniHub website remains online, but the business is described as being in a state of collapse, with its future highly uncertain.

3.2 Public-Private Partnership Model

Model description

The Public-Private Partnership (PPP) Model in agriculture involves collaboration between government entities and private sector companies to enhance agricultural productivity, infrastructure, and services. This model leverages the strengths of both sectors to drive innovation, improve efficiency, and deliver sustainable agricultural solutions. In the context of agriculture, PPPs can facilitate access to technology, finance, and markets, thereby addressing critical challenges such as food security and rural development. By sharing resources, risks, and expertise, PPPs can implement projects that neither the public nor private sector could achieve independently, ultimately fostering economic growth and improving livelihoods in rural communities.

Case Example: e-Granary

e-Granary is a digital platform developed by the Eastern Africa Farmers Federation (EAFF) in partnership with various private sector players and government support. The platform serves as a virtual aggregation system that connects smallholder farmers to markets, financial services, and agricultural inputs through mobile technology. e-Granary allows farmers to register their produce, access real-time market information, and receive payments via mobile money. This initiative is supported by partnerships with financial institutions, mobile network operators, and agricultural input suppliers, creating a comprehensive ecosystem that enhances the efficiency and productivity of smallholder farmers in Kenya.

Key Investors

Typical investors in the Public-Private Partnership (PPP) Model for digital solutions in agriculture include government agencies, international development organizations, and private sector companies. These investors are drawn to PPPs because they offer a structured way to leverage public funds and private expertise to achieve shared goals, such as enhancing agricultural productivity and sustainability. Government agencies often provide initial funding and policy support, creating a conducive environment for private investment. International organizations contribute by offering financial resources and technical expertise to ensure the project's success and alignment with broader development goals. Private companies, on the other hand, are attracted to PPPs because they provide opportunities to enter new markets, reduce risks through shared responsibilities, and access cutting-edge technologies and research methods. By combining these diverse sources of investment, PPPs can effectively address complex challenges in the agricultural sector, such as improving market access, technology transfer, and infrastructure development.

In the e-Granary PPP, key investors include international development organizations like IFAD and International Finance Cooperation (IFC), private technology firms Export Trading Group (ETF), and financial institutions such as VisionFund Kenya. These investors are attracted to PPPs due to their potential to deliver social and economic benefits while ensuring a return on investment through improved agricultural outputs. The platform has received support from organizations such as the Alliance for a Green Revolution in Africa (AGRA) and other international donors, which provide funding and technological expertise to ensure the project's success and sustainability.

Key Influencers and Promoters

Key influencers and promoters of Public-Private Partnership (PPP) digital solutions in agriculture typically include government officials, international development agencies, and industry leaders who advocate for collaborative approaches to agricultural development. These stakeholders play a crucial role in shaping the policy environment and creating awareness about the benefits of PPPs. Government officials provide regulatory support and create incentives for private sector participation, ensuring that PPPs align with national development goals. International organizations, such as the Food and Agriculture Organization (FAO) and the World Bank, promote PPPs by offering technical assistance, funding, and facilitating knowledge exchange between countries. Industry leaders, including agribusiness companies and technology firms, actively promote PPPs by demonstrating successful case studies and showcasing the potential for innovation and efficiency gains. Together, these influencers help build trust among stakeholders, encourage investment, and drive the adoption of digital solutions in the agricultural sector.

e-Granary influencers and promoters include government officials, international development agencies, and industry leaders who advocate for collaborative approaches to agricultural development. The Eastern Africa Farmers Federation (EAFF), a constituency of the World Farmers' Organization plays a significant role in promoting the initiative by facilitating collaboration between stakeholders and ensuring that the digital solutions are effectively integrated into existing agricultural systems. Additionally, partnerships with mobile network operators and financial institutions help promote the platform's benefits to a wider audience.

Its Fit into Existing Delivery/Business Landscape

Public-Private Partnerships (PPPs) in digital solutions fit well into existing delivery and business landscapes when there is a clear alignment of goals between the public and private sectors, and when both parties have complementary strengths to contribute. These partnerships are particularly effective in environments where there is a need for rapid technological advancement and complex service delivery, such as in healthcare, education, and agriculture. In such contexts, PPPs can leverage private sector efficiency, technical expertise, and investment to fill gaps in public sector capabilities, thereby accelerating the deployment of digital infrastructure and services. However, PPPs may not fit well in landscapes where there is a lack of trust or misalignment of objectives between the partners, or where regulatory and bureaucratic hurdles impede collaboration. Additionally, if the public sector lacks the capacity to effectively manage and oversee the partnership, or if the private sector is primarily driven by profit motives that do not align with public interest, the partnership may struggle to achieve its intended outcomes. For PPPs to be successful, there must be a strong framework for sharing risks and responsibilities, clear communication, and a commitment to achieving shared economic and social goals, such as improving digital literacy, fostering innovation, and promoting sustainable development.

e-Granary fits well into the existing delivery landscape when there is strong alignment between the public and private sectors, with both parties committed to enhancing agricultural productivity and market access for smallholder farmers. The platform effectively combines digital tools with traditional agricultural practices, addressing key challenges such as market access, financial inclusion, and access to quality inputs. By leveraging partnerships with organizations like the Eastern Africa Farmers Federation comprehensive services, including credit, insurance, and market linkages, which are crucial for smallholder farmers.

However, e-Granary may face challenges in fitting into the delivery landscape when there are misalignments in objectives or when regulatory and infrastructural barriers impede collaboration. For instance, the platform has encountered difficulties in maintaining partnerships for financial services and insurance due to external factors like weather variability and market fluctuations. Additionally, the complexity of integrating diverse services and stakeholders can create operational challenges, particularly when there is a lack of capacity to manage and oversee the partnership effectively https://www.gafspfund.org/sites/default/files/inline-files/GAFSP_MMI_eGranary_Final_Project_Report_L.pdf.

3.3 Youth-Centric Engagement Model

Model description

The Youth-Centric Engagement Model in agriculture focuses on actively involving young people in the development and implementation of digital solutions. This model leverages the unique perspectives and digital fluency of youth, who are often considered "digital natives," to drive innovation and ensure that digital products and services meet their needs and preferences. By engaging youth in co-design and co-creation processes, organizations can develop more relevant and effective solutions that resonate with young users. This approach not only empowers young people by giving them a voice in shaping the technologies they use but also fosters a sense of ownership and commitment to the solutions developed. The model is particularly effective in sectors like agriculture, where youth engagement can lead to more impactful and sustainable outcomes.

Case Example - Rikolto

A notable example of the Youth-Centric Engagement Model in agriculture is the digital marketing platform developed for cocoa farmers in West Sulawesi, Indonesia. Initiated by Rikolto Indonesia, this project aims to attract young people to agriculture by integrating digital technology into farming practices. The platform allows young cocoa farmers to market their products to a wider audience, thereby increasing their visibility and market reach. Youth volunteers from the eMpowering Youths Across ASEAN program were actively involved in the development of the platform, ensuring that it met the needs and preferences of young farmers . This initiative demonstrates how youth engagement can drive innovation and create new opportunities in the agricultural sector.

Key Investors

Investors in youth-centric digital solutions typically include international development agencies, non-governmental organizations, and private sector companies focused on social impact. These investors recognize the potential of engaging young people to drive innovation and create solutions that address pressing social issues. They are drawn to projects that empower youth, enhance digital literacy, and promote sustainable development. By investing in youth-centric models, these organizations aim to foster economic growth and social change by equipping young people with the tools and opportunities they need to succeed.

In the case of the digital marketing platform for cocoa farmers, key investors include organizations like Rikolto and the ASEAN Foundation, which support initiatives aimed at empowering young people and promoting sustainable agricultural practices. These investors provide funding and technical support to ensure the successful implementation and scalability of youth-centric digital solutions. Their involvement not only brings financial resources but also lends credibility and expertise to the project, helping to drive its success and impact.

Key Influencers and Promoters

Key influencers and promoters of the Youth-Centric Engagement Model include youth organizations, educational institutions, and advocacy groups that champion the involvement of young people in decision-making processes. These stakeholders play a crucial role in advocating for youth engagement and ensuring that young voices are heard in the development of digital

solutions. By promoting the benefits of youth involvement, they help to build momentum and support for initiatives that prioritize the needs and perspectives of young people.

For the digital marketing platform in Indonesia, partnerships with local youth organizations and international NGOs were instrumental in promoting the initiative and encouraging young people to participate in its development and use . These collaborations helped build trust and credibility among the target audience, enhancing the platform's reach and impact. By working closely with these influencers and promoters, the project was able to effectively engage young farmers and create a solution that met their needs and aspirations.

