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Understanding strategic decisions of digital agricultural platform companies: Six case studies of Sub-Saharan African platforms

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Understanding Strategic Decisions of Digital Agricultural Platform Companies

Six Case Studies of Sub-Saharan African Platforms

Matthias von Bismarck-Osten

Abstract

Over the last seven years, digital agricultural platforms offering a broad range of products and digital services to smallholder farmers have gained a dominant position on the African market. This paper examines the predictions of platform theory using case study evidence from six companies in Sub-Saharan Africa. The platform companies profiled in this paper are DigiFarm, FarmCrowdy, AgroMall, Twiga Foods, Tulaa and AgroCenta. While in theory platforms limit themselves to establishing linkages between user groups, the platform companies profiled in this paper have built vertical structures of control and integration into their business model, albeit to a varying degree. These include the maintenance of a field force that advises and accompanies the farmers, logistics and, above all, the direct sale of the farmers' produce on the platform company's own account. Thus, very different platform models are all subsumed under the term 'digital agricultural platforms'. With recourse to economic theory on platforms, the paper proposes categories with greater discriminatory power. In addition, it describes how platform companies make key strategic decisions as set out in economic theory. Finally, owing to varying contexts, the paper concludes that there is no silver bullet for the establishment of a digital agricultural platforms.

Keywords: Sub Saharan Africa, rural development, digital agricultural platforms, digital services for agriculture (D4Ag), agricultural value chain management, theory on platforms.

JEL Codes: D21, Q12, Q13, Q19, O32, O33.

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List of Acronyms

AFA	Mercy Corps' AgriFin Accelerate Program
AGRA	Alliance for a Green Revolution in Africa
BoAT	Agency Bank of Agricultural Transformation
B2B	Business-to-Business
B2C	Business-to-Customer
B2B2C	Business-to-Business-to-Customer
CTA	Technical Centre for Agricultural and Rural Cooperation
D4Ag	Digital Services for Agriculture
DFC	U.S. International Development Finance Corporation
DFI	Development Finance Institution
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GSMA	GSM Association
IDA	International Development Association – World Bank
IFAD	International Fund for Agricultural Development (IFAD)
IFC	International Finance Corporation
IoT	Internet-of-Things
IVR	Interactive Voice Response
MSP	Multi-Sided Platform
MVP	Minimum Viable Product
NGO	Non-governmental Organisation
OSP	One-sided Platform
RAF Learning	Rural & Agriculture Finance Learning Lab
SME	Small and Medium-sized Enterprise
SMS	Short Messaging Service
SSA	Sub-Saharan Africa
TSP	Two-sided Platform
WFP	World Food Programme

1 Introduction

Following the rapid dissemination of mobile phones and smartphones in Sub Saharan Africa, the market for Digital Services for Agriculture (D4Ag) has been rapidly expanding in the last 15 years.¹ By the end of 2020, there were 437 service companies registered offering a broad spectrum of services for farmers with advisory services at one end, via remote sensing, soil testing, access to finance, access to inputs and mechanisation, irrigation to off-takers on the other end.² For the past seven years or so, D4Ag companies have started bundling services and to offer them via platforms. Registered farmers thereby receive access to different services from one source. Since farmers have various interconnected needs, the value proposition of platforms appeals to them: They offer a ‘holistic’ solution to all needs from a single source.

In general, the business models of broad-based platforms have comparative advantages over single-service providers. In particular through their ability to collect a comprehensive set of data. This allows them to design new products in accordance with user preferences identified from the data and to calculate and mitigate risks more accurately. Furthermore, as platform theory describes it, multi-sided platforms have a chance to scale at a non-linear growth-rate due to network effects.

In its fundamental “Report on the Digitalisation of African Agriculture” the Technical Centre for Agricultural and Rural Cooperation (CTA) dubbed platforms which offer a broad range of services as “super platforms”. It defines them as “solutions that straddle many – and, at times, all – other D4Ag use cases. At the very minimum, super platforms combine digitally enabled market linkages, digital finance, and digital advisory services into an integrated service bundle for farmers”.³

This type of broad-scope-platform has witnessed a substantial growth in demand for its services. The Kenyan digital agricultural platform, DigiFarm, for example has gained no less than 1.4 million registered farmers in just a few years. The large increase in the demand translates into growing supply of platform offerings. Supported by development institutions, NGOs and impact-investors, platforms experimenting with new business concepts are constantly being launched.⁴ Meanwhile existing D4Ag-companies either slip under the roof of a platform offering a broad scope of services or seek for themselves to develop into one by extending their business scope in a product-by-product way. CTA predicts that “super platforms” will become the “most common architecture for D4Ag service delivery” and the “dominant approach in the sector in just a few years”.⁵

This paper highlights that the phenomenon of African digital agricultural platforms offering a broad range of services, has so far not been convincingly captured by economic theory. Firstly, there is a lack of a sufficiently broad set of categories making distinctively different platform types clearly distinguishable. Makeshift designations like ‘super platforms’ do not fulfil this claim. Secondly, strategic decision making of platform companies has so far been insufficiently understood. What are the basic strategic decisions for agricultural platforms leading to either success or failure? There is a need for a better understanding of decision making of digital agricultural platforms and of the complexities company builders have to get to grips with. The paper seeks to make an empirical contribution to filling these knowledge gaps. For this purpose, the economic theory of platforms is related to selected agricultural platforms in Sub-Saharan Africa (SSA), which serve as case studies.

¹ CTA defines D4Ag as “the use of digital technologies, data and business model innovations to transform practices across the agricultural value chain and address bottlenecks in *inter alia*, agricultural productivity, postharvest handling, market access, finance and supply chain management...” CTA (2019) p. 28

² GSMA (2020a) p. 6

³ CTA (2019) p. 88

⁴ A prominent supporter has been Mercy Corps’ AgriFin Accelerate Program (AFA) which has advised and accompanied several platform companies, including several of the case-study-platform-companies of this paper.

⁵ CTA (2019) p. 125

With regard to the first issue of the categorisation of platforms, this paper takes a recourse to economic theory of platforms and proposes terms which should help distinguish between different platform models. In economic literature, transaction platforms are described as marketplaces limiting themselves to creating links between platform user groups. Most of the paper's case-study-companies, however, operating as value chain integrators, run a field force supporting farmers, aggregate the produce and sell it on their account. By doing so, they assume related risks (inventory- and transaction risks) and costs (storage, logistics, etc). A broader range of platform categories is needed to allow for a conceptualisation of such fundamental differences.

To address the second issue which pertains to insufficient understanding of strategic decision making this paper first outlines the set of strategic decisions platform companies have to make according to the economic literature on platforms. It then examines how the case-study-platform-companies have made these decisions. Consequently, it will become clear that the adaptation of the platform business model to the conditions of the African D4Ag-market required a departure from the text-book platform concept. In theory, markets characterized by fragmentation and in-transparency are considered the most suitable ones for the use of platforms. The African D4Ag-market certainly exhibits these features. However, the market also exhibits some other, more adverse features. For example, farmers, particularly first-time users of digital services, are in most cases illiterate, maintain traditional production methods implying low yield and quality of the produce and had never been granted a loan to buy inputs. Case-study-platform-companies deal with these market features by building vertical elements in terms of control and by integration of downstream activities such as logistics into their business models - albeit to a varying degree.

For the purpose of this research, six well-known platform companies in SSA were selected for analysis, which are all private sector and for-profit companies covering a broad range of services, in particular offtake arrangements. Despite their common characteristics, they belong to different platform categories and have taken strategic decisions in a distinctively different way – confirming the observation that there is no silver bullet for building a platform. Not all of the platform companies profiled in the case studies have been successful. One of them, Tulaa, reportedly went into insolvency last year.⁶ Nevertheless, this company was included as it underlines the need for a better understanding of decision making of digital agricultural platforms.

This paper aims to contribute both to the economic literature on agricultural development as well as to platform theory, which, as has been highlighted with regard to the latter, lacks an empirical underpinning in particular as far as emerging platforms are concerned.⁷ This paper certainly does not claim to close the described knowledge-gaps but hopes to give directions and encouragement for further research.

This paper is organised as follows: The methodological approach is discussed in section 2. In section 3 a theoretical framework is established by taking recourse to the economic theory of platforms which should allow for (i) a categorisation of different types of digital agricultural platforms and (ii) a better understanding of the strategic decision making of platform companies and the different strategic routes they have been following. In section 4, six case studies are being profiled against the theoretical background. In the concluding chapter, findings are summarized.

⁶ See Pitchbook's page on Tulaa: <https://pitchbook.com/profiles/company/225735-40>. The Eckenstein Geigy Stiftung, one of its donors, reports on its homepage that Tulaa is in insolvency (<https://eckenstein-geigy-stiftung.org/en/portfolio/tulaa>).

⁷ Hein et al. (2019) p. 632

2 Methodological Approach

This research on the case-study-platform-companies relies on four sources of information: (i) publicly available information on the internet, e.g. on FarmCrowdy and AgroCenta, while companies such as DigiFarm, Twiga and Tulaa are well described in studies; (ii) answers to the questionnaire which was sent to four case-study-companies,⁸ of which three were completed and sent back; (iii) interviews with company representatives (AgroMall, AgroCenta, Twiga) and (iv) interviews with stakeholders of the case-study-companies and researchers specializing on platforms. These different sources made it possible to double-check information to a certain degree. This is unfortunately less the case with regard to AgroMall. The paper relies - to a larger extent than desired - on the company's self-portrayal on its webpage and on the interviews with its CEO.

The following chapter on economic theory of platforms does not claim to provide an overview of all aspects of platforms. It is narrowed down to cover only those aspects which are relevant for analysing digital agricultural platforms. The theoretical framework has been discussed with an economist specialising on platforms at the University of Toulouse (which hosts one of the leading research institutes in that field).

As part of the research on the case study companies, an attempt was also made to find out what impact the companies have achieved, specifically in terms of induced increases in job creation, farmers' yields and income. Impact is however not the central topic of this working paper. Building on the figures received from the companies and the publicly available reports and data, the paper accordingly makes statements. Nevertheless, it should be made clear that the information on which these statements are based, was in most cases not collected by independent entities. The statements on impact should therefore be taken with a degree of caution.

⁸ One of the six case study companies (Tulaa) is reportedly insolvent. Another (DigiFarm) is known not to respond to such requests, but there are a number of published studies that the paper relied on.

3 Platforms in Economic Literature: Definitions, Categorisations and Related Strategic Decisions to Be Made by Platform Builders

3.1 Definitions and Categorisations of Platforms

What is a platform? There is a vast amount of economic literature on platforms describing the broad range of platform models and their various aspects, making it difficult to find a generally accepted definition. The smallest common ground is that platforms “...bring together individuals and organizations so they can innovate or interact in ways not otherwise possible, with the potential for nonlinear increases in utility and value”.⁹ It is this cooperation among participants which drives the creation of value and, consequently, they work the better the more people join the platform.

Varying platform models exist. Thus, it is firstly necessary to differentiate between innovation and transaction platforms. Innovation platforms represent a space in which different participants use an existing core asset of the platform – a technology or a data-pool - as a basis for the design of products and services. Prominent examples are Android or Apple inviting app developers to build apps to be used on their smartphone operating system. As these external-app-developers create value for other platform users they increase the value of the platform.¹⁰ Establishing an innovation platform offers the opportunity for a company to get innovative products and services on its platform without having to make the necessary R&D investments itself.

Transaction platforms bring one, two or multiple sides to the platform mainly for matchmaking between buyers and sellers of goods or services. These platforms are not limited to transactions as they also cover the exchange of information with each other e.g., in social networks, or exchange financial authorizations and authentication data as in payment platforms.¹¹ There are three principal types of transaction platforms and combination-models – which also come up in the following case studies.¹²

A *one-sided platform* (OSP) intermediates between users among the same user group. A prominent example is Facebook (before it included other user groups such as advertisers). The more Facebook subscribers are on board for sharing information – the greater the usefulness of the platform for its users. This dynamic is called the same-side network effect. The distinction between a merchant market situation, such as a grocery shop, and a one-sided platform market is difficult to draw: While the merchant sells goods to unspecified customers, the one-sided market situation is characterised by a user group, in this example the customers of the grocery shop, for which it is advantageous if it grows in size, as this induces an expansion of the range of goods being offered.

Two-sided platforms (TSP) intermediate between two sets of users. Its classical use-case is matchmaking between demand and supply. Here, buyers find goods (for example on Amazon), chauffeurs find passengers (for example on Uber), etc. The more users on one side of the platform the greater the usefulness for those on the other side. This is called the cross-side network effect.¹³

⁹ Cusumano et al. (2019), p. 13

¹⁰ Cusumano et al. (2019) p.5

¹¹ Cusumano et al. (2019) p.80

¹² The theoretical basis for the categorisations of platforms presented here - including the coining of the terms same- and cross-side-effects - was mainly laid by Rochet and Tirole, University of Toulouse, see Rochet and Tirole (2003) and (2005). Jean Tirole received the Nobel Prize in 2004 for his contribution to economic theory on platforms. Theory is dominated by certain aspects of two- or multi-sided platforms such as pricing, competition, taxation and regulation. A good overview over the literature is provided: Juan Manuel Sanchez-Cartas and Gonzalo Leon (2019) and Abdelkafi et al. (2019).

¹³ Uber serves as a good example: The more Uber-drivers there are the less waiting time for passengers and tentatively the lower the prices for Uber-passengers – and vice versa.