Its Fit into Existing Delivery/Business Landscape

The Youth-Centric Engagement Model fits well into existing delivery and business landscapes when there is a supportive environment that facilitates youth involvement in agricultural activities. This model thrives under conditions where there is access to resources such as land, finance, and technology, as well as supportive policies that encourage youth participation in agriculture. It is particularly effective when there are efforts to make agriculture more attractive to young people by integrating modern technology and innovative practices, which can lead to increased productivity and long-term growth. Additionally, the model benefits from strong networks and mentorship programs that provide young people with the skills and knowledge needed to succeed in the agricultural sector.

However, the model may not fit well in landscapes where there are significant barriers to youth engagement, such as limited access to land and finance, inadequate training and education, and negative perceptions of agriculture as a viable career path. In such cases, the lack of infrastructure and support systems can hinder the effectiveness of youth-centric initiatives. Furthermore, if there is insufficient collaboration between stakeholders, including government agencies, educational institutions, and private sector partners, the model may struggle to achieve its intended outcomes. To ensure the success of the Youth-Centric Engagement Model, it is crucial to address these barriers and create an enabling environment that supports youth involvement in agriculture.

In the case of the digital marketing platform in West Sulawesi, the initiative successfully engaged youth by integrating digital tools that resonate with their technological skills and providing them with market access that traditional methods may not offer. The platform's ability to connect young farmers with broader markets and provide them with real-time data on market trends and pricing has empowered them to make informed decisions and improve their livelihoods. However, risks exist due to insufficient infrastructure to support digital connectivity or if cultural perceptions discourage youth from pursuing careers in agriculture.

3.4 Data Monetization and Insights Model

Model description

The Data Monetization and Insights Model involves leveraging data as a strategic asset to generate revenue and drive business insights. This model is particularly relevant in the agricultural sector, where data can be used to enhance productivity, optimize supply chains, and improve decision-making processes. By collecting and analyzing data from various sources, organizations can create valuable insights that benefit farmers, agribusinesses, and other stakeholders. In low and middle-income countries, this model can empower smallholder farmers by providing them with access to information that can improve their yields and market access. Additionally, it can attract investment by demonstrating the potential for data-driven innovation and efficiency gains.

Case Example: Smattcom

A notable example of the Data Monetization and Insights Model in agriculture is Smattcom, a digital platform operating in Mexico. Smattcom connects small-scale farmers with domestic and international buyers through an e-commerce platform, facilitating the sale of agricultural products. The platform collects data on market trends, pricing, and buyer preferences, which is then analyzed to provide farmers with actionable insights that can help them optimize their production and marketing strategies. By monetizing this data through partnerships with agribusinesses and financial institutions, Smattcom generates revenue that supports its sustainability and expansion. This approach not only benefits farmers by providing them with valuable market insights but also creates new opportunities for businesses to engage with the agricultural sector.

Key Investors

Investors in data monetization models typically include international development agencies, technology companies, and financial institutions. These investors are drawn to the potential for data-driven innovation and the opportunity to create social and economic impact. They recognize that data can be a powerful tool for improving agricultural productivity and sustainability, and they are willing to invest in initiatives that harness this potential. By supporting data monetization projects, these investors aim to drive growth and development in the agricultural sector while achieving a return on their investment.

In the case of Smattcom, key investors include international organizations like the Inter-American Development Bank (IDB) and private sector partners who provide funding and technical support to develop and implement the digital platform. Their involvement is crucial for ensuring the project's success and scalability, as they bring not only financial resources but also expertise in data management and agricultural development. These investors help to build the infrastructure needed to collect, analyze, and monetize agricultural data, thereby enhancing the project's impact and sustainability

Key Influencers and Promoters

Key influencers and promoters of the Data Monetization and Insights Model include government agencies, agricultural research institutions, and industry associations. These stakeholders play a vital role in advocating for data-driven approaches and building support among farmers and agribusinesses. By promoting the benefits of data monetization, they help to create an environment where data is seen as a valuable asset that can drive innovation and growth.

For Smattcom, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the project and encouraging farmer participation. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to share their data and engage with the platform. By working closely with these influencers and promoters, the initiative has been able to effectively reach its target audience and demonstrate the value of data-driven insights in agriculture

Its Fit into Existing Delivery/Business Landscape

The Data Monetization and Insights Model fits well into existing delivery and business landscapes when there is a robust infrastructure for data collection, integration, and analysis. This model thrives in environments where there is a clear strategy for leveraging data as a strategic asset, supported by advanced analytics and data governance frameworks. It is particularly effective when there is a culture of data-driven decision-making within organizations,

enabling them to extract actionable insights that enhance productivity and sustainability. Additionally, the model benefits from regulatory environments that support data privacy and sharing, allowing for the creation of new revenue streams through data products and services.

However, the model may not fit well in landscapes where there are significant challenges related to data quality, integration, and privacy. If there is a lack of technical expertise or infrastructure to manage and analyze large datasets, organizations may struggle to derive value from their data assets. Furthermore, if there is resistance to change or a lack of understanding of the potential benefits of data monetization, the model may face difficulties in gaining traction. Regulatory hurdles and concerns over data ownership and privacy can also impede the successful implementation of data monetization strategies. To ensure the model's success, it is crucial to address these barriers and foster a culture that values data as a key driver of innovation and growth.

Smattcom fits well into the existing delivery landscape in Mexico by leveraging robust data infrastructure and analytics to provide valuable market insights to smallholder farmers. The platform aligns with broader trends towards digital transformation and data-driven decision-making by offering real-time data on market trends, pricing, and buyer preferences. This enables farmers to make informed decisions, optimize their production and marketing strategies, and improve their profitability. The regulatory environment in Mexico, which supports digital innovation and data sharing, further enhances Smattcom's ability to monetize data effectively. Additionally, the platform's integration with existing agricultural systems and its ability to offer personalized insights tailored to the needs of farmers contribute to its success.

However, Smattcom may encounter challenges if there are issues related to data quality, integration, and privacy. If the platform struggles with maintaining high-quality data or faces difficulties in integrating diverse data sources, it may not be able to provide accurate and actionable insights. Furthermore, resistance to adopting data-driven practices among farmers or a lack of understanding of the benefits of data monetization could hinder the platform's effectiveness. Regulatory hurdles, such as concerns over data ownership and privacy, could also pose challenges to Smattcom's operations. To overcome these barriers, Smattcom needs to ensure robust data management practices, foster a culture of data-driven decision-making among its users, and navigate regulatory landscapes effectively.

3.5 Integration with Existing Agricultural and Non-Agricultural Systems: Hello Tractor

Model description

The Integration with Existing Agricultural and Non-Agricultural Systems Model involves the seamless incorporation of digital solutions into both agricultural and non-agricultural systems to enhance efficiency, productivity, and sustainability. This model leverages the interconnectedness of agriculture with various sectors, such as energy, transportation, and finance, to provide holistic solutions that address the multifaceted challenges faced by the agricultural sector. By integrating digital technologies with existing systems, this model can optimize resource use, reduce operational costs, and improve service delivery. In low and middle-income countries, this approach is particularly beneficial as it enables smallholder farmers to access a broader range of services and support, ultimately contributing to rural development and economic growth.

Case Example

A notable example of the Integration with Existing Systems Model in agriculture is Hello Tractor, a digital platform operating in Nigeria. Hello Tractor connects smallholder farmers with tractor owners through a mobile application, facilitating access to mechanization services.

The platform integrates with existing agricultural systems by providing real-time data on tractor availability, location, and usage, enabling efficient resource allocation and reducing downtime. Additionally, Hello Tractor collaborates with financial institutions to offer flexible payment options, making mechanization more accessible to farmers. By integrating with both agricultural and financial systems, Hello Tractor enhances productivity and supports the sustainable development of Nigeria's agricultural sector.

Key Investors

Investors in integration models typically include international development agencies, technology firms, and financial institutions. These investors are attracted to the potential for creating synergies across sectors and the opportunity to drive innovation and economic growth. They recognize that integrating digital solutions with existing systems can unlock new value and improve service delivery, making it an attractive investment opportunity. By supporting integration projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of Hello Tractor, key investors include organizations like the International Finance Corporation (IFC) and private sector partners who provide funding and technical support to develop and scale the platform. Their involvement is crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in technology and agricultural development. These investors help to build the infrastructure needed to integrate digital solutions with existing systems, thereby enhancing the project's impact and reach. Hello Tractor has also used an innovative finance system to generate private returns for business.

Key Influencers and Promoters

Key influencers and promoters of integration models include government agencies, industry associations, and technology providers. These stakeholders play a vital role in advocating for integrated approaches and building support among farmers and other stakeholders. By promoting the benefits of integration, they help to create an environment where digital solutions are seen as valuable tools for enhancing efficiency and productivity.

For Hello Tractor, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the platform and encouraging farmer participation. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. By working closely with these influencers and promoters, Hello Tractor has been able to effectively reach its target audience and demonstrate the value of integrated solutions in agriculture, creating big support from large influencers like UN.

Its Fit into Existing Delivery/Business Landscape

The Integration with Existing Agricultural and Non-Agricultural Systems Model fits well into existing delivery and business landscapes when there is a strong infrastructure that supports digital connectivity and interoperability between different sectors. This model thrives in environments where there is a commitment to cross-sector collaboration, allowing for seamless integration of agricultural systems with sectors such as finance, transportation, and energy. It is particularly effective when there is a shared vision among stakeholders to leverage digital technologies to enhance productivity, sustainability, and service delivery. Additionally, supportive regulatory frameworks that facilitate data sharing and collaboration across sectors can significantly enhance the model's effectiveness.

However, the model may not fit well in landscapes where there are significant barriers to integration, such as siloed operations, lack of interoperability, or resistance to change among stakeholders. If there is insufficient infrastructure to support digital connectivity or if regulatory restrictions impede data sharing, the model may struggle to achieve its intended outcomes. Furthermore, if there is a lack of alignment or trust among stakeholders from different sectors,

the integration efforts may face challenges in gaining traction. To ensure the model's success, it is crucial to address these barriers by fostering collaboration, building robust infrastructure, and creating an enabling environment that supports cross-sector integration.

In the case of Hello Tractor, the integration approach has been successfully implemented in Nigeria, providing farmers with access to mechanization services that enhance productivity and reduce labor costs. By demonstrating the potential for integration, Hello Tractor has attracted interest from various stakeholders, creating new opportunities for collaboration and growth. This model sets a precedent for similar initiatives in other regions, showcasing how integration can drive positive change in the agricultural sector.

Hello Tractor fits well into the existing delivery landscape by effectively integrating agricultural systems with non-agricultural sectors such as finance and technology. The platform leverages digital connectivity and Internet of Things (IoT) technology to connect tractor owners with smallholder farmers, facilitating access to mechanization services that were previously out of reach for many farmers. By collaborating with financial institutions, Hello Tractor offers innovative financing models like pay-as-you-go (PAYG), enabling farmers to afford tractor services and even become tractor owners themselves. This cross-sector collaboration enhances productivity and sustainability by providing farmers with access to essential resources and services. Additionally, the platform's ability to collect and analyze data on tractor usage and maintenance supports efficient resource management and decision-making.

However, Hello Tractor faces challenges in landscapes where there are barriers to integration, such as limited digital infrastructure or regulatory restrictions on data sharing. If there is insufficient infrastructure to support digital connectivity, the platform's ability to provide real-time data and insights may be hindered. Moreover, if there is resistance to adopting new technologies or a lack of alignment among stakeholders, the integration efforts may struggle to gain traction. Addressing these barriers is crucial for Hello Tractor to achieve its full potential and contribute to sustainable agricultural development. Ensuring robust infrastructure, fostering collaboration, and navigating regulatory landscapes effectively are key to the platform's success

3.6 Tiered Service Model for Different Farm Sizes

Model description

The Tiered Service Model for Different Farm Sizes is a strategic approach that tailors digital solutions and services to meet the specific needs of farms of varying sizes. This model recognizes that smallholder, medium, and large-scale farms have different operational challenges and resource requirements. By offering tiered services, digital solution providers can better address the unique needs of each farm category, enhancing efficiency, productivity, and sustainability. In low and middle-income countries, this model is particularly beneficial as it allows for more inclusive access to technology, ensuring that even the smallest farms can benefit from digital advancements. This approach not only improves farm-level outcomes but also fosters broader agricultural development by promoting technology adoption across diverse farming communities.

Case Example: TROTRO Tractor

A notable example of the Tiered Service Model in agriculture is TROTRO Tractor, a digital platform operating in Ghana. TROTRO Tractor provides access to mechanization services through a mobile platform that connects farmers with tractor owners. The service is tiered to cater to different farm sizes, offering customized packages that include varying levels of mechanization support, from basic plowing services for smallholders to comprehensive mechanization solutions for larger farms. By tailoring services to the specific needs of different farm sizes, TROTRO Tractor enhances agricultural productivity and supports sustainable farming practices. This model not only improves access to mechanization for smallholder farmers but also optimizes resource use for larger farms, demonstrating the effectiveness of tiered services in agriculture.

Key Investors

Investors in tiered service models typically include international development agencies, agribusiness companies, and financial institutions. These investors are attracted to the potential for scalable impact and the opportunity to drive inclusive growth in the agricultural sector. They recognize that tiered services can enhance technology adoption and improve farm productivity, making it an attractive investment opportunity. By supporting tiered service projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of TROTRO Tractor, key investors include organizations like the Alliance for a Green Revolution in Africa (AGRA), GIZ and private sector partners who provide funding and technical support to develop and scale the platform such as AgroAfrica and KOSMOS Energy as well as an innovation center. Their involvement is crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in agricultural development and technology deployment. These investors help to build the infrastructure needed to deliver tiered services effectively, thereby enhancing the project's impact and reach.

Key Influencers and Promoters

Key influencers and promoters of tiered service models include government agencies, agricultural extension services, and farmer cooperatives. These stakeholders play a vital role in advocating for tailored solutions and building support among farmers and other stakeholders. By promoting the benefits of tiered services, they help to create an environment where digital solutions are seen as valuable tools for enhancing efficiency and productivity.

For TROTRO Tractor, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the platform and encouraging farmer participation. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. TROTRO was also studied as an example internationally, which enhanced the promotion activities. By working closely with these influencers and promoters, TROTRO Tractor has been able to effectively reach its target audience and demonstrate the value of tiered services in agriculture.

Its Fit into Existing Delivery/Business Landscape

The Tiered Service Model for Different Farm Sizes fits well into existing delivery and business landscapes when there is a diverse agricultural sector with varying needs based on farm size. This model thrives in environments where there is a demand for customized solutions that cater to the specific requirements of smallholder, medium, and large-scale farms. It is particularly effective when there is an infrastructure that supports the delivery of differentiated services, such as access to technology, financial services, and market information tailored to different farm sizes. Additionally, the model benefits from a regulatory environment that encourages innovation and flexibility in service provision, allowing for the development of tailored packages that enhance productivity and sustainability.

However, the model may not fit well in landscapes where there is a lack of infrastructure to support differentiated service delivery or where there is resistance to adopting customized approaches. If there is insufficient capacity to assess and address the unique needs of different farm sizes, organizations may struggle to implement effective tiered services. Furthermore, if there is a lack of alignment or collaboration among stakeholders, such as service providers, government agencies, and farmers, the model may face challenges in gaining traction. To ensure the model's success, it is crucial to build the necessary infrastructure, foster collaboration among stakeholders, and create an enabling environment that supports the delivery of tailored services to farms of all sizes.

TROTRO Tractor fits well into the existing delivery landscape by providing tailored mechanization services that cater to the diverse needs of smallholder, medium, and large-scale farms. The platform's "Uber for tractors" model allows farmers to access mechanization services on demand, which is particularly beneficial in regions where purchasing tractors is cost-prohibitive for many farmers. By offering services for widespread activities such as ploughing, harrowing, and planting, TROTRO Tractor enhances productivity and efficiency across different farm sizes. The platform's use of digital tools, such as mobile apps and USSD codes, ensures accessibility even in areas with limited internet connectivity, thereby supporting a wide range of users.

However, TROTRO Tractor have occasional challenges in landscapes where there is insufficient infrastructure to support digital service delivery or where there is resistance to adopting mechanization. Connectivity issues in rural areas can impede the platform's ability to deliver timely services, although TROTRO Tractor has addressed this by developing USSD codes that work without internet access. Additionally, if there is a lack of alignment or collaboration among stakeholders, such as service providers, government agencies, and farmers, the model may struggle to gain traction. Ensuring robust infrastructure, fostering collaboration, and creating an enabling environment that supports the delivery of tailored services are crucial for the model's success.

3.7 Value-Added Services Model

Model description

The Value-Added Services (VAS) Model in agriculture involves providing additional services that enhance the core offerings of a digital platform, thereby increasing its value proposition to users. This model leverages digital technologies to offer services such as market information, financial services, and advisory support, which go beyond basic agricultural inputs and outputs. By bundling these services, platforms can address multiple needs of farmers, improving their productivity, market access, and overall livelihoods. In low and middle-income countries, this model is particularly beneficial as it provides smallholder farmers with access to a range of services that are often difficult to obtain independently. This approach not only improves farm-level outcomes but also fosters broader agricultural development by promoting technology adoption and integration across the value chain.