Multi-sided platforms (MSP) have more than two user groups. For instance, Google's smartphone operating system Android. It has four main user groups intermediated by the platform: the hardware producers manufacturing the handset, the telco-operator, the app-developers basing their application on the Android-system and finally the smartphone users.¹⁴

This paper also brings forth a number of combination-models:

Merchant-combined with a one-, two- or multi-sided platform: An example of such a combination-model is Amazon which entered the market as a merchant, selling books on its own account via the internet (e-commerce). In the late 1990's it attached a two-sided platform, establishing linkages between sellers and buyers without assuming any transaction risks and without intervening in price formation.¹⁵ Hagiu points out that such "distinction is quite important as the two models are associated with different business strategies".¹⁶ Some of this paper's case studies serve as good examples of these combination-models. They run platforms connecting product- and service providers with farmers while selling the farmers' produce on their own account as merchants. One case-study-company represents a merchant-combined with a one-sided platform model: Merchant, as the platform company sells the produce of the farmers' offtake directly to industrial buyers on its own account. It is a one-sided platform in the sense that there are no direct links between farmers and offtakers and service providers – while, nevertheless, the user group of farmers has an interest that it grows in size as that attracts more product and service providers to the platform leading to a broader spectrum being offered. In addition, a growing user group of farmers could produce larger quantities, which in turn attracts bulk buyers who usually are willing to pay a premium for larger quantities.

Agent-combined with a one- two- or multi-sided platform: The models resemble the combination-models with a merchant. The difference is that the agent does not sell the produce on its own account but arranges the transaction against a commission - again outside the platform.

Innovation and Transaction Platforms: It is not unusual that a successful transaction platform company adds on an innovation platform. Following its success, Facebook, for instance, attached a new side of independent programmers to its platform allowing them to use the Facebook database to design games and other applications.¹⁷ Similarly, one of the case-studies discussed below considers attaching an innovation platform to its existing transaction platform.

3.2 Characteristics of Transaction Platforms

The subsequent sections of the paper will focus on two- and multi-sided transaction platforms as they are a very relevant type of digital agricultural platforms in SSA. As the difference between two- and multi-sided platforms is insignificant in this context they are subsumed under the term multi-sided-platforms (MSP). These are posited to have the following characteristics:

Matchmaking at low transaction-costs: MSPs prove successful in particular in markets which are characterised by a highly fragmented demand- and/or supply-side. Fragmentation implies high costs for searching transaction partners which MSP achieve to lower drastically. Formalised transaction

¹⁴ There is unease among economists about the failure to arrive at a commonly shared definition of two- or multi-sided platforms, see Sanchez-Cartas and Leon (2019) p.3. Tirole and Rochet are often quoted with what looks like their pragmatic solution "You know a two-sided market when you see it..." overlooking the sheer irony. Rochet and Tirole (2005) p.2

¹⁵ Rysman describes Amazon's original book-selling business as a one-sided market. Rysman (2009) p. 132. This paper perceives this classification as not convincing - in its view it is a classical merchant business.

¹⁶ Hagiu, interviewed by Silverthorne (2006), p.3

¹⁷ Cusumano et al. (2019) p.6

processes through transaction platform companies offer reliable and convenient ways to settle transactions which contributes towards increased efficiencies and lower transaction costs.¹⁸

Supporting information symmetry: Platforms are also successful in markets which are characterised by a massive information asymmetry. For example, before farmers were offered digital services, they had limited to no information on current market prices. Hence, digital agricultural platforms providing this information effectively, strengthen the position of smallholders vis-à-vis service providers and offtakers.

Network Effects: Network effects, a fundamental characteristic of platforms, result from successful platform intermediation which leads to positive feedback loops, i.e., to more frequent usage of the platform by satisfied customers. Even if positive feedback loops are more pronounced on one side, they lead to positive effects on the other side (cross-side effects). To illustrate: A rise in demand yields an increased supply (driven by higher prices) and vice versa: an increase in supply leads to more demand (via lower prices). With the growing pool of users, the number of combinations increases in a non-linear way - called the Metcalfe's Law¹⁹ - and with it the likelihood of a satisfactory match-making. The more traffic on the platform the more attractive it becomes for additional user groups such as advertisers. Platform-economists emphasise that the non-linear dynamic of network effects could entail both an upward and downward spiral.²⁰ Referring to empirical evidence they also note: "Although network effects are very powerful, they do not guarantee success forever".²¹

High fixed establishing costs and low marginal costs: Many platforms have high establishing costs (mainly IT and marketing) and low marginal costs. In particular, for most IT-based platforms, the average cost of on-boarding an additional user or of enabling an individual transaction declines with the total number of customers that participate or transactions that are enabled. This characteristic of platforms bears an enormous potential for economies of scale.²²

Collection of data which could enhance the network effect: The potential for a platform company to collect monetizable data grows exponentially with the number of transactions being settled on the platform. As more data become available for analysis, products can be tailored more precisely, while risks can be measured and mitigated more accurately. The pool of data that transaction platforms accumulate is a key asset on the basis of which platform companies could attract additional service providers to join the platform. They could also use the data pool to attach an innovation platform. Data are particularly relevant for certain services such as lending. As the paper will show in subsequent sections, digital agricultural platforms have more data on farmers registered on their platform - such as data on farms and farmers, booked training programs, use of inputs, history of earnings, etc. - than any bank outside the platform could possibly have. Therefore, banks tend to rely on digital agricultural platforms to provide the data for the credit-scoring - which is quite unique in the finance industry. Data thereby gain paramount importance as they have the capacity to "enhance the power of network effects".²³

¹⁸ The paper follows the definition of transaction costs including search-costs. For reference: Corporate Finance Institute: <https://corporatefinanceinstitute.com/resources/knowledge/economics/transaction-costs>

¹⁹ Robert Metcalfe, co-inventor of Ethernet and founder of 3Com, showed that the value of telephone networks grew non-linearly with the number of subscribers to the network increasing, as this makes more connections among subscribers possible.

²⁰ Abdelkafi, et al. (2019) p.1

²¹ Cusumano et al. (2019) p.129. They refer to Microsoft's Internet Explorer, a "classic innovation platform" which had been the leading internet browser but "lost the battle" against Google's Chrome.

²² Hagi (2014) pp. 73-74

²³ Cusumano et al. (2019) p.51

3.3 Strategic Decisions to Be Made by Platform Builders

3.3.1 Business Model

The most common value proposition of transaction platforms is matchmaking. By direct linking of demand and supply MSP eliminate intermediaries and therefore unlock value. In addition, platforms reduce search-costs which could be very high in fragmented markets. Furthermore, they reduce possible frictions in the transaction process. Parker et al. highlight that “well-designed platforms create far more value than they directly capture—which is why they attract large numbers of users, who are happy to enjoy the benefits of all the “free” value provided by the platform.”²⁴

The key challenge of business model development is the monetisation of platform usage which could be achieved in the following ways:

1. Transaction-fees - fixed, percentage wise or by revenue-sharing;
2. Fee for granting access to the platform;
3. Special fee arrangements for service providers and advertisers;
4. Fee for additional services (logistics and services).

The business model also implies a decision on the scope of the market to be serviced. There are platform companies very successfully covering a narrow market. An outstanding example is HelloTractor, the Nigerian platform for tractor-usage, which has serviced more than 500,000 farmers since it was launched in 2015.²⁵ Many platform companies expand their business leveraging the client base once they have won it. A well-known example for horizontal expansion is Uber entering the food delivery market with its “Uber Eats” or - as will be shown – Twiga Foods which decided to go beyond perishable fruits as to handle processed food as well.

Furthermore, the number of sides of the platform to get on board need to be decided upon. There are well-known companies such as LinkedIn which started as one side-platform company (exchange within a group of users) and then expanded to a multi-sided platform accepting advertisers and later recruiters as additional user groups. In a similar fashion, only after having gained a sizable user group, did Facebook invite advertisers and subsequently game developers, online-newspapers and other complementors to join the platform. On the one hand, extending the number of sides could increase the number of combinations between users of the various sides and thus to a non-linear growth of utility and value of the platform. On the other hand, however, the more sides are on board, the higher the likelihood of frictions and conflict of interests between the multiple sides.

3.3.2 Pricing

Pricing for services in a two-sided market is a matter extensively debated among economists. Rochet and Tirole pioneered the research showing that the effects of pricing depend on the price-elasticity of the respective user groups and the marginal costs of offering services and products on the platform. Given the interdependency of the two sides, a specific pricing of one side of the platform affects the other side— depending on its price elasticity.²⁶ Many multisided platforms offer their services permanently for free or at subsidized prices to one side of the platform (the loss-leader) and derive their profits on the other side (profit-pool). The decision is based on price elasticity and the importance of the value contribution of the respective side.²⁷

²⁴ Parker et al. (2016) p.111

²⁵ WFP Innovation Accelerator (2020)

²⁶ Rysman (2009) pp. 129-130

²⁷ Hagiu (2014) p.76

Most of the case-studies companies profiled in this paper perceive themselves as ‘farmer-centric’ and arrange the pricing of goods and services accordingly. Pricing is also a way to solve the chicken-and-egg problem.

3.3.3 Solving the Chicken-and-Egg Problem

The attractiveness of the platform for one of its sides depends – as has been shown - on the active user-presence on the other side. Which side to get affiliated first with the platform? And how then to fill the other side - as to avoid user-disappointment? This key challenge of any platform is dubbed the chicken-and-egg problem and is widely debated in economic literature.²⁸ There are four avenues (not necessarily excluding each other):

1. Onboarding of existing user groups. To this end, Cusumano et al. describe how AirBnB systematically acquired and aggregated publicly available information on property owners willing to rent out their flats.²⁹ Some of the case-study-platforms illuminated in this paper pursued this strategy by systematically approaching farmer-communities and cooperatives.
2. Simultaneous on-boarding “in a kind of zigzag fashion”.³⁰ Simultaneous on-boarding of both sides, however, implies a rather slow step-by-step approach.
3. Penetration pricing: i.e., subsidizing the supply or the demand side. This is a fairly standard approach - the “poster child” of this approach is Uber which has been subsidizing the supply-side – the drivers – for many years.³¹ As Hagiu explains, “the idea is to subsidize one side in order to attract it more or less irrespectively of the other side and then turn to the second side and charge it positive prices”.³² Although it is perceived as quite risky and expensive, there are also cases of both sides being subsidised in order to rapidly scale the platform.
4. By switching from a merchant-model with an existing customer-base to a transaction platform. Once again, Amazon serves as an example for this since it first established itself as a merchant (selling books) and then enhanced the value of its client base by attaching a two-sided platform.

Companies endeavouring to get their one-side transaction platform in motion and to achieve a critical mass also have to solve a kind of chicken-and-egg problem: How to get the first users on board while the user group is still very small, and the usefulness of the platform is below the costs of joining it? The problem is usually solved by attractive and innovative services based on superior technological solutions provided by the operating company (good examples are the business models with which Facebook and Google started).

3.3.4 Partnerships

It is in the interests of platform companies that there is an attractive supply of services and products offered on their platform. The better the products and services the greater the value for the demand side of the platform inducing positive cross-side-effects. Conversely, platforms are interesting for product- and service providers, especially for those who have not yet built up their own customer base and are hesitant to embark on the costly venture of becoming known in the market. Although this looks like a win-win situation, forming partnerships with suitable complementors is a difficult exercise for platform builders. There are many decisions to make and agreements to reach concerning

²⁸ Abdelkafi (2019) p. 2. Cusumano et al. (2019) pp. 17–18

²⁹ Cusumano et al. (2019) p.5

³⁰ Cusumano et al. (2019) p. 17

³¹ Cusumano et al. (2019) p. 77

³² Hagiu, interviewed by Silverthorne (2006) p.2

exclusivity (both-side, one-side or none); remuneration of the platform company (fixed, revenue sharing or commission-based); whether to provide access to the platform company's data pool; and finally, whether technical and financial support should be provided by the platform company.³³

3.3.5 Degree of Vertical Control and Integration

The strategic decision to what degree vertical control and integration is required is particularly relevant for platforms which do not only handle straight-forward-matches between demand and supply but integrate end-to-end value chains. This range of companies to whom this concerns is broader than it is generally perceived. The value proposition of many platforms, which appear to be straight-forward match-making platforms, include down- and upstream elements and vertical process control elements. In an interview, Deliveroo's cofounder, William Shu, explained that it was "a big misconception" to assume his company was a pure online marketplace. In his view, Deliveroo was rather "a logistics service" managing the logistics around getting the deliveries from the restaurants to the food customers.³⁴

This strategic decision of what degree of vertical features are required for successful operation of the platform is of paramount importance to all case-study-platforms brought forward in this paper. In economic literature, however, there is no consensus on whether vertical features should be regarded as an outdated element or as an indispensable component of transaction platforms required for its proper and reliable functioning.