Case Example: DigiFarm

A notable example of the Value-Added Services Model in agriculture is DigiFarm, a digital platform developed by Safaricom in Kenya. DigiFarm offers a suite of services to smallholder farmers, including access to credit, insurance, and market information, all accessible via a mobile phone. The platform also provides advisory services and input financing, enabling farmers to make

informed decisions and improve their productivity. By bundling these value-added services, DigiFarm enhances the overall value proposition for farmers, helping them to overcome barriers such as lack of access to credit and market information. This model not only supports individual farmers but also contributes to the broader agricultural ecosystem by facilitating access to essential services and resources.

Key Investors

Investors in value-added service models typically include mobile network operators, financial institutions, and international development organizations. These investors are attracted to the potential for scalable impact and the opportunity to drive inclusive growth in the agricultural sector. They recognize that value-added services can enhance technology adoption and improve farm productivity, making it an attractive investment opportunity. By supporting value-added service projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of DigiFarm, key investors include Safaricom, which provides the technological infrastructure and platform development, and financial partners like the Commercial Bank of Africa, which offers credit and insurance services through the platform. Difgifarm is also supported by GIZ, FamilyBank, Bayer Foundation and FSD Kenya and Mastercard Foundation via Mercy Cops. Their involvement is crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in technology and financial services. These investors help to build the infrastructure needed to deliver value-added services effectively, thereby enhancing the project's impact and reach.

Key Influencers and Promoters

Key influencers and promoters of value-added service models include government agencies, agricultural extension services, and farmer cooperatives. These stakeholders play a vital role in advocating for comprehensive solutions and building support among farmers and other stakeholders. By promoting the benefits of value-added services, they help to create an environment where digital solutions are seen as valuable tools for enhancing efficiency and productivity.

For DigiFarm, partnerships with local agricultural organizations such as Kenya Livestock Producers Association (KLPA) and government agencies have been instrumental in promoting the platform and encouraging farmer participation. DigiFarm also was mainstreamed by international influencers such as Reuters. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. By working closely with these influencers and promoters, DigiFarm has been able to effectively reach its target audience and demonstrate the value of comprehensive service offerings in agriculture.

Its Fit into Existing Delivery/Business Landscape

The Value-Added Services Model fits well into existing delivery and business landscapes when there is a demand for comprehensive solutions that enhance the core offerings of agricultural platforms. This model thrives in environments where there is a strong infrastructure to support the integration of additional services, such as financial products, market information, and advisory support, which can significantly enhance the value proposition for farmers. It is particularly effective when there is a collaborative ecosystem involving various stakeholders, including technology providers, financial institutions, and agricultural experts, working together to deliver a suite of services that improve productivity and sustainability. Additionally, a regulatory environment that supports innovation and flexibility in service provision can further enhance the model's effectiveness.

However, the model may not fit well in landscapes where there is a lack of infrastructure or stakeholder collaboration to support the delivery of value-added services. If there is insufficient capacity to integrate diverse services or if there is resistance to adopting new solutions,

organizations may struggle to implement effective value-added offerings. Furthermore, if there is a lack of alignment or trust among stakeholders, such as service providers, government agencies, and farmers, the model may face challenges in gaining traction. To ensure the model's success, it is crucial to build the necessary infrastructure, foster collaboration among stakeholders, and create an enabling environment that supports the delivery of comprehensive services to farmers.

DigiFarm fits well into the existing delivery landscape by leveraging a comprehensive suite of services that address the diverse needs of smallholder farmers in Kenya. The platform offers a one-stop-shop for farmers, providing access to financial services, quality inputs, market linkages, and agricultural advice, all through a mobile platform. This aligns with broader trends towards integrated solutions and user-centered innovation, allowing DigiFarm to enhance service delivery by providing targeted support that improves productivity and sustainability. The collaboration with partners like Safaricom and iProcure ensures that DigiFarm can deliver these value-added services effectively, supported by a robust infrastructure that facilitates digital transactions and information dissemination. Additionally, the regulatory environment in Kenya, which supports mobile money transactions through platforms like M-Pesa, further enhances DigiFarm's ability to integrate these services seamlessly.

However, DigiFarm may encounter challenges in landscapes where there is a lack of infrastructure or stakeholder collaboration to support the delivery of value-added services. If there are connectivity issues or resistance to adopting digital solutions among farmers, the platform's effectiveness may be hindered. Moreover, if there is insufficient capacity to integrate diverse services or if there is a lack of alignment among stakeholders, such as service providers, government agencies, and farmers, the model may face challenges in gaining traction. To ensure the model's success, DigiFarm must continue to build the necessary infrastructure, foster collaboration among stakeholders, and create an enabling environment that supports the delivery of comprehensive services to farmers.

3.8 Mobile-First Approach

Model description

The Mobile-First Approach in agriculture involves prioritizing mobile technology as the primary means of delivering digital solutions to farmers. This model leverages the widespread availability and accessibility of mobile phones to provide farmers with essential services such as market information, financial services, and agricultural advice. By focusing on mobile platforms, agricultural solutions can reach a broader audience, including smallholder farmers in remote areas who may not have access to traditional agricultural extension services. In low and middle-income countries, the mobile-first approach is particularly beneficial as it enables farmers to access timely and relevant information that can improve their productivity and livelihoods. This approach not only enhances individual farm outcomes but also contributes to the broader agricultural ecosystem by promoting technology adoption and integration across the value chain.

Case Example: mAgri

A notable example of the Mobile-First Approach in agriculture is the mAgri program in Tanzania. Developed by the GSMA in partnership with local mobile operators and agricultural organizations, mAgri provides smallholder farmers with access to a range of services through their mobile phones. These services include weather forecasts, market prices, agronomic advice, and financial services. By leveraging mobile technology, mAgri ensures that farmers receive timely and actionable information that can help them make informed

decisions and improve their productivity. This model not only supports individual farmers but also strengthens the overall agricultural value chain by facilitating access to essential services and resources.

Key Investors

Investors in mobile-first models typically include mobile network operators, international development organizations, and technology companies. These investors are attracted to the potential for scalable impact and the opportunity to drive inclusive growth in the agricultural sector. They recognize that mobile technology can enhance information dissemination and improve farm productivity, making it an attractive investment opportunity. By supporting mobile-first projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of mAgri, key investors include the GSMA, which provides the technological infrastructure and platform development, and local mobile operators like Vodacom Tanzania, which offer connectivity and distribution support. Their involvement is crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in mobile technology and agricultural services. mAgri was also supported by USAID and Bill and Melinda Gates Foundation These investors help to build the infrastructure needed to deliver mobile-first services effectively, thereby enhancing the project's impact and reach

Key Influencers and Promoters

Key influencers and promoters of the mobile-first approach include government agencies, agricultural extension services, and farmer cooperatives. These stakeholders play a vital role in advocating for mobile solutions and building support among farmers and other stakeholders. By promoting the benefits of mobile technology, they help to create an environment where digital solutions are seen as valuable tools for enhancing efficiency and productivity.

For mAgri, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the platform and encouraging farmer participation. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. By working closely with these influencers and promoters, mAgri has been able to effectively reach its target audience and demonstrate the value of mobile-first solutions in agriculture

Its Fit into Existing Delivery/Business Landscape

The Mobile-First Approach fits well into existing delivery and business landscapes when there is a significant mobile user base and robust mobile infrastructure. This model thrives in environments where mobile devices are the primary means of accessing digital content, allowing organizations to prioritize mobile platforms in their service delivery. It is particularly effective when there is a demand for user-centered innovation, as mobile-first design emphasizes streamlined, intuitive interfaces that enhance usability and engagement. The model benefits from a regulatory environment that supports mobile connectivity and digital transformation, enabling organizations to reach a broader audience and improve service delivery through mobile channels.

However, the model may not fit well in landscapes where there is limited mobile infrastructure or where users predominantly access services through desktop platforms. If there is insufficient capacity to optimize content and services for mobile devices, organizations may struggle to implement effective mobile-first solutions. Furthermore, if there is resistance to adopting mobile technologies or if the target audience lacks access to mobile devices, the model may face challenges in gaining traction. To ensure the model's success, it is crucial to build the necessary infrastructure, foster collaboration among stakeholders, and create an enabling environment that supports the delivery of mobile-first services.

In the case of mAgri, the mobile-first approach has been successfully implemented in Tanzania, providing farmers with access to a range of services that enhance productivity and reduce barriers to market access. By demonstrating the potential for mobile-first solutions, mAgri has attracted interest from various stakeholders, creating new opportunities for collaboration and growth. This model sets a precedent for similar initiatives in other regions, showcasing how mobile technology can drive positive change in the agricultural sector.

3.9 Collaborative Community Model

Model description

The Collaborative Community Model in agriculture involves the collective efforts of farmers, agribusinesses, and other stakeholders to work together towards common goals. This model leverages the power of collaboration to enhance productivity, sustainability, and innovation in the agricultural sector. By fostering a sense of community and shared purpose, collaborative initiatives can address complex challenges such as resource management, market access, and technological adoption. In low and middle-income countries, this model is particularly beneficial as it empowers smallholder farmers by providing them with access to shared resources, knowledge, and networks. This approach not only improves individual farm outcomes but also strengthens the overall agricultural ecosystem by promoting cooperation and collective action.

Case Example: WeFarm

A notable example of the Collaborative Community Model in agriculture is WeFarm, a digital platform operating in Kenya. WeFarm connects farmers through a peer-to-peer network, allowing them to share knowledge, ask questions, and provide advice to one another. The platform leverages SMS technology to facilitate communication among farmers, even in areas with limited internet access. By fostering a collaborative community, WeFarm enables farmers to access valuable insights and solutions to agricultural challenges, enhancing their productivity and resilience. This model not only supports individual farmers but also strengthens the overall agricultural value chain by promoting knowledge exchange and collective problem-solving.

Key Investors

Investors in collaborative community models typically include international development organizations, technology companies, and social impact investors. These investors are attracted to the potential for scalable impact and the opportunity to drive inclusive growth in the agricultural sector. They recognize that collaboration can enhance technology adoption and improve farm productivity, making it an attractive investment opportunity. By supporting collaborative community projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of WeFarm, key investors include organizations like True Ventures and LocalGlobe, which provide funding and technical support to develop and scale the platform and early inventors like LocalGlobE, ADV and Norrsken Foundation. Their involvement was crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in technology and community development. These investors help to build the infrastructure needed to facilitate collaboration effectively, thereby enhancing the project's impact and reach

Key Influencers and Promoters

Key influencers and promoters of collaborative community models include government agencies, agricultural extension services, and farmer cooperatives. These stakeholders play a vital role in advocating for collaborative solutions and building support among farmers and other stakeholders. By promoting the benefits of collaboration, they help to create an environment where digital solutions are seen as valuable tools for enhancing efficiency and productivity.

For WeFarm, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the platform and encouraging farmer participation. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. WeFarm was also promoted by multiple international sector platforms due to its collaborative model and reached to global media outlets such as BBC. By working closely with these influencers and promoters, WeFarm has been able to effectively reach its target audience and demonstrate the value of collaborative solutions in agriculture.

Its Fit into Existing Delivery/Business Landscape

The Collaborative Community Model fits well into the existing delivery landscape by aligning with broader trends towards participatory design and user-centered innovation. By fostering a sense of community and shared purpose, organizations can create more efficient and effective agricultural solutions that meet the needs of farmers and other stakeholders. This model enhances service delivery by providing targeted support that improves productivity and sustainability.

In the case of WeFarm, the collaborative community approach has been successfully implemented in Kenya, providing farmers with access to a network of peers who can offer support and advice. By demonstrating the potential for collaboration, WeFarm has attracted interest from various stakeholders, creating new opportunities for collaboration and growth. This model sets a precedent for similar initiatives in other regions, showcasing how collective action can drive positive change in the agricultural sector. However, a sustainable delivery model could not be found and the operations of WeFarm had to be downgraded significantly.

3.10 Localized Content and Language Support: EsokoModel description

The Localized Content and Language Support Model in agriculture involves tailoring digital solutions to meet the linguistic and cultural needs of local communities. This model emphasizes the importance of providing content in local languages, styles and adapting digital platforms to align with regional practices and preferences. By doing so, it enhances user engagement, eases technology adoption, and improves the overall effectiveness of agricultural solutions. In low and middle-income countries, this approach is particularly beneficial as it ensures that smallholder farmers can access and utilize digital tools effectively, regardless of language barriers. This model not only improves individual farm outcomes but also strengthens the agricultural ecosystem by promoting inclusivity and accessibility.

Case Example

A notable example of the Localized Content and Language Support Model in agriculture is Esoko, a digital platform operating in Ghana. Esoko provides market information, weather forecasts, and agricultural advice to farmers via SMS in local languages and local styles, ensuring that the content is accessible and relevant to its users. By localizing its services, Esoko helps farmers make informed decisions, improve productivity, and access better market opportunities. This model not only supports individual farmers but also enhances the overall agricultural value chain by facilitating communication and information exchange in a culturally relevant manner.

Key Investors

Investors in localized content models typically include international development organizations, technology companies, and social impact investors. These investors are attracted to the potential for scalable impact and the opportunity to drive inclusive growth in the agricultural sector. They recognize that localized content can enhance technology adoption and improve farm productivity, making it an attractive investment opportunity. By supporting localized content projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of Esoko, key investors include organizations like the International Finance Corporation (IFC) and the Soros Economic Development Fund, which provide funding and technical support to develop and scale the platform. Their involvement is crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in technology and community development. These investors help to build the infrastructure needed to deliver localized content effectively, thereby enhancing the project's impact and reach.

Key Influencers and Promoters

Key influencers and promoters of localized content models include government agencies, agricultural extension services, and farmer cooperatives. These stakeholders play a vital role in advocating for culturally relevant solutions and building support among farmers and other stakeholders. By promoting the benefits of localized content, they help to create an environment where digital solutions are seen as valuable tools for enhancing efficiency and productivity.

For Esoko, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the platform and encouraging farmer participation. Esoko had also significant continental and international spotlight. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. By working closely with these influencers and promoters, Esoko has been able to effectively reach its target audience and demonstrate the value of localized solutions in agriculture.

Its Fit into Existing Delivery/Business Landscape

The Localized Content and Language Support Model fits well into the existing delivery landscape under conditions where there is a strong emphasis on user-centered design and cultural sensitivity. By offering services in local languages and adapting content to regional contexts, organizations can create more efficient and effective solutions that meet the diverse needs of stakeholders. This model enhances service delivery by providing targeted support that improves productivity and sustainability, particularly when there is a deep understanding of local cultural nuances and linguistic differences. However, it may not fit in situations where there is a lack of cultural awareness and understanding of local needs, leading to potential miscommunication and inefficiency. For instance, businesses often fail in global expansion due to a lack of cultural awareness and adaptation to local markets. Therefore, it is crucial to integrate cultural awareness and local adaptation strategies to ensure the success of localized content and language support models.

In the case of Esoko, the localized content approach has been successfully implemented in Ghana, providing farmers with access to relevant information that enhances productivity and reduces barriers to market access. By demonstrating the potential for localized solutions, Esoko has attracted interest from various stakeholders, creating new opportunities for collaboration and growth. This model sets a precedent for similar initiatives in other regions, showcasing how culturally relevant content can drive positive change in the agricultural sector.

3.11 E-commerce Integration

Model description

The E-commerce Integration Model in agriculture involves leveraging digital platforms to connect farmers directly with consumers, bypassing traditional intermediaries. This model enhances market access, increases transparency, and improves the efficiency of agricultural value chains. By integrating e-commerce solutions, farmers can sell their produce directly to buyers, thereby maximizing their profits and reducing post-harvest losses. In low and middle-income countries, this approach is particularly beneficial as it empowers smallholder farmers by providing them with broader market access and competitive pricing. This model not only improves individual farm outcomes but also strengthens the agricultural ecosystem by promoting fair trade practices and reducing inefficiencies.

Case Example: Twiga Foods

A notable example of the E-commerce Integration Model in agriculture is Twiga Foods, a digital platform operating in Kenya. Twiga Foods connects smallholder farmers with vendors and retailers through a mobile-based platform, facilitating the efficient distribution of fresh produce. By leveraging technology, Twiga Foods streamlines the supply chain, reducing the number of intermediaries and ensuring that farmers receive fair compensation for their products. This model not only supports individual farmers but also enhances the overall agricultural value chain by improving logistics and reducing food wastage

Key Investors

Investors in e-commerce integration models typically include venture capital firms, technology companies, and international development organizations. These investors are attracted to the potential for scalable impact and the opportunity to drive inclusive growth in the agricultural sector. They recognize that e-commerce can enhance market access and improve farm productivity, making it an attractive investment opportunity. By supporting e-commerce integration projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of Twiga Foods, key investors include Goldman Sachs, the International Finance Corporation (IFC), and TLcom Capital and one of the richest families of France which provide funding and technical support to develop and scale the platform. Their involvement is crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in technology and market development. These investors help to build the infrastructure needed to deliver e-commerce solutions effectively, thereby enhancing the project's impact and reach.

Key Influencers and Promoters

Key influencers and promoters of e-commerce integration models include government agencies, industry associations, and agricultural cooperatives. These stakeholders play a vital role in advocating for digital solutions and building support among farmers and other stakeholders. By promoting the benefits of e-commerce, they help to create an environment where digital platforms are seen as valuable tools for enhancing efficiency and productivity.