On the one hand there are economists like Choudary et al. suggesting that "pipes", i.e., a vertical process of production or of crafting services, is in the process of being replaced by platforms driven by "increasing connectedness, decentralized production and the rise of artificial intelligence."³⁵ In his view platforms manage to control and coordinate the processes of aggregation of labour and resources much better than "pipes". He posits that the "fastest-scaling businesses today build and manage platforms that allow external producers and consumers to plug in and create and exchange value with each other directly."³⁶ And he goes on: "...the precipitous drop in the costs of coordination and distributed production enables platforms to achieve aggregation across many types of activities more effectively and efficiently than a command-and-control hierarchy ever could".³⁷ Parker et al. also observe, that "control mechanisms are costly and inefficient to grow to scale".³⁸ Conversely, however, it is emphasised that among those "fastest scaling companies" there is a company like Apple which stubbornly maintains vertical structures as it counts on a "pipe" for the production of its hardware product and for maintenance of its operating system. Hagiú explains: "Apple's logic is that vertical integration allows the company to better control design, innovation, and production throughout the entire vertical chain and therefore comes up with superior products."³⁹ Hagiú concludes that there seems to be a trade-off between a broad (horizontal) ecosystem of complementors and a controlled (vertical) process ensuring high quality.⁴⁰

³³ Cusumano et al. (2019) p. 68

³⁴ Quoted after Cusumano et al. (2019) p. 83

³⁵ Choudary et al. (2015) p. 19

³⁶ Choudary et al. (2015) p. 25

³⁷ Choudary et al. (2015) p. 33

³⁸ Parker et al. (2016) p. 10

³⁹ Hagiú, interviewed by Silverthorne (2006) p.2. Cusumano et al. wonder why "Apple is so profitable and valuable primarily because of strong network effects and the multisided market strategy surrounding the iPhone, which now accounts for about 60 percent of revenues? Or does a large part of Apple's market value come from its design skills, brand, and ability to charge premium prices for the iPhone and some other products and services?" Cusumano et al. (2019) p. 24

⁴⁰ Hagiú, interviewed by Silverthorne (2006) p. 2

4 Case Studies

The following table provides an overview of the case studies.⁴¹

Tab 1: Overview of Case-Study-Platform-Companies

	DigiFarm	FarmCrowdy	AgroMall	Twiga Foods	Tulaa (reportedly in insolvency)	AgroCenta
Founded by	Safaricom	O. Akumah and partners	A. Adeniyi and partners	P.Njonjo & G. Brooke	H.Miller-Wise	F.Obirikorang & M.K. Ocansey
Establishment year	2017	2016	2017	2014	2017	2015
Location of headquarters	Nairobi	Lagos	Lagos	Nairobi	Nairobi	Accra
Location of Operation	12 counties in Kenya	14 federal states of Nigeria	several federal states of Nigeria	6 cities in Kenya	several counties in Kenya	various regions in Ghana
Platform Category	MSP	Merchant- combined with a TSP	Agent- combined with a OSP	Merchant- combined with a MSP	Merchant- combined with a OSP	Agent- combined with a OSP
Farmers registered	1.43 m	298,000	1.7 m	n/a	15,000	45,000
Total Funding by end of 2020	not disclosed	US\$ 2.4 m	not disclosed	US\$ 56,1 m	US\$ 627,000 plus grants	US\$ 2.2 m
Main services provided	Advisory, provision of inputs, financing, off-take	Advisory, provision of inputs, financing, off- take	Advisory, provision of inputs, financing, off- take	Delivery of broad range of food products to vendors	Advisory, provision of inputs, financing, off- take	Advisory, provision of inputs, financing, off-take

(Source: Different reports and data provided by companies, as specified in the case-study-analysis.)

4.1 DigiFarm

4.1.1 Business Model Development

DigiFarm Kenya Ltd. was launched in 2017. The company is incorporated as a for-profit social enterprise and is wholly owned by Safaricom, the Kenyan telecom company. DigiFarm is a multi-sided platform connecting farmers with providers of a broad range of products and services that are required along the value chain. The spectrum of goods spans from advisory services via financing to market linkages to input providers and to off-takers. In compliance with platform-philosophy DigiFarm focuses on the establishment of links without taking transaction risks on its own account.

Following the high penetration of both mobile phones and the widespread use of mobile money in Kenya, a dynamic D4Ag-market has continued to grow with a wide range of products and services being developed. However, in the course of its rapid growth, the market became increasingly opaque and fragmented. DigiFarm recognised this and saw an opportunity to build a platform that bundles the offerings. Meanwhile, Safaricom was in a strong position for launching such an entity due to its client

⁴¹ Some companies run several platforms; the categorisation proposed here refers to their core-business.

and data pool which came as a result of not only being the leading Kenyan telecom company (with 29 million mobile subscribers), but also as the main partner of M-Pesa, the leading mobile-money operator in East Africa (with 25 million customers and 85,000 agent outlets)⁴². Both brands, Safaricom and M-Pesa, have continuously gained trust among farmers and digital service providers upon which DigiFarm was able to leverage on. Consequently, all services provided by DigiFarm are accessible on a basic feature phone and all money transactions are transmitted via M-Pesa. DigiFarm has also been able to use Safaricom's network to market its services via push information through its mobile-phone-network.⁴³

In 2015, with the help of Mercy Corps' AgriFin Accelerate Program (AFA), DigiFarm began to meticulously design the business model and tested it over two years before the company was launched in 2017. Thereafter, the platform scaled up rapidly as numbers grew from 77,000 registered farmers soon after the launch in April 2017, to 162,000 in October of the same year to more than 1.43 million by the end of 2020 ⁴⁴ (even if the share of active users is significantly lower, which will be addressed later). DigiFarm's take-off could be seen as an implementation of Parker et al.'s recommendation to pursue a "big-bang adoption strategy". In particular, Parker et al. suggest that the companies "use one or more traditional push marketing strategies to attract a high volume of interest and attention to your platform. This triggers a simultaneous on-boarding effect, creating an almost fully-developed network virtually instantaneously".⁴⁵ Accordingly, DigiFarm supervised the development closely by measuring the user experience of farmers during the early stages of its platform.⁴⁶ Over time, DigiFarm has reached a broad service range through partnerships with product and service providers and thus become a full-fledged multi-sided platform.

4.1.2 Solving the Chicken-and-Egg Problem

Safaricom took a principal decision to establish DigiFarm as a farmer-centric platform for which smallholder farmers would constitute the key user group. Accordingly, DigiFarm solved the chicken-and egg-problem by focusing on the onboarding of farmers first, maintaining a preference for those who were already organised in cooperative structures. To this end, DigiFarm cooperated with institutions such as the African Instore Solutions (AIS), and the Kenya Livestock Producers Association (KLPA). The support by these institutions was the driving force behind the rapid scaling of the platform.

In compliance with its farmer-centricity, DigiFarm has favoured the farmer-side with regard to its pricing policy. For this reason, DigiFarm usually seeks to conclude revenue-sharing schemes with its product- and service providers rather than charging fees to farmers.

4.1.3 Partnerships

In the course of designing its business plan DigiFarm has mapped out a strategy for partnerships with established service providers for smallholder farmers. For Safaricom - as a Telco company with no own competencies in agriculture - it was of utmost importance to get partners on board who were able to design customised products and services for farmers. Its strategy thus was to cooperate with a number of established and well-respected partners.

DigiFarm envisioned partnerships as a win-win-situation. DigiFarm's advantage would be that these partners broadened the range of product and services offered on the platform, help to build-up trust and credibility for the platform and – last but not least - would allow DigiFarm to gain access to the traditional user group of that partner.⁴⁷ The partners' advantage would obviously be to gain access to DigiFarm's large client base. This was particularly valuable for those product- and service providing

⁴² AgriFin (2019) p. 7

⁴³ GIZ/Mercy Corps AgriFin (2021) p. 32

⁴⁴ GIZ/Mercy Corps AgriFin (2021) p. 37

⁴⁵ Parker et al. (2016) p. 97

⁴⁶ AgriFin (2019) p. 23

⁴⁷ GIZ/Mercy Corps AgriFin (2021) p. 32

partners who felt threatened by the growing number of new D4Ag-companies and began worrying about its market position. Thus, the idea was that DigiFarm supports the partners with data (in form of a data/content sharing model)⁴⁸ and allows them to take advantage of DigiFarm's back-office (which is managed by Safaricom) and, of course, of M-Pesa's mobile-money services. However, there were difficulties with regard to maintaining these partnerships as will be shown later.

Following the road map for attracting partners DigiFarm began with two products: provision of inputs and educational services. As such, iProcure was one of the first partners. The company provides just-in-time agricultural input supply based on a network of 5,000 farm-input-dealers and has a strong brand recognition. iProcure saw the cooperation as a great opportunity, perceiving DigiFarm as a "big scaling partner".⁴⁹ DigiFarm supported it with data and technology tools enabling it to improve its inventory management and distribution efficiency. Another early-stage partner was Arifu which provides interactive information services and e-learning programs to farmers. DigiFarm supported Arifu with regard to upgrading and broadening the learning content.⁵⁰

It was a big step in December 2017, when DigiFarm embarked on a partnership with FarmDrive, a Kenyan fintech-company specialising in digital loans products, to jointly develop an innovative small loans-product to purchase quality inputs. The lack of financing constitutes one of the most important limiting factors for smallholder farming. Due to a lack of documentation of their earnings history, banks usually do not consider SHFs as eligible for bank loans. The idea driving the partnership between DigiFarm and FarmDrive was therefore to use alternative data which DigiFarm had been collecting. Building on this a credit-scoring table could be compiled to be used by banks to assess the creditworthiness of the smallholder applying for a loan.⁵¹ Banks were co-operative and appreciated the possibility to expand into the significantly de-risked smallholder market-segment. Loans were disbursed to input suppliers directly and the loan terms construed as to match crop cycles.⁵²

The next step was to provide farmers with access to the food market. To this end, DigiFarm launched *DigiSoko* at the end of 2018, a trading-platform for agricultural products – covering a limited amount of cash crops. DigiSoko was set up as a two-sided platform whereby on the supply-side of the platform there were smallholders and, on the demand-side, wholesale offtakers. While DigiFarm does not assume transaction risks, it negotiates prices and conditions on behalf of the farmers. DigiFarm also commits itself vis-à-vis the farmers to offtake produce at contracted prices in case industrial offtakers do not fulfil their commitment (which may occur when market prices fall).⁵³

Over the years, DigiFarm has continued to build partnerships such as with AgroCares, a company specialising in soil testing and precision agriculture services based on weather information; iCow, which was providing advice for animal diseases and other service providers for renting agricultural machinery and solar energy-powered irrigation.⁵⁴ At the end of 2020 there were ten different partners on board offering a broad range of services and products.

4.1.4 Degree of Vertical Control and Integration

The course DigiFarm in terms of its vertical orientation has been subject to change. The platform was originally conceived as a "pure" platform, with few vertical elements among which the field force supporting the on-boarding of farmers and their training. Its number increased considerably following the inception of DigiSoko, the affiliate arranging the offtake, reaching 1,500 field agents.⁵⁵ The field

⁴⁸ GIZ/Mercy Corps AgriFin (2021) p. 33

⁴⁹ CTA (2019) p. 212

⁵⁰ AgriFin (2019) p. 18

⁵¹ Obviously Safaricom and M-Pesa already collected a big number of data, but there are regulatory restrictions to use them.

⁵² AgriFin (2019) p. 5

⁵³ GIZ/Mercy Corps AgriFin (2021) p. 36

⁵⁴ GIZ/Mercy Corps AgriFin (2021) p. 33

⁵⁵ AgriFin (2019) p. 28

force only absorbs 48% of total costs projected for 2020/21.⁵⁶ DigiFarm understood that offtake required an adaption of the business model towards vertically controlled production and aggregation, as was illuminated by an observer: “Firms like DigiFarm must figure out how to reliably gather commodities from small farms to be sold in bulk... The food supply chain is very inefficient. Until we can streamline the supply chain... it is a hard nut to crack.”⁵⁷ DigiFarm thus had to invest in infrastructure required for aggregation such as warehouses and produce- and inventory tracking which turned out to be a cost-intensive exercise.

However, there are indications that the company seeks to reduce the vertical depth it had built up, and to return to its original more ‘horizontal’ platform with which it started. DigiFarm seemingly intends to rely more on farmer associations and cooperatives rather than on individual farmers as its core user group, assuming that production of the former demands less vertical control and that the infrastructure required for aggregation and offtake does already exist – or that offtakers take care of it. One indicator for that intended strategic shift is that it refers to its field force as ‘Digital Village Advisors’.

4.1.5 Impact

Through its pricing policy and the overall curation of the platform, DigiFarm can be deemed as a farmer-centric platform. Accordingly, it has achieved a noteworthy impact. In their ‘Platforms Blueprints Deep-Dive Report’ GIZ, Mercy Corps AgriFin and Dalberg state that the income of the farmers using the platform has risen by 30-50% on average. The increase in income spans across the various services used and crops being grown. For example, learning and training - which 95% of all platform users demand – usually result in a 20-40% higher income. Meanwhile, the earnings-raising-effect of soil testing and precision tools are somewhat higher with irrigation and weather forecast (both 50%). Lending has played a key role as it has enabled smallholders to purchase quality-seeds and other supplies. 67,000 loans had been processed with the volume of US\$ 3.8 million credit value by the end of 2020.⁵⁸ Market linkages to offtakers have proven to have the highest impact as they have contributed towards a 100% rise of farmers’ earnings.⁵⁹ Furthermore, DigiFarm is reported to negotiate good prices for the produce of its registered farmers which are well above the ones paid by “traditional brokers”.⁶⁰

43% of its registered farmers are women which is well above the D4Ag average of 25%.⁶¹ However, the percentage of women-farmers among the active users of the platform is considerably lower, only 30%. It is also noteworthy that 12% of registered farmers on the DigiFarm platform belong to the category of youth.⁶²

4.1.6 Concluding Remarks

DigiFarm has successfully pursued a “big-bang” strategy of establishing itself as a classic multi-sided-platform covering a broad spectrum of services. Careful business-planning and implementation have paid off. The business model proved particularly successful with regard to onboarding of farmers. Nevertheless, we recognise three main challenges DigiFarm could face in the coming years:

⁵⁶ GIZ/Mercy Corps AgriFin (2021) p. 36

⁵⁷ Professor Jane Ambuko of the University of Nairobi’s College of Agriculture, quoted by Miriri (2020) p.3.

⁵⁸ GIZ/Mercy Corps AgriFin (2021) p. 40

⁵⁹ GIZ/Mercy Corps AgriFin (2021) p. 34. As source is given: Dalberg interviews and analysis, 2020; “DVA app design and DigiSoko UX evaluation”, 2019

⁶⁰ Miriri (2020) p.4

⁶¹ CTA (2019) P. 21. According to ISF DigiFarm partnered with a women’s cooperative with a view to raise the percentage of women among its registered farmers. ISF Advisors, RAF Learning Lab (2021) p. 46

⁶² GIZ/Mercy Corps AgriFin (2021) p. 40. The source did not define the category ‘youth.’

Profitability: It is generally assumed that DigiFarm’s profitability is low. Low profitability is a typical problem of broad-scale multi-sided platforms resulting from a low average value of transactions. Digital agricultural platforms, in particular, tend to be affected as Bain points out: “Models that are highly focused on smallholder farmers and that address a full range of value chain bottlenecks will be less profitable than firms operating in the same value chain that are not explicitly farmer-allied”.⁶³ However, market observers believe that low profitability and a possible delay in reaching break-even is not a major problem for its owner, since Safaricom collects an advance-dividend through the use of its telephone network and of M-Pesa. It has also the chance to collect more valuable data through the use of the platform. Safaricom is perceived as pursuing a long-term perspective with a view to binding smallholder farmers, which is gaining ever greater economic weight, to its conglomerate.