For Twiga Foods, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the platform and encouraging farmer participation. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. Because of its early success in performance, Twiga had been promoted by largest international business intelligence

platforms. By working closely with these influencers and promoters, Twiga Foods has been able to effectively reach its target audience and demonstrate the value of e-commerce solutions in agriculture.

Its Fit into Existing Delivery/Business Landscape

The E-commerce Integration Model fits well into the existing delivery landscape by aligning with broader trends towards digital transformation and direct-to-consumer sales. By offering a platform that connects farmers directly with buyers, organizations can create more efficient and effective agricultural solutions that meet the needs of farmers and other stakeholders. This model enhances service delivery by providing targeted support that improves productivity and sustainability.

In the case of Twiga Foods, the e-commerce integration approach has been successfully implemented in Kenya, providing farmers with access to a range of markets that enhance productivity and reduce barriers to market access. By demonstrating the potential for e-commerce solutions, Twiga Foods has attracted interest from various stakeholders, creating new opportunities for collaboration and growth. This model sets a precedent for similar initiatives in other regions, showcasing how digital platforms can drive positive change in the agricultural sector.

3.12 Blended Digital-Physical Support Model

Model description

The Blended Digital-Physical Support Model in agriculture combines digital tools with traditional, in-person support to provide comprehensive services to farmers. This model leverages the strengths of both digital platforms and physical interactions to enhance agricultural productivity, sustainability, and resilience. By integrating digital solutions with face-to-face support, farmers can access real-time data and expert advice while maintaining the personal touch that is often crucial in agricultural communities. In low and middle-income countries, this approach is particularly beneficial as it bridges the digital divide, ensuring that farmers who may not have full access to digital technologies can still benefit from modern agricultural practices. This model not only improves individual farm outcomes but also strengthens the agricultural ecosystem by promoting technology adoption and knowledge sharing.

Case Example: Shamba Shape Up

A notable example of the Blended Digital-Physical Support Model in agriculture is Shamba Shape Up, a multimedia agricultural extension service in Kenya. Shamba Shape Up combines a popular television show with digital platforms and on-the-ground extension services to provide farmers with practical advice and information. The TV show features real-life farm makeovers, offering viewers insights into best practices and innovative farming techniques. This is complemented by digital resources, such as a mobile app and SMS services, which provide additional information and support. By blending digital and physical elements, Shamba Shape Up effectively reaches a wide audience, providing farmers with the knowledge and tools they need to improve their productivity and livelihoods.

Key Investors

Investors in blended support models can include a big range of organizations depending on the blended capabilities. It can include media companies, international development organizations, and agricultural extension services. These investors are attracted to the potential for scalable impact and the opportunity to drive inclusive growth in the agricultural sector. They recognize that combining digital and physical support can enhance technology adoption and improve farm productivity, making it an attractive investment opportunity. By supporting blended support projects, these investors aim to foster sustainable development and improve livelihoods in low and middle-income countries.

In the case of Shamba Shape Up, key investors include international organizations like GIZ, CGIAR, the Syngenta Foundation, several companies, Hello Tractor, CKL Africa Limited, KenChic Olivado and media partners who provide funding and technical support to develop and scale the platform. Their involvement is crucial for ensuring the project's success and sustainability, as they bring not only financial resources but also expertise in media production and agricultural development. These investors help to build the infrastructure needed to deliver blended support services effectively, thereby enhancing the project's impact and reach.

Key Influencers and Promoters

Key influencers and promoters of blended support models include government agencies, agricultural extension services, and media organizations. These stakeholders play a vital role in advocating for comprehensive solutions and building support among farmers and other stakeholders. By promoting the benefits of blended support, they help to create an environment where digital and physical solutions are seen as valuable tools for enhancing efficiency and productivity.

For Shamba Shape Up, the influencer and promotor situation was unique as it is a media platform with TV shows. However, partnerships with local agricultural organizations and government agencies have been instrumental in promoting the platform and encouraging farmer participation. These collaborations help to build trust and credibility among farmers, ensuring that they are willing to adopt the technology and integrate it into their operations. By working closely with these influencers and promoters, Shamba Shape Up has been able to effectively reach its target audience and demonstrate the value of blended support solutions in agriculture.

Its Fit into Existing Delivery/Business Landscape

The Blended Digital-Physical Support Model fits well into the existing delivery landscape by aligning with broader trends towards integrated solutions and user-centered innovation. By offering a combination of digital and physical support, organizations can create more efficient and effective agricultural solutions that meet the needs of farmers and other stakeholders. This model enhances service delivery by providing targeted support that improves productivity and sustainability.

The Blended Digital-Physical Support Model fits well into the existing delivery landscape in agricultural sectors under conditions where there is a strong emphasis on integrated solutions and user-centered innovation. By offering a combination of digital and physical support, organizations can create more efficient and effective agricultural solutions that meet the diverse needs of farmers and other stakeholders. This model enhances service delivery by providing targeted support that improves productivity and sustainability, particularly when there is a deep understanding of local agricultural practices and technological capabilities. For instance, digital technologies can enhance the flexibility and responsiveness of farm operations, improve resource utilization, and ensure product safety. Additionally, digital twins can simulate and model physical systems to optimize agricultural processes.

However, this model may not fit in situations where there is a lack of technological infrastructure, digital literacy, or cultural awareness, leading to potential miscommunication and inefficiency. For example, the adoption of digital technologies in agriculture requires careful consideration of the challenges and obstacles involved, including the need for user-friendly interfaces and the active involvement of stakeholders. Therefore, it is crucial to integrate cultural awareness, technological adaptation, and local understanding to ensure the success of blended digital-physical support models in agricultural sectors.

In the case of Shamba Shape Up, the blended support approach has been successfully implemented in Kenya, providing farmers with access to a range of services that enhance productivity and reduce barriers to market access. By demonstrating the potential for blended support solutions, Shamba Shape Up has attracted interest from various stakeholders, creating new opportunities for collaboration and growth. This model sets a precedent for similar initiatives in other regions, showcasing how integrated solutions can drive positive change in the agricultural sector.

4. COMPARATIVE ANALYSIS

4.1 Summary of the Delivery/Business Models

Table 1 provides a comprehensive overview of various digital business models that can be employed in the agricultural sector, particularly in low- and middle-income countries. The table outlines the typical key investors, promoters or influencers, and the landscape features that are conducive or detrimental to the success of each model. Additionally, the table includes real-world examples of each model, showcasing their practical applications and potential impact. The information presented in this table can serve as a valuable resource for stakeholders involved in agricultural development, including investors, entrepreneurs, policymakers, and development practitioners.

By understanding the characteristics and requirements of different digital business models, these stakeholders can make informed decisions about which models are most suitable for their specific contexts and objectives. The table also highlights the importance of considering the broader ecosystem and landscape features when implementing digital solutions in agriculture, as these factors can significantly influence the success and sustainability of such initiatives. The examples provided offer insights into how these models have been implemented in real-world scenarios, demonstrating their potential to address challenges and create opportunities in the agricultural sector.

Furthermore, the table underscores the dynamic nature of the digital landscape and the need for adaptability and innovation in agricultural development. As technology continues to evolve and new challenges emerge, it is essential for stakeholders to remain informed about the latest trends and explore new business models that can effectively leverage digital solutions to promote sustainable and inclusive growth in the agricultural sector. The table serves as a starting point for such exploration, providing a framework for understanding the key elements and considerations involved in implementing digital solutions in agriculture.

Table 1. Summary of the Delivery/Business Models

Model Name	Typical Key Investors	Typical Promoters or Influencers	Best Fit For	Unfit For	Real examples
Hybrid Subscription-Freemium Model	Venture capitalists, Private equity firms	Industry experts, Tech bloggers	Large user base, Clear path to profitability	High operational costs, Difficulty in converting free users to paying customers	TaniHub (Indonesia), TROTRO Tractor (Ghana), DigiFarm (Kenya)
Public-Private Partnership Model	Government agencies, International development organizations	Government officials, Industry leaders	Clear alignment of goals, Complementary strengths	Lack of trust or misalignment of objectives, Regulatory and bureaucratic hurdles	e-Granary (Kenya), National Agricultural Research System (India), Golden Rice Project (Philippines)
Youth-Centric Engagement Model	International development agencies, Non-governmental organizations	Youth organizations, Educational institutions	Supportive environment, Access to resources	Limited access to land and finance, Negative perceptions of agriculture	Digital marketing platform for cocoa farmers (Indonesia), 4-H Youth Development Program (USA), Young Farmers' Clubs (Kenya)
Data Monetization and Insights Model	International development agencies, Technology companies	Government agencies, Agricultural research institutions	Robust data infrastructure, Culture of data-driven decision-making	Data quality and integration challenges, Regulatory hurdles and privacy concerns	Smattcom (Mexico), Climate Corporation (USA), aWhere (Kenya)

Model Name	Typical Key Investors	Typical Promoters or Influencers	Best Fit For	Unfit For	Real examples
Integration with Existing Agricultural and Non-Agricultural Systems Model	International development agencies, Technology firms	Government agencies, Industry associations	Strong infrastructure for digital connectivity, Commitment to cross-sector collaboration	Siloed operations and lack of interoperability, Regulatory restrictions on data sharing	Hello Tractor (Nigeria), AgriDigital (Australia), FarmLogs (USA)
Tiered Service Model for Different Farm Sizes	International development agencies, Agribusiness companies	Government agencies, Agricultural extension services	Diverse agricultural sector, Demand for customized solutions	Lack of infrastructure to support differentiated service delivery, Resistance to adopting customized approaches	TROTRO Tractor (Ghana), FarmDrive (Kenya), CropIn (India)
Value-Added Services Model	Mobile network operators, Financial institutions	Government agencies, Agricultural extension services	Demand for comprehensive solutions, Strong infrastructure to support integration of additional services	Lack of infrastructure or stakeholder collaboration, Resistance to adopting new solutions	DigiFarm (Kenya), iCow (Kenya), MyAgro (Tanzania)
Mobile-First Approach	Mobile network operators, Technology companies	Government agencies, Agricultural extension services	Significant mobile user base, Robust mobile infrastructure	Limited mobile infrastructure, Resistance to adopting mobile technologies	mAgri (Tanzania), Farmerline (Ghana), Grameen Foundation's Community Knowledge Worker initiative (Uganda)
Collaborative Community Model	International development organizations, Technology companies	Government agencies, Agricultural extension services	Strong emphasis on participatory design, Sense of community and shared purpose	Lack of technological infrastructure or digital literacy, Cultural barriers to collaboration	WeFarm (Kenya), Digital Green (India), Farmer Business Network (USA)
Localized Content and Language Support Model	International development organizations, Technology companies	Government agencies, Agricultural extension services	Strong emphasis on user-centered design, Cultural sensitivity	Lack of cultural awareness, Resistance to adopting localized solutions	Esoko (Ghana), Uliza (Kenya), RiceAdvice (Vietnam)
E-commerce Integration Model	Venture capital firms, Technology companies	Government agencies, Agricultural cooperatives	Digital transformation, Direct-to-consumer sales	Limited internet connectivity, Lack of trust in online transactions	Twiga Foods (Kenya), BigHaat (India), Farmpal (Nigeria)
Blended Digital-Physical Support Model	Media companies, International development organizations	Government agencies, Media organizations	Integrated solutions, User-centered innovation	Lack of technological infrastructure, Digital literacy gap	Shamba Shape Up (Kenya), Esoko (Ghana), Digital Green (India)

4.2 Status of the ACB and Feedback from the Stakeholders

The Agro-Climatic Bulletin (ACB) in Vietnam is designed to provide farmers with timely and relevant climate information to support their agricultural practices. It aims to help them make informed decisions regarding planting, irrigation, and harvesting, thereby reducing risks associated with climate change. The ACB is intended to be a core climate information solution, and is being developed in the context of Vietnam's vulnerability to climate change, with its long coastline, extensive low-lying areas, and dependence on agriculture. The Alliance of Bioversity International and CIAT is working on a portfolio of projects focused on climate change adaptation and mitigation in the Mekong Delta, which includes the development of digital climate advisories and bundled services for smallholder farmers. The ACB is part of these efforts.

General Feedback

The stakeholder consultation and feedback session organized by The Alliance of Bioversity International and CIAT team in December 2024 in Hanoi provided important insights on the desirability and feasibility of the business models presented above. It showed that the current implementation of the ACB faces several challenges. The ACB is intended to be disseminated through various channels including digital platforms (such as Zalo groups) and traditional methods, but it is not always reaching farmers effectively. For example, the stakeholders mentioned that "the use of the Zalo group might not be sufficient, as farmers are involved in many different Zalo groups. How can we evaluate the number of actual users, considering that some may join the Zalo group but not read the ACBs?". Also, messages sent through the Zalo channel might be too long and lack focus.

Workshop participants provided valuable feedback on various aspects of the ACB's current status. Key issues and suggestions included:

- ***Content and Specificity:*** The ACBs need to be more detailed, particularly regarding water management. Participants noted that "The ACBs should integrate recommendations for water management by growth stages/time when the water demand of plants is different". There is also a need to provide information on extreme and sudden weather events, alongside regular forecasts.
- ***Dissemination Channels:*** The effectiveness of Zalo groups as a dissemination channel was questioned, with concerns raised about user engagement and information overload due to farmers participating in multiple groups. It was suggested that other social media platforms like TikTok and Facebook might be more effective for reaching farmers. Also, "The ACBs' broadcast messages should be edited/shortened; otherwise, they would be too long and lack focus".
- ***User Experience:*** Participants emphasized the need for a more intuitive tool, with logically presented information and enhanced value. There is also a need for continuous data collection and feedback from users to inform improvements to the ACB. Different types of farmers have different information needs. For example, "durian farmers are primarily concerned with rainfall and rain warnings, while star apple farmers focus more on salinity. Rice farmers, due to their years of experience, are more interested in price information".
- ***Cost and Investment:*** The focus of government investment is shifting towards long-term projects with proven sustainability, with less attention for investment in the agricultural sector. The need to explore avenues for attracting private sector investment and developing revenue-generating products was also discussed.
- ***Interdisciplinary Cooperation:*** There is a need for more interdisciplinary cooperation to reduce costs and enhance the effectiveness of the ACB. This includes collaboration between meteorological agencies, irrigation departments, and local experts. There is a potential for "enterprises to mentor students to conduct research and apply their findings in practice. This approach could also help reduce costs". Additionally, the focus should be on "producing high-quality products that meet local needs".

Feedback on Key Investors

The current status of the ACB is heavily reliant on funding and support from international organizations, and government agencies. To ensure long-term sustainability, the ACB needs to attract a broader range of investors, particularly from the private sector. The feedback from the workshop highlighted the following considerations:

- Government Priorities: Government priorities are shifting away from agriculture towards modernizing physical infrastructure and transportation, which makes it challenging to obtain government funding. To obtain these funds there is a need for "evidence of success" and that "accessing it requires time due to procedural requirements".
- Private Sector Focus: The private sector prioritizes revenue generation and may not be interested in non-profit initiatives, except for some large companies. It is difficult to attract "private sector investment in green innovations" as there is not enough "policies and governmental support for the private sector".
- Long-term Sustainability: International support has shifted from one-off aid to long-term cooperation, so there is a need to develop products that can increase added value for farmers, to attract large enterprises for testing innovations. There is a need for "identifying funding sources to sustain the ACBs" and that the "public-private partnership model should be applied as it aligns well with Vietnam's current management system".
- Public-Private Partnerships: A public-private partnership model is viewed positively, but it is important to ensure "a clear alignment and synchronization between the roles of the government, private sector, and civil society". Also, "when complementary skills are involved, the government has expertise in this area, while the private sector has different strengths". The model needs to avoid "too much regulation or processes that take too long, [otherwise] the private sector may be hesitant to collaborate with the government".

Key Influencers and Promoters

Currently, key influencers and promoters of the ACB include government officials, the Technical Working Group (TWG), and international development organizations, but the stakeholders mentioned opportunities to engage other influencers to enhance the dissemination and adoption of the ACB. Feedback from the workshop included:

- Technical Working Group (TWG): The TWG plays an important role in developing and disseminating the ACBs. They are responsible for making sure the ACBs are accessible. There is a need for the TWG to "study user preferences to determine whether they prefer Zalo groups or individual recommendations via the app".
- Local Experts: Local irrigation experts need to be included in the TWG to provide recommendations on water management.
- Social Media: Television and radio are effective but social media platforms like TikTok and Facebook are more engaging and impactful for reaching farmers.
- Community Engagement: The support team should "collaborate to determine the most appropriate communication methods for each audience". There is also a need to classify farmers based on their needs in order to approach them appropriately.
- Mobile Networks: The potential for utilizing mobile networks to reach farmers was recognized, with participants suggesting that CIAT and WeatherPlus should "collaborate with MobiFone to distribute the ACBs for free to more users, with a fee charged for in-depth information, access to experts, or a premium version".