However, according to a recent case study by AFA, profitability has been rising and break-even is expected to be reached in 2023-24 - six years after launch of the platform in 2017.⁶⁴ This is not a surprisingly long period - given DigiFarm’s high up-front costs for IT and the costs of onboarding farmers. However, the goal appears to be very ambitious in the light of conditions which need to be met to reach it. The most important and difficult condition is probably to increase the proportion of active users and to cross-sell them higher revenue generating products.⁶⁵ Currently the platform has no more than 340,000 active users (out of 1.4 Mio. registered farmers) which would need to be brought up to 2,1 Mio – i.e., a sixfold increase of active users.⁶⁶ Additionally, only 42,000 of its active users are currently accessing multiple products across the platform – i.e., there currently is very little amount of cross-selling. The latter is necessary to balance the revenue-mix: Products which are most in demand such as learning or training (solicited by 95% of active users) are low- or medium profit products - while only 23% of active users demanding more profitable products such as linkages to offtakers.⁶⁷

Strategic direction in terms of vertical features: DigiFarm needs to establish to what degree it wishes to maintain vertical features. As shown above under section 4.1.4, DigiFarm is about to scale back vertical elements. The impact of this, however, is subject to considerable uncertainty as to whether the D4Ag-market is developing in the expected way and whether DigiFarm will be successful with regard to shifting its user group in the direction of farmer-cooperatives and -communities.

Difficulty in upholding partnerships: Partnerships with well-established reputable institutions are one of DigiFarm’s distinct features. However, reportedly there are difficulties in maintaining them. Concerning the partnership with FarmDrive AFA notes in its recent study: “Partnership negotiations discontinued due to a lack of financing” and with regard to AgroCares: “Partnership negotiations halted due to a mismatch of business models (revenue sharing vs. product buying model)”.⁶⁸

AFA summaries potential conflict points in partnerships as follows:

1. “Mismatch of business models – DigiFarm only enters revenue sharing agreements and tends not to pay upfront
2. Difference in price points – DigiFarm always seeks the lowest possible price points for its farmers
3. Decision-making – DigiFarm prefers to retain control over operational decisions within a partnership
4. Data sharing – Data sharing policies and preferences are not always aligned
5. Priorities’ misalignment – How DigiFarm prioritises potential partnerships is sometimes not aligned with the partner’s expectations.”⁶⁹

⁶³ Bain (2020) p. 19

⁶⁴ GIZ/Mercy Corps AgriFin (2021) p. 45

⁶⁵ GIZ/Mercy Corps AgriFin (2021) p. 35

⁶⁶ GIZ/Mercy Corps AgriFin (2021) p. 37

⁶⁷ GIZ/Mercy Corps AgriFin (2021) p. 34

⁶⁸ GIZ/Mercy Corps AgriFin (2021) p.42

⁶⁹ GIZ/Mercy Corps AgriFin (2021) p. 42

The challenges in upholding partnerships are likely a consequence of a power-game between DigiFarm and the main product- and service providers on its platform. Usually, platforms which successfully solved the chicken-and-egg problem and have managed to muster traffic on their platforms, hold the stronger position in negotiations with service providers. The case of DigiFarm, however, is atypical, as its partners have already been active in the market long before DigiFarm was launched. Subsequently, the partners might not be willing to take the weaker position assigned to them. They may also fear their brand being obscured by Safaricom's and DigiFarm's dominance.

4.2 FarmCrowdy

4.2.1 Business Model Development

FarmCrowdy Limited, based in Lagos, Nigeria is registered as a for-profit company. It was founded in September 2016 by Onyeka Akumah (CEO), a technology entrepreneur, and three partners. The company started by launching a two-sided-platform model with smallholder farmers raising poultry on one side and “sponsors” on the other. As is mirrored in its name, the company has described itself as a crowd-funding platform. The supply-side of this platform is represented by middle- and upper-income Nigerians seeking exposure to agriculture. Before accepting sponsors on the platform FarmCrowdy runs background checks on them. In an attempt to build confidence, sponsors receive bi-weekly updates about the farm's progress including pictures and videos. Furthermore, sponsors are encouraged and assisted to visit their sponsored farms to learn more about the smallholder and the farm operations.⁷⁰ On the demand-side there are smallholder farmers preselected by FarmCrowdy based on their experience in farming, quality of farmland; size of land; documentation of ownership and reputation. The platform functions on the basis of a mobile app. Beginning with poultry, FarmCrowdy soon broadened the range of investment opportunities for sponsors offering a broad variety of farms in terms of size, region and products – which also determines, how long the invested capital is bound. During the crop-cycle, FarmCrowdy arranges for agronomic advice and all inputs required by its registered smallholders - disbursing the sponsors' funds for that.

The sponsoring-arrangements are backed – and de-risked - by an offtake-agreement with a buyer at a pre-fixed price negotiated by FarmCrowdy as an agent. After repayment of the sponsors' initial capital, FarmCrowdy retains 20% of the profits generated from the sale of the produce, with the remaining 80% being shared between farm-sponsors and the farmers. The model with which FarmCrowdy started is therefore categorized as an agent -combined with a two-sided platform model.

FarmCrowdy had to manage two main risks. On the production side, the smallholder farmers could fail to produce in time. This risk has been mitigated through its field force providing smallholder farmers with extension advice and training in state-of-the-art farm practices for different types of crops. The other risk involves offtakers failing to fulfil their commitment. FarmCrowdy would in that case have three options: (i) to face the loss of confidence vis-à-vis the sponsor whose contribution it cannot pay back, (ii) find a new offtaker or (iii) bear the damage on its own account.

Following a successful kick-off, the platform scaled quickly on both sides of the platform. In the first year, 3,000 smallholder farmers were registered. This number grew to 7,000 in the second and 25,000 smallholder farmers in the third year.⁷¹ FarmCrowdy successfully cooperated with smallholder farmer community leaders and associations which helped to build trust in the platform among smallholder farmers and encouraged them to register.⁷² Feedback-loops by these representatives were consequently used to finetune the model. Unlike many other platforms, FarmCrowdy did not have the typical problem of having a gap between registered and actively using farmers. The company informed that since its early stages, it had a high rate of engagement by the farmers given its positive return expectations. This point is highlighted in a reply to the questionnaire: “We tied our farmers to our

⁷⁰ Atuahene-Gima and Amuzu (2019), p. 4

⁷¹ Techpoint Africa (2020) p.3

⁷² Atuahene-Gima and Amuzu (2019), p. 4

contracts at the very early stages and we always worked with prevailing or expected market prices of agricultural commodities".⁷³

Given the well-functioning of the platform and given the huge room for scaling there was no clear need to adapt the model. However, in 2017 FarmCrowdy faced a major set-back caused by Avian Influenza, a bird disease, which severely affected the stock of poultry. Management became aware that the original platform business was not profitable enough to cover such risks and concluded the company's dependency on specific goods and services should be lowered. Observing that trading had become the most profitable aspect of the business model, FarmCrowdy decided to foster trading with industrial buyers and processors, which had made up a large part of the demand side for bulk crops. To this end FarmCrowdy sought to aggregate crops and livestock even beyond what its registered farmers produced. Onyeka Akumah, the CEO, explained the move towards trading as follows: "We noticed most of the losses happen in core farming. But once you go up the [agriculture] value chain, there is more value and more money to be made. So, we have moved up the value chain beyond just core production and that has sustained us".⁷⁴

FarmCrowdy launched another platform as a separate entity called Farmgate Africa which connects major processors and international buyers directly to FarmCrowdy's local aggregation centres. The management argued that "...the platform creates an atmosphere for greater integration of the value chain through vertical relationships, which improves product flow thereby reducing cost, inconveniences, and improving efficiencies through technology".⁷⁵ So FarmCrowdy pivoted from an agent-combined with a two-sided platform model (smallholder farmers/sponsors) to a merchant-combined with a two-sided platform model. The company no longer acts as an agent, it meanwhile acts as a merchant - as FarmCrowdy runs the aggregation centres and sells directly to industrial buyers – bearing the transaction risks on its own account.

In 2019 Farmgate Trading & FarmCrowdy were merged; bundling what it calls its "core production" - i.e., farm production, processing and selling activities - under the label FarmCrowdy. The crowd-funding business in turn was moved to a new entity called CrowdyVest covering support services i.e., sponsoring, marketing and customer relations management.

In the same year FarmCrowdy decided to enter Nigeria's lucrative retail food market which is characterised by an excess of demand over supply. It did so by concluding a partnership with Livestock247.com, an online multi-sided Livestock platform connecting the various stakeholders of the meat production and processing value chain including the buyers and sellers. FarmCrowdy also partnered with Best Foods Livestock Ltd, an established meat processing and trading company which it took over in 2020. The company highlighted that "Best Foods offered an opportunity for FarmCrowdy to strengthen and expand its service offering in livestock production, processing, and supply"⁷⁶. Today, FarmCrowdy's retail meat service supplies up to 50 meat markets with fresh beef and poultry across the south-west region of Nigeria including 100 customer endpoints.⁷⁷

In April 2020, during the COVID-19 pandemic, FarmCrowdy launched FarmCrowdy Foods which it established as a one-stop e-commerce retail platform for fresh food and groceries.

Following this considerable inception of new activities at various ends of Nigeria's food market, FarmCrowdy comprehensively restructured the company in autumn 2020. The move has been described as "a full pivot to a digital agriculture platform."⁷⁸ Following the example of Google which re-organised itself under a holding called Alphabet, FarmCrowdy established Emfato Holdings to house three different entities FarmCrowdy, CrowdyVest, and Plentywaka. CrowdyVest hosts the investment

⁷³ Response to questionnaire by Olusola Oyawale, Chief Operating Officer of FarmCrowdy, received 11th December 2020

⁷⁴ Quoted by Benjamin Dada (2020)

⁷⁵ Quoted from The Guardian (2020)

⁷⁶ Kenneth Obiajulu, Managing Director of FarmCrowdy, quoted by Techcabal (2020)

⁷⁷ Techcabal (2020)

⁷⁸ Techpoint Africa (2020)

and savings platform meanwhile going well beyond sponsoring farmers. Plentywaka is a ride-hailing company and FarmCrowdy, the heavy-weight among the affiliates, incorporates six different business divisions, described below. Each of these businesses are set up as a separate unit with its own management.⁷⁹

FC Structured Finance: As it continued to grow in size, FarmCrowdy needed a broader range of instruments to finance smallholder farmers well beyond crowdfunding. FarmCrowdy won banks as financing partners for the farmers. Banks were increasingly attracted to the huge agricultural market following its digitalisation which enhanced its potential. FarmCrowdy offered the banks a set of data on farmers applying for loans and arranged cross-guaranteeing schemes of the respective smallholder farmer community.⁸⁰ Loans were bound to the purchase of inputs and to FarmCrowdy selling the produce at a predetermined price.

FarmCrowdy Aggregation is the trading entity into which the merged Farmgate/FarmCrowdy company was incorporated. Its keystone asset is the FarmCrowdy Trader Platform connecting the aggregation centres with industrial buyers. The term platform could be misleading: FarmCrowdy Trader Platform sounds as if it was a two-sided platform. However, it is just a way of decentralising FarmCrowdy's merchant activities. Instead of running a central trading hub, FarmCrowdy Aggregation maintains more than hundred aggregation centres in rural areas (owned and managed by FarmCrowdy) that wholesale customers can link to. At each centre, it has established an IT-based aggregation system (dubbed GrainPoint) which accompanies the farmers in the crop cycle, i.e., handles input disbursements, provides finance and insurance services and, naturally, supervises the aggregation at the centre.⁸¹

FarmCrowdy Foods: This division covers the retail market business described above – with the retail foods platform being its keystone.

FarmCrowdy Marketing: This division runs a “marketing-as-a-service platform” connecting small and medium-sized enterprises (SMEs) in the food chain (needing e.g., a website or brand representation or PR services) with agencies offering respective services.

FarmCrowdy Insurance: The platform provides access to life, health, crop & property insurance to farmers and other low-income value chain participants.⁸²

FarmCrowdy Tech & Data: This used to be FarmCrowdy's internal IT-department which is now established as a separate business unit offering respective services to outside clients in the food chain and also to governments.

Henceforth, as a result of this reorganisation Emfato Holdings runs various platforms linking sponsors with farmers (now managed by CrowdVest), farmers with retail buyers and farmers with insurance providers. Its main activity, i.e., aggregation and trading with wholesale purchasers, however, the company carries out as a merchant.

As a group FarmCrowdy is pursuing ambitious plans:

- By the end of 2020, it had 298.000 registered farmers and plans to reach one million by 2023;⁸³
- It now operates in 14 federal states and plans to move into four more in the following year. There are also plans to enter other African markets;
- production and trading are planned to double in volume in the following years.⁸⁴

⁷⁹ Business Day (2020)

⁸⁰ Response to questionnaire by Olusola Oyawale, Chief Operating Officer of FarmCrowdy, received 11th December 2020

⁸¹ Business Elites (2020)

⁸² Benjamin Dada (2020)

⁸³ Response to questionnaire by Olusola Oyawale, Chief Operating Officer of FarmCrowdy, received 11th December 2020

⁸⁴ Benjamin Dada (2020)

4.2.2 Solving the Chicken-and-Egg Problem

FarmCrowdy started with poultry farming and solved the chicken-and-egg problem by zigzagging between farmers and sponsors. It quickly broadened the range of products, hence providing investors a broader choice which allowed for more rapid scaling.⁸⁵ The rapid growth of the crowd funding business meant that FarmCrowdy had to sell ever larger volumes of agricultural products. This helped launch its career as a trading company.

4.2.3 Partnerships

FarmCrowdy entered into new territories such as the food-retail market consequently through partnerships with a view to testing the waters and to experimenting how best to position itself. In the case of Best Foods LTD it decided soon after entering into the partnership to take it over.

4.2.4 Degree of Vertical Control and Integration

FarmCrowdy has always maintained strong vertical elements. Since its inception, production has been vertically controlled; aggregation vertically managed and sold to wholesale offtakers and on retail food markets.

4.2.5 Funding

To date, FarmCrowdy has received a total funding of US\$ 2.4 million. Donors and investors came from a broad range of investors such as TechStars, Cox Ventures, as well as impact-oriented investors such as Greentec Capital Partners. In addition, FarmCrowdy has received grants from GSMA's Ecosystem Accelerator Innovation Fund and other institutions.⁸⁶ Looking at the remarkable size of FarmCrowdy including the take-over of Best Foods, an established company, the capital-base appears quite slim. However, reportedly a Series A-financing round is being prepared. Given the many awards FarmCrowdy and its founders have received, the company enjoys considerable attention from the investor community.

4.2.6 Impact

Having morphed into a major trading company, FarmCrowdy nevertheless achieved a noteworthy impact – according to figures the company provided:⁸⁷

- Within two years of registration income of farmers has grown per acre by 50% on average;
- The percentage of female registered farmers over time stands at 40% which is above D4Ag-average;⁸⁸
- Creation of 500,000 new jobs – directly and indirectly - in the areas of processing, transport, warehousing/cooling, etc.;⁸⁹
- Generation of over \$1.9 million in sponsorships;⁹⁰ and US\$ 15 million in financing for 25,000 farmers in 3 years;⁹¹ empowerment of 25,000 farmers in 14 federal Nigerian states;⁹²

⁸⁵ Response to questionnaire by Olusola Oyawale, Chief Operating Officer of FarmCrowdy, received 11th December 2020

⁸⁶ See Pitchbook's page on FarmCrowdy: <https://pitchbook.com/profiles/company/221810-95> and the one of Crunchbase: <https://www.crunchbase.com/organization/farmcrowdy>.

⁸⁷ There is no independent verification of these figures.

⁸⁸ Which according to CTA stands at 25%. CTA (2019) p. 21

⁸⁹ Response to questionnaire by Olusola Oyawale, Chief Operating Officer of FarmCrowdy, 11 December 2020

⁹⁰ Business Day (2020)

⁹¹ FarmCrowdy (2019) p. 7

⁹² Disrupt Africa (2020)

- Aggregation centres being managed by young people (“Entrepreneurial framework for youth”).⁹³

4.2.7 *Concluding Remarks*

FarmCrowdy is a prime example of successful pivoting and flexible sizing of opportunities. The company started with a two-sided platform model – farmers raising poultry on one side and sponsors funding these activities on the other. This simple model bore the advantage that it could be scaled easily. However, its mono-line revenue-base meant the business was associated with high risks. The answer was to switch from an agent to a merchant and to drive the trading with industrial offtakers - which now contributes no less than 85 % of total sales.⁹⁴ While trading has become by far the most important source of revenue, the company is nevertheless built on a broad foundation of business activities in Nigeria’s food market - much broader than any of the case studies brought forward in this paper. Although this certainly has advantages in terms of limiting risks, it also carries the danger of an over-boarding complexity. FarmCrowdy consists of a holding with three affiliates, among which FarmCrowdy consists of six business lines and two major platforms. It requires sophisticated management skills to operate the various business lines and to balance the interests of the various user groups and their potential conflicts. Platforms are built on trust and any incident at one end affects the whole holding.

4.3 **AgroMall**

4.3.1 *Business Model Development*

AgroMall Discovery and Extension Ltd. is a Nigerian Company registered as a for-profit social enterprise. It was founded in 2017 by Adefemi Adeniyi, a former manager and “Resident Advisor” to the International Finance Corporation (IFC) and today the CEO of the company. Co-founders were a number of private sector investors (none of which can be classified as a strategic investor, such as a large telecom company or a bank).

AgroMall perceives the fragmentation of farmers and the “dearth of data” on agricultural production as a key obstacle to business development and to improving farmer’s livelihoods and – at the same time - as a great business opportunity for itself. The founders envisaged that by employing technology and consequent collection of data AgroMall could open opportunities for industrial offtakers, financial service and input providers to do business with farmers.

AgroMall began its operations by systematically collecting data and profiling both farmers and farms, using biometric credentials, soil testing and GPS mapping. Building on this, AgroMall was able to calculate the economics of production per crop type on the varying types of land. Furthermore, AgroMall was able to demonstrate delivery capacity for products which are in high demand in Nigeria - the bulk crops. In these transactions, AgroMall does not take on the role of a seller, but that of an agent managing a value chain for its clients against a fixed and a success fee. Its first clients were banks willing to grant loans to farmers who were contracted to produce the crops and needed loans for inputs. Accordingly, AgroMall provided the banks with data, particularly ‘know-your-customer’- data, needed for regulatory reasons as well as a predictive analysis on the farmers’ ability to repay their loan at the end of the crop cycle. Thus, the first links AgroMall successfully intermediated were the ones between farmers and banks.

Thereafter, AgroMall established a network of agents with a view to provide farmers with state-of-the-art farming advice. Thereupon, AgroMall established itself as an IT-technology-led value chain manager not only for banks but also directly for industrial offtakers. As a consequence of many successful

⁹³ FarmCrowdy’s homepage: <https://www.farmcrowdy.com/> no concrete numbers are given.

⁹⁴ Response to questionnaire by Olusola Oyawale, Chief Operating Officer of FarmCrowdy, received 11th December 2020

transactions, additional farmers registered and more banks and offtakers solicited the services of AgroMall. Hence, the platform scaled rapidly.

AgroMall then developed a more comprehensive data system called ‘AgroMall’s Digital Agricultural Platform’ (ADAP) which allows for an “even more reliable yield prediction as the basis for planning, efficient allocation of resources, monitoring and commercial linkage of individual and aggregated farms and farms in standalone cropping projects or in large out grower programmes”.⁹⁵ ADAP also included functions to support mobile payments between user groups of the platform.

In an attempt to diversify and develop a proper revenue-mix, AgroMall expanded its business range both horizontally and vertically. Its vertical expansion was characterised by processing activity it embarked on; it processes rice (milling) and tomatoes (concentrate) and sells it directly to industrial offtakers. Moreover, AgroMall developed systems for modular and mobile processing of cassava to pellets directly at the farms. AgroMall describes this downstream expansion as a necessity arising from infrastructure deficiencies which disrupt the flow of the processing value chain and cause food waste. AgroMall expanded its business scope horizontally by broadening its role as a cooperation partner of the banks beyond its support in the lending process. Its view is to serve as an agency bank for Nigerian commercial banks in rural areas with farmers and agriculture-related SMEs as clients. Hence, the platform company would leverage on both the data-pool it has gathered on farmer communities in several Nigerian federal states and its field force in order to support banks gaining a larger exposure in that sector. Given the 96 million people who live in rural areas of Nigeria⁹⁶ this business is seen to bear enormous potential.

To prepare for its role as an agency bank, AgroMall developed a data-based “integrated banking service package” consisting of two elements. Firstly, “Transform”, a registered trademark, which is an IT-system for the analysis of alternative data required to score farmers and agricultural SMEs for credit ratings. The individual score influenced the chances of farmers and agriculture-related SMEs receiving premium contracts without-growers, cheaper insurance and a lower interest on bank loans. ‘Transform’ was developed with a view to foster the financial inclusion of farming communities. Secondly, the “Agency Bank of Agricultural Transformation” (BoAT) element which stands for agent locations being “deployed to support an intimate and linked cluster of not more than 250 farmers and 12 agricultural SMEs...”. These agent locations are designed as small platforms linking banks, farmers and SMEs. By 2022, AgroMall intends to deploy about 3,000 BoAT-Hubs across Nigeria. Each hub is expected to support 250 farmers and 12 agricultural SMEs.⁹⁷

AgroMall is categorized as an agent-combined with a one-sided platform model. It is a one-sided platform as there are no direct links between farmers on one side and banks and input providers on the other (as in case of multi-sided agricultural platforms), while the one user group, the farmers, is interested in it becoming bigger as this would lead to more lucrative offtake contracts and a wider range of services. AgroMall acts as an agent since it acquires contracts from banks and offtakers, supervises the value chain, provides quality farming inputs and arranges last mile logistics against a fee.⁹⁸

4.3.2 Solving the Chicken-and-Egg Problem

AgroMall set the platform in motion by profiling farms and farmers and using this set of data to enter into a cooperation with banks who needed these data as a prerequisite for granting loans to farmers. The starting point for the platform was the data on farms and farmers, which the latter willingly provided in the expectation that this would put AgroMall in a better position to acquire bank loans and

⁹⁵ AgroMall’s homepage: <https://theagromall.com>

⁹⁶ According to IFAD 53% of Nigeria’s total population of 182 million live in rural areas: <https://www.ifad.org/en/web/operations/w/country/nigeria>

⁹⁷ AgroMall’s homepage: <https://theagromall.com>

⁹⁸ As far as rice and tomato concentrate are concerned AgroMall also acts as a merchant – however this still is a side-business which could be neglected in the context of categorisation.

lucrative buyer or buyer contracts for them. As far as pricing is concerned AgroMall has remained farmer centric as it has not received any fees from farmers. Only once AgroMall will start to serve as an agency bank, will it charge farmers and agricultural SMEs fees for the banking services.

4.3.3 Partnerships

As AgroMall has positioned itself as an agent-combined with a one-sided platform model there are no complementors on the platform. Instead of building partnerships explicitly, AgroMall serves as an agent to its clients. Nonetheless, there are considerations of whether the company should allow partners to use AgroMall's data pool to design products to be sold exclusively on AgroMall's platform. That would mean it attaches an innovation-platform to its existing platform. This would imply a major shift from vertical to horizontal structures allowing complementors to offer value adding complementary services on the platform.

4.3.4 Degree of Vertical Control and Integration

AgroMall's business model is built on its capability to manage and supervise the value chain in compliance with its stated belief "that transformation requires capacity building, introduction of deliberate and good fit governance, controls, operations process, market discovery, and consistent monitoring and evaluation of their operations and progress."⁹⁹ The business model is thus characterised by strong vertical structures.

The vertical control AgroMall exercises also manifests itself in how it describes its role as service agency for the lending banks on its homepage: "We do not just stop at making money available for work, we also help with the proper use of money as planned, after which we evaluate results to know, if the impact and returns desired from financing activities are met".¹⁰⁰

4.3.5 Funding

According to information provided by the company, the current funding is still based on the first seed-round (the amount is not disclosed) which is why it is assumed that the company is similar to its peer group in that it has a thin capital base. However, as the CEO informed, a pre-Series A financing round is expected to take place by the end of 2021. Moreover, it has received grants from a number of institutions such as Mercy Corps, GSMA, Microsoft, IDA and the GIZ for the development of 'Transform', the above-mentioned IT-program for analysing alternative data to be used by banks.

4.3.6 Impact

According to AgroMall's responses to the questionnaire (i.e., the information is not based on an independent assessment) the company has achieved impact in the following ways:

- Income of farmers has increased in the last two to three years by 75-100% following an increase in yields (average) per acre of around 50%-75%;
- Over 5,000 new jobs were created in the regions that AgroMall operates in, following an extension of the value chain (i.e., in processing, transport, warehousing/cooling, etc.);
- Engagement for youth: AgroMall created an offer for young people called AgroCola (www.agrocola.com). It is built on existing platform instruments geared to young people. The company brings forth that

"We need more support to drive behavioural change and interest of young people in agriculture. We believe the profile of the average farmer in Nigeria must change from an unlettered 45-year-old male with basic primary education to a 25-year-old (50% male and 50% female) digital native with aspiration to go commercial using digital technology and data for precision farming, which will further trickle down to engage subsistence farmers in both

⁹⁹ AgroMall's homepage: <https://theagromall.com>

¹⁰⁰ AgroMall's homepage: <https://theagromall.com>

extension and employment models. We have conducted surveys and pilots that show the youth are interested in earning a living through agriculture - we need to develop and fund a path to their engagement".¹⁰¹

4.3.7 Concluding Remarks

AgroMall's agent-combined with a one-sided platform model is quite unique and has demonstrated a remarkable dynamism with regard to scaling. In only three years it has won 1.7 million registered farmers on the platform. The company endeavours to bring the number up 3.5 million by 2023.¹⁰² It runs a network of no less than 5,000 agents (including free-lancers) who are engaged on a project-by-project-basis (on average half of them are active).

In terms of revenue, AgroMall currently relies on value chain management (which it prefers to call "farm and farmer profiling and extension business") which contributes around 80% of total revenues, while services for banks (currently four of them) make up only approximately 7% and direct selling of processed produce around 10%. Accordingly, the company seeks to diversify its revenue-side in an attempt to reduce its dependency on a still small number of banks and offtakers by broadening its service to farmers so as to include payable services. Thus, agency banking appears to be a great opportunity for AgroMall in this respect.

According to information provided by the company, profitability has developed according to plan. Value chain management has already broken-even, while for the other business lines, services for banks and direct selling are expected to break even in 2-3 years.

Similar to DigiFarm, AgroMall profitability would benefit from an activation of registered farmers. Currently, only about 20% of registered farmers actively use the full modules of agronomy and extension up to produce aggregation and sales.¹⁰³

4.4 Twiga Foods

4.4.1 Business Model Development

Twiga Foods Ltd was founded in 2014 by Peter Njonjo, a former manager of Coca-Cola and today the CEO of the company, and Grant Brooke, an economist. Twiga is a food platform in Kenya which sources fresh horticultural produce from farmers and sells and delivers it with its own fleet of vehicles to vendors in urban areas. Twiga thus started as a merchant-combined with a two-sided-platform model.

The original intention of the two founders was to export bananas. Nonetheless, "the more we looked, the more we saw that there were loads of inefficiencies in the market... We pivoted to the opportunity to sell locally," the founders elaborated.¹⁰⁴ The origin of the observed inefficiencies was to be found in the high fragmentation of both the demand- and the supply side. There are 180,000 small food vendors in Nairobi on the demand-side. Across the country, 90% of food is sold through small roadside stands and other informal channels.¹⁰⁵ The supply-side, consisting of the farmers, was even more fragmented. The farm-to-kiosk chain was also burdened with a number of layers each of them capturing a margin. The way the produce was handled, transported and stored by the various layers also resulted in lower quality and a 30-50% waste of perishable goods.¹⁰⁶ All these inefficiencies led to increased costs, which were passed on to consumers in urban centres.