ACBs Fit into Existing Delivery/Business Landscape

The feedback on ACB's fit into the existing delivery and business landscape is mixed. While it addresses a critical need for climate information, several factors affect its integration:

- Existing Infrastructure: There are challenges in leveraging existing digital platforms effectively, such as the Zalo groups, due to information overload and inconsistent user engagement. The need for more user-friendly tools was highlighted.
- Government Mechanisms: The ACB is intended to work within the current management system in Vietnam and public-private partnerships align well with this approach. However, accessing government funding can be time-consuming and requires clear evidence of success.
- Private Sector Integration: While the private sector is a potential source of investment, there needs to be clear mechanisms for cooperation and mutual benefit. There is an opportunity for "partnering with input suppliers and processors/buyers [to] provide a funding source to maintain the ACBs".
- Hybrid Models: A hybrid approach was suggested to better serve farmers. Mr. Trung from Winrock proposed "the Blended Digital-Physical Support Model". Also, a "hybrid Subscription-Freemium Model with weather index insurance... could be applied to the case of ACB, too".
- Localized Content: There was support for "a localized content and language support model" to be combined with other models to ensure a "user-centered and tailored to local needs" service.
- Community Collaboration: Community cooperation can make the ACB suitable for local conditions, but without private sector cooperation it may not be sustainable.
- Need for a Management System: It would be useful to develop a "small unit, like a survey or reporting model, to regularly collect and provide feedback to the technical working group. This could be similar to a design system or an information management system that gathers data about user experience and provides regular input to the technical working group for the best presentation based on user preferences".

5. OPTIMAL BUSINESS/DELIVERY MODELS FOR CLIMATE INFORMATION SOLUTIONS IN VIETNAM

Based on the analysis of various delivery and business models and considering the specific context of Vietnam, several models stand out as optimal for scaling Climate Information Solutions (CIS), particularly the Agro-Climatic Bulletin (ACB). These models are chosen for their potential to address the unique challenges and opportunities in Vietnam's agricultural sector, as well as the feedback from the workshop. We recommend

Blended Digital-Physical Support Model:

Why it's optimal: This model combines the reach and efficiency of digital platforms with the trust and personal touch of physical interactions. It is particularly suited to the Vietnamese context where farmers may have varying levels of digital literacy and access. It ensures that climate information reaches a broad audience and is effectively understood and applied. As noted in the feedback, the current use of Zalo might not be enough to reach all users. Combining digital platforms with in-person support from local experts would ensure a more comprehensive and effective approach. Also, the blended model can leverage the existing network of Technical Working Groups (TWG) for dissemination and capacity building.

How it can be deployed: This model integrates digital platforms, such as the WeatherPlus app, Zalo, or other apps, with traditional channels like TV programs, community meetings, and direct interactions with extension officers and experts. It can also include training programs for commune-level staff to act as focal points for dissemination and support. As suggested in the workshop "CIAT and WeatherPlus should work together to integrate ACBs with the AgiMedia App and collaborate with MobiFone to distribute the ACBs for free to more users, with a fee charged for in-depth information, access to experts, or a premium version".

Public-Private Partnership (PPP) Model:

Why it's optimal: This model aligns well with Vietnam's management structure and priorities. It leverages the strengths of both the government and private sectors, allowing for shared resources, expertise, and investment. In the context of Vietnam, where the government plays a significant role in agricultural development, PPPs can ensure that the ACB is integrated into national strategies. It can also provide access to both public and private funding.

How it can be deployed: PPP involves collaboration between government entities, private companies (such as input suppliers, technology providers, and buyers), and civil society organizations. The government can provide policy support and public funding, while private companies can bring technological expertise and financial investment. As suggested in the workshop, "partnering with input suppliers and processors/buyers could provide a funding source to maintain the ACBs". This approach can also ensure that climate information services are affordable or free through government mechanisms.

Localized Content and Language Support Model:

Why it's optimal: This model ensures that climate information is culturally relevant and easily understood by farmers in different regions. Given the diversity of agricultural practices and local conditions in Vietnam, it is critical to tailor content to the specific needs of each community. This approach also respects indigenous knowledge and cultural practices, thereby enhancing trust and adoption of the ACB. As suggested in the workshop, "the content and language localization model is user-centered and tailored to local needs".

How it can be deployed: This model involves translating the ACB into local styles. It also requires adapting content to regional agricultural practices and ensuring that the information is relevant and actionable for each specific region. This model should be combined with community models to gather local knowledge. As a workshop participant mentioned, "each type of farmer is interested in specific types of weather information... therefore, it is important to classify farmers based on their needs in order to approach them appropriately".

Hybrid Subscription-Freemium Model:

Why it's optimal: This model can create a sustainable revenue stream for the ACB while ensuring that essential climate information is still accessible to all farmers. This can be achieved by offering basic climate information services for free, with options for farmers to purchase more detailed and personalized information or value-added services. It would require an understanding of what farmers would be willing to pay for, since rice farmers have a very low profit margin.

How it can be deployed: A freemium model could provide basic weather forecasts, while a subscription package could offer more detailed information such as weather index insurance, specific recommendations, or direct access to experts. This model aligns with current approaches of WeatherPlus, as suggested by Mr. Quang.

Models That Are Less Suitable for ACB in Vietnam:

While other models may be effective in different contexts, the following are less suited for the specific circumstances of the ACB in Vietnam:

Youth-Centric Engagement Model:

Why it's less suitable: While engaging youth in agriculture is crucial for long-term sustainability, the immediate need for the ACB is to reach a broad audience of existing farmers, many of whom may not be tech-savvy. Focusing on youth engagement as a primary model could divert resources from the immediate need of providing climate information to current farmers. While the model itself is useful, it needs to be integrated into a larger solution.

Challenges: This model may face challenges where there is limited access to land and finance, or negative perceptions of agriculture as a viable career path.

Data Monetization and Insights Model:

Why it's less suitable: While this model can enhance the value of agricultural data, it may not be the most direct path to scaling climate information services for the ACB in Vietnam, especially in the short term. The focus of the ACB is on delivering actionable information, and monetizing data may distract from the primary goal of helping farmers adapt to climate change. Also, there is a need for a "robust data infrastructure" and a culture of "data-driven decision-making" which are not yet fully established.

Challenges: This model requires advanced analytics and data governance frameworks, which may not be readily available in many rural areas of Vietnam. Also, regulatory hurdles and concerns over data privacy can impede implementation.

Mobile-First Approach:

Why it's less suitable: While mobile technology is important, a mobile-first approach alone is not sufficient. Given the varied levels of digital literacy and infrastructure limitations in Vietnam, relying solely on mobile platforms may not reach all farmers. It needs to be combined with other communication methods.

Challenges: This approach is less suitable in areas with limited mobile infrastructure, and where users may not be able to access services through mobile devices, or if they are not comfortable with mobile technology.

E-commerce Integration Model:

Why it's less suitable: Although integrating e-commerce into agriculture can improve market access and efficiency, this model is less relevant for the ACB which provides climate information rather than direct market access. It is more suited for platforms that directly facilitate the sale of agricultural products.

Challenges: This model requires a robust digital infrastructure and trust in online transactions, which may not be universally present among Vietnamese farmers.

Tiered Service Model for Different Farm Sizes:

Why it's less suitable: While a tiered service model can provide tailored support, the initial focus of the ACB should be to deliver core climate information to all farmers, regardless of their farm size. Implementing a tiered service model could create unnecessary complexity in the initial scaling process. It is more suitable for mechanization services or access to inputs, not directly to access to climate information.

Challenges: The approach requires a clear understanding of different farm sizes and their needs and capacity to assess and address unique needs, which may not be readily available.

Collaborative Community Model:

Why it's less suitable: While community involvement is important, the ACB also requires expert input and government support to ensure scientific accuracy and relevance. Relying solely on community collaboration may not be sufficient to deliver high-quality climate information. The model may be suitable as one of the dissemination channels, but it should not be the main business model.

Challenges: This model may face challenges in areas with limited infrastructure and digital literacy.

6. CONCLUSION

The optimal business/delivery models for scaling climate information solutions in Vietnam, and particularly the ACB, should leverage the Blended Digital-Physical Support Model, Public-Private Partnership, and Localized Content and Language Support Model. Additionally, a Hybrid Subscription-Freemium Model could provide a sustainable source of revenue for more detailed services, while not excluding access to basic services for all farmers. These models are chosen for their ability to address the specific needs and challenges of the Vietnamese agricultural sector, as well as their potential to integrate into existing structures. By combining digital technologies with community engagement and local expertise, the ACB can effectively reach and benefit a broad range of Vietnamese farmers. While other models might have potential value, they may not be as efficient, sustainable, or effective in the short- to medium-term for the specific context of the ACB in Vietnam

Photo by: The Alliance of Bioversity International & CIAT

The **Initiative on Asian Mega-Deltas (AMD)** aims to create resilient, inclusive and productive deltas, which maintain socio-ecological integrity, adapt to climatic and other stressors, and support human prosperity and wellbeing, by removing systemic barriers to the scaling of transformative technologies and practices at community, national and regional levels.

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