¹⁰¹ Response to questionnaire by Adefemi Adeniyi, CEO, received 8th December 2020

¹⁰² Response to questionnaire by Adefemi Adeniyi, CEO, received 8th December 2020

¹⁰³ Response to questionnaire by Adefemi Adeniyi, CEO, received 8th December 2020

¹⁰⁴ allAfrica (2019), quoting the CEO Peter Njonjo

¹⁰⁵ Bain (2020) pp. 19-10

¹⁰⁶ The Supply Chain Lab (2020)

The business model was based on the idea of creating value by forming an end-to-end process from farm-to-kiosk and a platform established to link demand and supply. Vendors were offered an above-market-average produce in terms of freshness and quality, delivered by Twiga's own fleet of vehicles to their doorstep within 18 hours of ordering on the platform. Farmers, in turn, were given a perspective of a long-lasting (albeit non-binding) offtake perspective. Farmers were promised to be paid for their produce within 48 hours of collection. However, the most powerful marketing tool was Twiga's commitment made to both the supply- and the demand side "to pay farmers more and sell to vendors for less" than actual market prices. This commitment was based on the calculation, that the streamlining of the farm-to-kiosk process unlocks so much value that a share of it could be re-distributed to both user groups with a view of binding them to the platform. As Grant Brooke put it in an interview: "The 'buy high, sell low philosophy': This meant customer acquisition was not a challenge, but our ability to execute on our promise was. Choose your battles carefully and be sure of winning them. Know your unique selling point (USP) and use it."¹⁰⁷

Twiga's end-to-end logistics system was underpinned by a "tech-enabled" platform which matches supply and demand. As Twiga works with real-time demand data, both sides had a transparent picture of current pricings shown on price boards at its aggregation centres. The technology also enabled a digital mastering of the routing from farm to kiosk. Furthermore, the system made it possible to accurately trace the produce back to the farm. Another important feature of the MVP was, based on an agreement with Safaricom, an entirely cashless payment process based on M-Pesa.

The first product which was traded were bananas, as this fruit would enable Twiga to exercise its competitive advantages. Bananas are sold primarily through little kiosks, the core user group of Twiga, and they are quickly perishable, requiring a value saving handling process, which Twiga came to master both with regard to cost-control and to minimizing post-harvest loss.¹⁰⁸ Since its inception, the business model has performed very well. Twiga quickly achieved positive unit costs and took advantage of rapidly evolving network effects.¹⁰⁹ It soon expanded to cover more farmers, more products, more vendors along an increasing number of routes being served on a daily basis.

Twiga's original business model foresaw that the value chain integrated by the company begins at the farm gate – not before. In line with that neither a field force providing training of farmers, nor an extension of the platform as to cover advisory, financing and input provision was envisaged – in contrast to all other platforms profiled in this paper. Later, it was decided to extend the value chain slightly so as to include harvesting, grading and greening of bananas in the company's own packhouses.

Following this strategic line, Twiga only broadened the scope of the business horizontally as to cover other quickly perishable high-demand products such as tomatoes and watermelons. Thereupon, adding on rotational crops such as potatoes and lucerne. Consequently, Twiga could offer a widened basket to its vendors without gaps caused by the seasons. Meanwhile farmers appreciated the new distribution channel for their rotational products. Some of these goods are purchased by Twiga via a bidding platform which the company had established.

A big step towards horizontal expansion was Twiga's decision to open its distribution network for processed food products of manufacturers. This implied a lifting of Twiga's self-restraint to only handle fast moving horticultural products. By doing this Twiga became the most important product supplier for many kiosks in Nairobi, while the ambition goes well beyond that: "our goal is to be their single source of supply"¹¹⁰. This move showed a remarkable capability to seize emerging opportunities - given that the co-founder, Grant Brooke, had been strongly opposed to opening the distribution lines for other partners. He once brought forth that "We are good at saying no as an organisation. Lots of people

¹⁰⁷ How we made it in Africa (2018), quoting Grant Brooke

¹⁰⁸ Bain (2020) p. 18

¹⁰⁹ Bain (2020) p. 18

¹¹⁰ Digest Africa (2021)

want to partner with us, use us to distribute their products, to build things on our platform, to photo op with us, and so on. We are not easily distracted from our core objective of ‘selling bananas’.”¹¹¹

The vast amount of data on its farmers and vendors that Twiga had been able to collect allowed Twiga to bring more sophisticated products on the platform, such as financing. The first step was a working capital line for vendors which they can use to pay for their orders. To achieve this, Twiga cooperated with IBM which had been in the process of rolling out a new supply chain finance platform across Africa. Grant Brooke explains the advantage for both Twiga and the vendors: “It’s simple, if the food vendors can sell more, we can distribute more, growing both of our businesses.”¹¹²

Twiga went on with a step in vertical direction offering financing to farmers. Supported by a number of development institutions, including its shareholder IFC, Twiga embarked on two pilot projects. The first was a US\$ 30 million project granting a loan to 300 medium-scale (>15ha) farms with limited banking- or operating track records and/or lower levels of collateral. The main objective behind this is to finance irrigation systems. Twiga’s main contribution to the financial feasibility of the project is to guarantee the offtake. The first phase of the program is led by KCB Bank Kenya with IFC providing a first-loss-buffer. The second financing project consists of a US\$ 3 million working capital line for selected farmers (for sourcing seedlings) - again on the basis of a risk sharing agreement among the above-mentioned partners.

Twiga then continued expanding horizontally. Last year (2020), the company entered into a cooperation with Jumia Kenya, a Business-to-Customer (B2C) e-commerce platform for food. Through this partnership it henceforth delivers not only to vendors but also to consumers – who no longer need to go to a market or a shop during Covid-19-lockdowns. With this step Twiga shifted its platform model from a merchant-combined with a two-sided platform model to a merchant-combined with a multi-sided platform model comprising farmers, vendors and consumers.

Twiga’s growth strategy is projected to go well beyond Nairobi. This expansion has already begun as the company has recently embarked on services in six Kenyan cities. It plans to enter markets in other African countries in the coming years.

4.4.2 Solving the ‘Chicken-and-Egg’ Problem

Twiga Foods is a vendor-centric platform. The company solved the chicken-and-egg-problem by first registering small and medium sized vendors, establishing transport routes and, on the basis of projected aggregate demand, fostering the registration of farmers. With regard to pricing, Twiga has maintained a balance whereby both sides of the platform should get better prices than on traditional marketplaces.

4.4.3 Partnerships

As described above, Twiga embarked on pilot projects that are directed towards providing loans to vendors and farmers. Hence, selected banks are brought in as complementors on the platform since they can offer financial services to vendors and farmers – i.e., using alternative data Twiga has collected. In addition, Twiga maintains partnerships with insurance companies which offer vendors a business interruption insurance to protect them from income loss in the event of hospitalisation.

4.4.4 Degree of Vertical Control and Integration

Twiga vertically controls an end-to-end value chain, from harvesting at the farm to the kiosk. In contrast with the platform-philosophy whereby “command and demand-hierarchies” became obsolete,¹¹³ - Twiga has continued to rely on a high degree of vertical control. In an interview Grant

¹¹¹ How we made it in Africa (2018), quoting Grant Brooke

¹¹² IBM (2018), quoting Grant Brooke

¹¹³ Choudary et al. (2015) p. 33

Brooke explained: “Own your problems’ is fundamental to the Twiga business design. We do not outsource core business functions. That would simply be too risky at this point. We do not easily trust outsiders, consultants, brokers and contractors. In our experience they will let you down more often than not. While it is great to have ecosystems where you can outsource 50% of your work to pre-existing providers, I have a giant list of examples showing that this is not the case here. Hence, if you can control it, control it.”¹¹⁴ Accordingly, Twiga directly controls logistics which for them implies ownership of the fleet of vehicles.¹¹⁵ Although, more recently the company has begun to reconsider the requirement of ownership, albeit not the one of direct control. As the co-founder put it “We have found as we have scaled that more options have emerged to take them (the trucks) off our balance sheet. It is important to manage them, not necessary to own them”.¹¹⁶

A further step towards vertical integration was the company's recent decision to buy a farm (Takuwa). At its farm, Twiga recently embarked on a pilot cooperation project with Liquid Telecom, an African telco company, to test a precision agriculture Internet-of-Things (IoT) network system to improve farm productivity.

4.4.5 Funding

Twiga succeeded in gaining trust by investors, both from the private-sector and development institutions. Based on its funding, it could reasonably be concluded that Twiga realised or even exceeded its business plan in terms of scaling and profitability. Since its inception in 2014, the company has reached US\$ 56.1 million in total funding. The latest financing round of US\$10.3 million took place in 2020 which was one of the largest financing rounds in Africa’s VC-sector.¹¹⁷ Among the investors were Goldman Sachs, Tlcom Capital, U.S. International Development Finance Corporation (DFC) and the IFC (a shareholder since 2018). Moreover, in the last years Twiga successfully has secured grants from Mercy Corps, Shell Foundation, USAID, the GSMA, Mastercard Foundation and others.

4.4.6 Impact

Twiga has achieved impact in the following areas:

- Income-rise of vendors. Twiga’s key user group, the vendors, benefits from a broadening of services provided, including financing and insurance;
- Income-rise of farmers and greater reliability of sales. Farmers participating in the pilot projects were also given the opportunity to take out a loan;
- Contribution to food security in the urban environment, where 80 % of the food produced in Kenya is consumed;¹¹⁸
- The reduction of food waste. According to the CEO, Twiga reduced typical post-harvest losses from 30% to 4%.¹¹⁹

4.4.7 Concluding Remarks

Twiga’s business model has been remarkably successful in regard to scaling. Its key parameters prove this: 4,000 suppliers, over 100 sales routes through which 35,000 vendors have been reached and more than 1,000 employees.¹²⁰ Observers attribute this success to the simplicity of the original business model which was easily scalable - the end-to-end-banana-delivery value chain. Meanwhile the model

¹¹⁴ How we made in Africa (2018), quoting Grant Brooke

¹¹⁵ With the exception of trucks transporting goods from individual farms to Twiga’s packing stations.

¹¹⁶ How we made it in Africa (2018), quoting Grant Brooke

¹¹⁷ It included the conversion of a US\$ 10.3 million note, an equity investment of US\$ 23.75 million of new cash into the business and debt for US\$ 6 million.

¹¹⁸ Bain (2020) p. 18

¹¹⁹ How we made it in Africa (2021) p. 2. There is no independent verification of this claim.

¹²⁰ Twiga Foods’s homepage: <https://twiga.com>

has certainly become more sophisticated, in particular since a third user group was added to the platform - the consumers. Twiga has since turned into a Business-to-Business-to-Customer (B2B2C)-company, which means that it has to balance conflicting interests of consumers and vendors.

It is perceived that Twiga's relationship with the farmers is changing. Being asked how Twiga will manage to maintain its profitability the CEO Peter Njonjo replied: "This is anchored on output in the production of food. Besides, we transition to more commercial farms with better agronomy is how we maintain our profitability".¹²¹ That means that Twiga henceforth seeks to procure only from farms producing larger quantities with economies of scale and that it will phase-out smallholder farmers. Reasons for this include (i) that Twiga's procurement from smallholders reportedly is 40% more expensive than the one from larger companies¹²² and (ii) its concern to secure sufficient and reliable supply. Therefore, Twiga's procurement will rely on three fundamental pillars: (i) larger farms by way of contract farming; (ii) purchase from aggregators which Twiga helps to set up with technology and know-how; (iii) from its own farms. Observers view this strategic shift with a critical eye - as with this step Twiga reinstalls a middleman, a layer between itself and the farmers that it once had abolished. Twiga's justification of this move, that "it contributes to the strategic priority of food safety"¹²³, is seen as evidence that empowerment of farmers is not a strategic priority. As Bain puts it: "Twiga's engagement with smallholder farmers has been a by-product of its business model, not a central pillar of it..."¹²⁴

4.5 Tulaa

4.5.1 Business Model Development

Tulaa was founded in 2017 by Hillary Miller-Wise, the former CEO of Esoko Networks Ltd, an impact-oriented D4Ag company. Tulaa suspended its business activity in 2020. According to several sources it went into insolvency.¹²⁵

Tulaa was set up explicitly as a one-sided platform with a view to provide farmers with advice and credit to finance input packages. In late 2018, Tulaa added offtake arrangements 'to close the loop', thus transforming the platform into a 'digitally enabled end-to-end market linkage platform' i.e., a platform offering selected services to farmers along the value chain such as advisory services, digital payment via e-wallet and the provision of digital credit to buy a pre-designed package of inputs. The farmers' produce was sold by Tulaa at its own risk with last mile logistics being provided by its agents.¹²⁶ Tulaa limited its product range on horticultural products —primarily potatoes, cabbage, watermelon and onions.¹²⁷ On the basis of these features, Tulaa is classified in this paper as a merchant-combined with a one-sided platform model. Merchant - as Tulaa brokered the produce assuming transaction risks on its own account; while it is a one-sided platform because there were no direct linkages between product- and service-providers and farmers since all services were vertically arranged by Tulaa. It is also a one-side platform in the sense that farmers had an interest in seeing their numbers grow so as to attract a broader range of product- and services providers to the platform and, obviously, wholesale offtakers who want to buy large quantities.

Tulaa had two strong features through which it sought to bind farmers to the platform. Firstly, the comprehensive support of farmers provided both digitally and physically by agents. In particular, Tulaa

¹²¹ Silicon Review (2021) p. 2, quoting Peter Njonjo

¹²² Bain (2020) p. 15., referring to information it received from Twiga's management.

¹²³ How we made it in Africa (2020)

¹²⁴ Bain (2020) p. 10

¹²⁵ See Pitchbook's page on Tulaa: <https://pitchbook.com/profiles/company/225735-40>. The Eckenstein Geigy Stiftung, one of its donors, reports on its homepage that Tulaa is in insolvency (<https://eckenstein-geigy-stiftung.org/en/portfolio/tulaa>). The company's homepage www.tulaa.io is no longer accessible.

¹²⁶ CTA (2019) p. 93

¹²⁷ Bain (2020) p. 16

sent free SMS messages to farmers with tailored agronomic advice during the crop-cycle, based on their location, the cultivated crops and types of inputs purchased. It also maintained a call-centre staffed with agronomists to answer questions.¹²⁸ Additionally, the company's field force not only supported the onboarding of farmers, but also advised them on what to grow, accompanied the production process, conducted quality assessment of the produce, collected it and managed the logistics.¹²⁹ Tulaa carried out this value chain management in a very tech-intensive way. For instance, it used a blockchain-enabled system to track input and offtake and to support supply chain logistics.¹³⁰

Secondly, the company provided loans to farmers - a fundamental part of the company's value proposition to the farmers.¹³¹ It was clear to Tulaa that its mission to empower farmers and to improve their livelihoods could not be realised without the granting of loans. As the paper has shown in other cases - no loans mean no inputs, and no inputs means low yield and poor quality of produce – all ending up in low offtake proceeds. Tulaa assumed that comprehensive support for its registered farmers and the collection of data would de-risk the loans granted by the banks to farmer businesses. Accordingly, Tulaa began with a small number of local commercial banks as partners. Tulaa's field force conducted a credit assessment using a proprietary tool based on alternative data the company had collected on farms and farmers. The banks converted these into a credit-scoring system upon which they accessed the creditworthiness of farmers. Thereafter, if the loan was approved, Tulaa sent an electronic voucher to the farmer for collection of a precomposed package of inputs.¹³² To reassure the banks, Tulaa implemented a supervisory scheme for farmers reminding them of their obligations as borrowers through customized SMS messages.

Tulaa's business model was mainly based on three streams of revenue: (i) a margin on inputs purchased by the farmers, (ii) a margin on the loans granted by the banks and (iii) profit margins on the sale of the produce. Since the first two revenue streams made only modest contributions to cost recovery, the one resulting from the latter had the greatest significance. RAF Learning observed: "With a net margin almost nine times that of its input on credit service, Tulaa's market access services are expected to account for over three-quarters of its cumulative profit over the next five years."¹³³

Tulaa grew quite quickly: Early 2020 it had already reached 15,000 farmers and it planned to serve over 110,000 farmers through partnerships with more than 500 value chain partners by 2024.¹³⁴

4.5.2 Solving the Chicken-and-Egg Problem

As a merchant-combined with a one-sided platform model Tulaa did not face the challenge of having to decide which side of the platform to get on board first. Its task rather was to convince farmers of the advantages of registering on its platform. Having prototyped this kind of value chain integrating platform in Kenya, Tulaa's marketing was based on the credibility of its farmer-centric approach, its tech-intensive value chain management promising high efficiency gains and, last not least, the prospect of reliable and lucrative offtake guaranteed by Tulaa.

4.5.3 Partnerships

Tulaa successfully built partnerships with over 100 retailers and other service-providers. Nonetheless, the company failed to secure partnerships with key players, the banks. The reason for this being the misalignment of interests between the banks and Tulaa. RAF Learning refers to the regulatory environment to account for this misalignment. In particular, the government had installed an interest-cap which rendered a risk-adjusted pricing of loans impossible. Banks therefore feared that the

¹²⁸ Bain (2020) p. 16

¹²⁹ Bain (2020) p. 17

¹³⁰ CTA (2019) p. 141

¹³¹ Because of Tulaa's emphasis on loans, CGAP classified Tulaa as a fin-tech company. CGAP (2019) pp. 28-29

¹³² RAF Learning (2019) p. 2

¹³³ RAF Learning (2019) p. 3

¹³⁴ RAF Learning (2019) p. 2

standard loans-to-farmer business would become less profitable, if not even loss-making. As a means of compensation, banks sought to switch to fully vetted farmers to whom they could cross-sell other products¹³⁵. Since 71% of Tulaa’s registered farmers had never accessed input financing before¹³⁶, there was an unequivocal mismatch. Tulaa, meanwhile, expected the banks to establish a quasi-automatic loan-approval process based on the alternative-data-based credit assessment that it provided. This, however, required a complete system integration through an application programming interface (API) and comprehensive organisational preconditions which the banks were hesitant or unwilling to install.¹³⁷ Hence, the banks opted out of the service provision system which Tulaa had orchestrated along the crop cycle. This caused material damage down the value chain and weakened Tulaa’s relationship with the farmers.¹³⁸ Given the central role of loans in the business model, Tulaa decided to grant loans on its own account. Hillary Miller-Wise, Tulaa’s CEO, noted that this decision had certainly increased financial risks for the company, however, it enabled Tulaa “to control the customer experience and ultimately the company’s reputation in the market”.¹³⁹

4.5.4 Degree of Vertical Control and Integration

Tulaa was designed as a one-sided platform with the company curating services for its registered farmers in a top-down-way. Although farmers had the choice of accepting these services, they could not modulate the tailored input packages or choose another service provider on the platform. When the banks had dropped out, Tulaa decided to provide loans from its own account. Regarding credit, Tulaa once again opted for a vertical solution albeit having initiated a strategic shift towards loosening of vertical control in favour of horizontal partnerships with “best-in-class, customer-centric services.”¹⁴⁰ It had already initiated this shift with regard to logistics and even with offtake. It looks as if the plan was to alter the business model from a one-sided to a multi-sided platform allowing for direct links between product- and service providers, buyers of the agricultural goods and farmers.

4.5.5 Funding

Tulaa had a seed capital round in July 2018 during which it raised US\$ 627,000 from impact-oriented institutions including Global Partnerships, Beyond Capital Fund, Acumen and AHL Venture Partners.¹⁴¹ The company later received some grant funding from NGOs and foundations such as the Geigy Eckenstein Foundation with a view to support the onboarding of farmers and further development of the IT-base.¹⁴²

4.5.6 Impact

According to assessments of its impact in 2019 – which, according to CTA, was carried out by an independent entity - Tulaa achieved a significant impact with regard to an increase of farmer revenues and of yields soon after its inception.¹⁴³ RAF Learning reports (regrettably without naming the source of the data) that “the farmers using all of Tulaa’s services could see their annual net incomes increase by over 165% from US\$ 1,044 to US\$ 2,803. This is roughly 50% higher than the median-income for the

¹³⁵ RAF Learning (2019) p. 4

¹³⁶ 1 World Connected (2020) p. 1

¹³⁷ CGAP (2019) p. 29

¹³⁸ RAF Learning (2019) p. 4

¹³⁹ CGAP (2019) p. 29

¹⁴⁰ RAF Learning (2019) p. 4

¹⁴¹ 1 World Connected (2020) p. 2

¹⁴² Pitchbook’s page on Tulaa: <https://pitchbook.com/profiles/company/225735-40>. In its report on Tulaa, 1 World Connected informs that Tulaa received about US\$ 900,000 in equity in 2019 and raised about \$600,000 in debt in 2020. However, this information could not be confirmed. 1 World Connected (2020) p. 2

¹⁴³ CTA (2019) p. 56

average Kenyan household. Over 50% of that increase was made possible by higher farm-gate prices, lower post-harvest losses, and quality premiums.”¹⁴⁴

4.5.7 *Concluding Remarks*

Having prototyped this kind of value chain integrating platform model in Kenya, Tulaa received a lot of attention from impact-investors, NGOs and foundations. Despite significant access to this category of investors, Tulaa’s capital base remained small and not appropriate for the broad scope of business it has set up. Building off a small seed capital round of US\$ 627,000 and some grants, Tulaa set up a comprehensive (working-capital-intensive) physical and digital support for 15,000 farmers. However, the loans-to-farmer business it had embarked on required significantly higher working-capital needs to cover credit-process-related fixed overhead costs. Beyond working capital requirements, additional capital was required to cover increased risks, in particular default-risks. Although Tulaa’s data system certainly helped to lower the risk profile of smallholder loans, the company could inevitably not eliminate them. Lending unavoidably requires a strong capital base which is why all other platform companies profiled in this paper offering input-loans rely on partnerships with banks. Moreover, the small capital base also limited the possibility to invest thereby hampering the much-needed rapid scaling of the platform.

As is described above, Tulaa was in the process of shifting from a one-sided towards a multi-sided platform. It would have opened up the prospect of scaling the platform quickly; a scaling which would no longer have been held back by a high demand for working capital and also for manpower, which is associated with a high degree of vertical control and integration. This strategic development could have been very promising, based on the trust the company had built in the market, had the process not been abruptly ended by the insolvency in which the company reportedly finds itself.

4.6 **AgroCenta**

4.6.1 *Business Model Development*

AgroCenta (Holdings) Limited is a Ghanaian digital agricultural platform founded in 2015 by two tech start-up-entrepreneurs, Francis Obirikorang and Michael K. Ocansey. AgroCenta was a true greenfield start-up with no strategic partner on board supporting it with data, clients or financial power. The principal business idea was to aggregate production of crops from smallholder-farmers and to arrange the offtake by industrial buyers. To this end the company developed two platforms AgroTrade and AgroPay.

AgroTrade represented an end-to-end supply chain covering production, aggregation and offtake. AgroCenta arranges the offtake (i.e., finds clients and negotiates the terms) against a 30%-margin of the selling price. As the platform did not establish direct linkages between offtakers and farmers the paper categorizes AgroTrade as an agent-combined with a one-sided-platform model. It is a one-sided platform because users (i.e., the farmers) are interested in the growth of their numbers because this would attract a broadened offer of product- and service providers and induce demand by large industrial buyers for bulk crops.

The other platform, AgroPay enabled a settlement of transactions with mobile money, hence facilitating transactions among users. AgroPay was based on a partnership with Vodafone Ghana which also comprised transmission of advisory and other services via SMS and IVR. We categorise AgroPay as a two-sided platform.

After the platforms were successfully brought in motion following a successful completion of an order (see below 4.7.2.) AgroCenta invested into the standardisation and digitalisation of the production- and aggregation process. Aggregation centres were in need of adequate infrastructure i.e., accurate

¹⁴⁴ RAF Learning (2019) p. 3

scales, branded and normed sacks, sack sealing machines, etc. Aggregation has been fully digitalised, albeit in a low-tech version. CTO Michael K. Ocansey explains why:

“Being a technology company dealing with a lot of low-tech people, we developed a very low-tech solution that is super easy to use but we soon realized (...) it still couldn’t beat pen and paper. Internally we have a solid app we use to manage every aspect of the business. This automation makes us move fast but our agents moved faster with pen and paper. So, pen and paper it had to be. We moved some of their tasks solely to paper forms and found professional data entry guys to take over the entering of data.”¹⁴⁵

In the second quarter of 2017, AgroCenta enjoyed a real surge in registered farmers when AgroCenta began to sell larger quantities of crops to industrial offtakers.¹⁴⁶ To cope with the increasing demand, AgroCenta erected aggregation and distribution centres all over the country.

AgroCenta also embarked on a horizontal expansion servicing the retail market. It found a way of solving the last mile problem through establishing a food distribution platform called AgroMart. On this platform retail vendors could sign-up to retailers and sell selected commodities at a fixed price with a 30% margin. AgroMart is categorised as a two-sided platform. This move was a success since 30% of total sales were sold on retail markets and 70% to industrial buyers.¹⁴⁷

Between 2018-2020 AgriTrade and AgriPay had been comprehensively revised resulting in successor platform models which were launched in 2020 called CropChain and LendIT.

CropChain collects and analyses data very thoroughly throughout the value chain. At its core the system consists of a digital profiling of farms that enhances data collection on the field, traceability and on-demand logistics allowing for route optimisation.¹⁴⁸ LendIT required a much more comprehensive re-design of its predecessor-platform. Currently, LendIT represents a full-fledged multi-sided platform with smallholder farmers representing the demand-side and various service-providers namely banks, insurances and pension providers on the other side. Based on its respective partnerships with service providers, Lendit offers the following services to smallholder farmers:

1. Input financing – based on partnerships with commercial banks bound to the purchase of certified seeds, fertilizers and tractor services;
2. Digital payments – based on a partnership with MTN, Vodafone and PaySwitch;
3. Crop insurance;
4. Pensions – based on a partnership with Enterprise Trustees.

Services are physically provided at so-called LendIt Kiosks in the region where there are no banks. “Farmers can walk to any of these kiosks, apply for input financing loans, pay pensions premiums, perform cash in and cash out services on their mobile phones etc. which in the past did not exist at the community levels.”¹⁴⁹

LendIt enables transactions by providing the database which the service-providers need. To this end AgroCenta concludes service agreements with each service provider company. Vis-à-vis banks it commits itself to provide a list of creditworthy farmers; the partnering banks so gain de-risked access to a pool of farmers as they are already assessed by AgroCenta. The company is remunerated for its services in the form of annual subscription fees and a commission.

¹⁴⁵ Ocansey (2017) p. 4

¹⁴⁶ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁴⁷ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁴⁸ Obirikorang, entry in LinkedIn: <https://www.linkedin.com/in/swapchief/detail/recent-activity>.

¹⁴⁹ Obirikorang, entry in LinkedIn: <https://www.linkedin.com/in/swapchief/detail/recent-activity>. AgroPay had tested these services (called Spot Banks at that time) on a pilot basis with 5000 clients.

Since its inception, LendIt has been using alternative credit-scoring models based on data collected by AgroCenta. Francis Obirikorang explains:

“We have implemented a 360-degree farmer data that takes into account bio data, digital identity focusing on financial and trade activities... With this critical and important information, service providers can now leverage on our rich data to extend services to the informal sector, which were largely missing a few years ago.... Financial institutions can now provide financial services to smallholder farmers because of credit-scoring algorithm and credit data on farmers, fertilizer companies can now manufacture customized farming inputs based on soil data present and FMCGs are assured of responsible sourcing of commodities based on traceability features.”¹⁵⁰

The two platforms are interlinked as the data coverage throughout CropChain’s end-to-end production process constitutes a key-component of LendIt’s database. In particular, the offtake-perspectives are decisive for the assessment of creditworthiness.

With regard to LendIT, AgroCenta plays the platform game i.e., it does not bear any transaction or lending risks. It just commits itself to the described service role as a farmer profiler and pre-assessor of creditworthiness.

4.6.2 Solving the Chicken-and-Egg Problem

AgroCenta solved the chicken-and-egg-problem by securing demand first. The business was initiated by a contract with a large industrial buyer setting a delivery time of only one month. At that time the company had not yet secured a sufficient amount of working capital to service such a contract. Nonetheless, with the support of a business angel the company succeeded and – based on its visible success in this case – has been able to secure interest in the platform by other industrial buyers.¹⁵¹ The founders then turned to the supply side, the farmers, to foster their registration with the platform. To accelerate this process, AgroCenta sought the cooperation with large farmer associations and cooperatives rather than approaching individual smallholders. AgroCenta assumed that “it is easier to provide services through cooperatives as these serve as a means of accountability in itself”.¹⁵² Furthermore, the company assumed that cooperatives had better access to government subsidized fertilizers. Following this approach AgroCenta recruited agents with good contacts to respective community leaders. These agents helped onboard farmer communities and support training of the farmers mainly on the basis of best-practise examples in the communities. Michael K. Ocansey described how AgroCenta managed to convince farmers that it was advantageous to join the platform:

“We render transparent that AgroCenta takes a 30%-margin on the achieved selling price of crops. So, the interest of farmers and of AgroCenta are obviously aligned. We also pay the farmers on the same day the produce is collected. Farmers appreciate very much that there is no time-interval between offtake and payments. (While middlemen in the past used to pay not before they had sold the produce.) We also pay farmers the prevailing market rate even if we pick up the commodities from their homes or farms. Other buyers will deduct their cost of transportation to farmers home/farm if they picked up from there.”¹⁵³

However, according to Ocansey, the most convincing argument for registering and an active usage of the platform was that the farmers “no longer needed to worry about offtake”.¹⁵⁴

¹⁵⁰ Obirikorang, entry in LinkedIn: <https://www.linkedin.com/in/swapchief/detail/recent-activity>

¹⁵¹ According to Michael K. Ocansey, CTO, in an interview <https://www.youtube.com/watch?v=pb3p-68OCe4>

¹⁵² Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁵³ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁵⁴ Quoted from a telephone interview with Michael K. Ocansey, 8th December 2020

4.6.3 Partnerships

AgroCenta has given partnerships great importance – in particular as far as its platform LendIT is concerned. LendIT is based on successfully concluded partnerships with IT-companies and mobile money operators which helped constituting the platform, banks, insurance companies and pension providers which serve as complementors offering their services on the platform.

4.6.4 Degree of Vertical Control and Integration

CropChain, as an agent- combined with a one-sided platform model is characterised by a considerable amount of vertical control and supervision. The company perceives this as indispensable because any failure to meet contractual obligations vis-à-vis industrial offtakers would imply a major backlash in terms of trust and reputation. However, with regard to the two platforms LendIT and AgroMart the role of AgroCenta is the one of a curator.

4.6.5 Impact

According to responses to the questionnaire – i.e., the information is not based on an independent assessment - income of registered farmers increased per acre after 3 years by 100 to 250%. Company representatives share: “We were hoping to have raised it already to 300% but failed because of Covid.”¹⁵⁵ AgroCenta induced an increase in yield in terms of maize from 5.6 to 10 tonnes per acre. The percentage of female registered farmers stands at 40% while “60% of loan recipients are female farmers.”¹⁵⁶ AgroCenta also highlights what it has achieved in regard to attracting younger farmers: “The cohort 20-45y is the strongest. 10% of registered farmers are 60plus years old”.¹⁵⁷

AgroCenta induced the creation of new jobs beyond farming following an extension of the value chain (i.e., in processing, transport, warehousing/cooling, etc) either directly or by offtakers processing in the area in which the platform operates. However, no clear figures were given: “Jobs are being recruited in the last mile service, agents and tri-cyclers providing farmers with input and collecting produce. At the aggregation centres the degree of purity must be checked and the grains must be filled in 50k sacks. We have created jobs here, in particular for women. Loading boys are also responsible for offloading the 100kg sacks from the tricycles at the aggregation centres and then loading the 50kg sacks onto vehicles, when it is time to ship to an offtaker. We also recruit IT personnel for the installation and maintenance of IT infrastructure in the many aggregation centres.”¹⁵⁸

With its financing platform LendIT AgroCenta fosters financial inclusion of farmers in rural areas. Its target for the next 5 years is to provide more than 2 million farmers with access to financial services.

4.6.6 Funding

AgroCenta has raised a total of US\$ 2.2 million in funding over four rounds.¹⁵⁹ The most recent seed round of US\$ 790,000 which took place earlier this year (2021) was provided by impact oriented VC-Investors such as AV Ventures and a number of international development institutions and foundations, including Shell Foundation, the United Kingdom’s Foreign, Commonwealth and Development Office, and the Rabo Foundation. AV Ventures sees its investment as “part of its long-term strategy of providing innovative and catalytic capital to support growth-oriented small- and medium-sized enterprises (SMEs) like AgroCenta that make up the “missing middle” of investment — too large for microfinance but too small or too early-stage to attract private equity investors. These

¹⁵⁵ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁵⁶ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁵⁷ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁵⁸ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁵⁹ See respective page of Crunchbase: <https://www.crunchbase.com/organization/agrocenta>

SMEs are often the backbone of economies and potential drivers of innovation, but too often they miss out on financing that could enable their growth and longevity”.¹⁶⁰

Cooperation with private sector grant providers has been part of AgroCenta’s funding strategy since inception and will continue to be as Co-founder Michael K. Ocansey confirms:

“We have in the past received grants, among others by AGRA and GSMA, to foster the financial inclusion of farmers. We are open for further blended finance operations to enhance the impact of our operation. By principle, we do not seek state subsidies as a business, except subsidies for farmers. (For) example, in LendIT, we provide our farmers with government subsidized fertilizers to drive down their loan amounts”.

4.6.7 Concluding Remarks

AgroCenta runs three different – albeit interconnected – platforms. CropChain is an agent-connected with a one-sided platform model, while LendIT and AgroMart are classical two – and multi-sided platforms. The platforms target different user groups while offering a clear value proposition to its main group, the smallholder farmers. Through its CropChain platform, the company advises and trains farmers during the crop-cycle and arranges the offtake. AgroMart offers an additional routing for offtake. Via LendIT the company promises financial inclusion. Other important user groups are offtakers and financial service providers whom the company offers a de-risked access to farmers in rural areas.

With a view to reaching a critical mass the company needs to foster a rapid scaling of its platforms and does indeed pursue an aggressive growth-plan: Currently there are 45,000 farmers registered on the CropChain platform. The number was supposed to reach 100,000 farmers by the end of the year 2020 but failed to do so because of Covid19. The company now seeks to reach 100,000 farmers by the end of 2021. Ocansey gives the following outlook: “We have projects lined up with development partners which should get us to between 500,000 and 1 million farmers by the end of 2023”.¹⁶¹ Quick scaling of LendIT would be particularly beneficial for AgroCenta as that would lead to a healthier revenue-mix. For the time being, aggregation and offtake arrangements are the dominant source of revenues causing significant exposure of AgroCenta to related risks (such as weather risks).

A clear bottleneck for scaling is the small capital base (US\$ 2.2. million total funding) which limits its possibility to invest and recruit talents. However, reportedly a Series A round is in sight.

¹⁶⁰ AV Ventures (2021) p.2

¹⁶¹ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

5 Conclusions

Drawing from economic theory on platforms, this paper proposes categories for platforms with a greater discriminatory power than those being used in economic literature on the digitalisation of African agriculture. The broader range of categories is required to label the distinctive differences between platform companies. None of the platforms studied in this paper represent a text-book platform whereby services would be limited to linkages created between user-groups. To the contrary, the platforms all go well beyond creating linkages. As value chain integrators they all assume responsibility with regard to the offtake of the farmers' produce. The way they do it is crucial for the categorisation of the platform: As a multi-sided platform, DigiFarm assists farmers in their negotiations with purchasers - while maintaining the direct linkages between the user groups. Meanwhile, FarmCrowdy, Tulaa¹⁶² and Twiga Foods sell the produce on their companies' account as merchants. Henceforth, they are categorised as a merchant-combined with a one- two- or multi-sided platform. AgroMall and AgroCenta in turn sell the produce as agents on the behalf of the farmers. Consequently, they are categorized here as an agent-combined with a one-sided platform.¹⁶³ Whether it is a one-, two-, or multi-sided platform depends on how many different user groups the platform has (e.g. farmers, financial service-, and input providers).

Furthermore, this paper describes - through the lens of the economic theory on platforms - how platform-companies have made strategic decisions:

Business model development: According to some economists, platforms change the way value is created: No longer through vertical processes of production or of crafting services but rather in a decentralised way through horizontal partnerships coordinated by platforms.¹⁶⁴ However, all case-study platform-companies rely on vertical features - albeit to a varying degree. There are mainly three vertical elements companies built into their platform business models, namely a field force, logistics and their arrangement of the offtake. With regard to the field force, this paper shows that all platform companies (with the exception of *Twiga Foods*) see the necessity of a comprehensive support of farmers through a field force, despite the significant cost factor. In addition, the studied companies have vertically integrated logistics-services (with exception of AgroMall and DigiFarm). Concerning offtake, all case-study-platform companies play an active role as a facilitator, agent or merchant.

Offtake is an important revenue driver for all case-study-platform-companies, notwithstanding the way in which it is arranged. Differences exist with regard to the degree companies rely on trading/arranging offtake. No other company relies as heavily on trading as FarmCrowdy does. The company derives no less than 85% of its income from trading, whereas AgroCenta und AgroMall seek to diversify. Both companies leverage their presence in the field and their comprehensive data pool on farms and farmers by broadening their client base as to cover other sectors beyond agricultural production and trading of crops. For example, an important client for them is the financial sector which has discovered smallholders as a huge future customer group. AgroCenta und AgroMall both seek to serve the financial sector as agency banks, handling a broad range of financial products for smallholders. AgroCenta has successfully erected a multi-sided platform connecting farmers and financial service providers called LendIt.

The platform-companies studied deviate most significantly from what economic theory would lead us to expect with regard to the *degree of vertical control and integration*. Vertical elements are the way in which platform companies adapt to the specificities of the African agricultural market. Given the high illiteracy rate, the use of traditional, less efficient farming methods and also the lack of financial literacy in many African countries, platform companies have to empower smallholder farmers first i.e., provide training, arrange credit for inputs, provide access to inputs. With a view to meeting contractual

¹⁶² Tulaa until the insolvency, into which it reportedly went in 2020.

¹⁶³ Some of the companies run different platforms which belong to different categories – such as FarmCrowdy and AgroCenta. The Categorisation here refers to the main business of the case-study-company.

¹⁶⁴ For example: Choudary et al. (2015) p. 19

offtake arrangements, value chain management is required to ensure delivery of the produce in time and in agreed quality. This raises the question which market situation in certain African countries or regions prevails, once a large number of smallholders become empowered. A business model with strong vertical features may no longer be in line with the market. Instead, a lighter platform model, built on horizontal partnerships with service providers, requiring less working-capital and manpower is likely to be more market consistent. In such a scenario platform companies face additional competition: Empowered farmers working in groups or in a cooperative-like structure are likely to be offered offtake-contracts directly - circumventing all types of existing platforms.¹⁶⁵

Partnerships: The more platform models incorporate vertical elements, the less they rely on *partnerships* – as a horizontal way of creating value. DigiFarm which comes closest to a “pure” platform among the case study companies, accordingly is highly dependent on well-functioning partnerships. As shown in section 3.3.4, economic theory highlights the difficulties in building partnerships since it involves a delicate balance of give-and-takes. Confirming this, DigiFarm reportedly has had difficulties in forming and maintaining some of its partnerships. With regard to partnerships with banks the picture is mixed: In case of LendIt, AgroCenta’s financial service platform, partnerships seem to work well, while Tulaa failed to come to terms with the banks. It seems that these differences are due to regional circumstances – concerning the regulatory environment and, in particular, the competition among banks and their commercial interest to win the farmer segment as a customer base. Actually, it could be expected that digital agricultural platforms maintain a strong position in partnerships with banks because of the data they bring in, without which no financial services can be provided.

The studied platforms also differ in terms of how they solve the *chicken and egg-problem*, namely the strategic decision which user-group to attract first on the platform – and how. FarmCrowdy, Twiga, AgroCenta have taken a zig-zag approach i.e., they close transactions in the beginning one-by-one, keeping working capital expenditure low. DigiFarm, Tulaa and AgroMall, on the other hand, first on-boarded farmers and collected data on a larger scale allowing them to demonstrate delivery capacity vis-à-vis industrial buyers interested in bulk crops and also vis-à-vis banks. With this approach, it naturally takes longer until the first capital reflows occur – and thus, more working capital is required.

Funding: The working paper also showed that most platform companies are very thinly capitalised which limits their resilience and their possibility to invest. FarmCrowdy, AgroCenta and Tulaa established their comprehensive operations with a small single-digit million USD funding while Twiga only recently received another US\$ 26 million, with the support of IFC and DCF, bringing its total funding up to US\$ 56 million. This difference with regard to the equity position between Twiga and the other case-study-companies is remarkable. It confirms the observation that International Finance Institutions – with regard to their direct venture-capital investments - tend to focus on the more advanced companies in Africa to the detriment of innovative, truly early-stage companies. As GSMA aptly laments:

“Over the last two decades, the role of Development Finance Institutions (DFIs) has changed. Previously tasked with building capability, demonstrating success and crowding in other investors, DFIs now avoid early-stage ventures and play a similar role as venture capital or private equity firms. All three prefer to invest big ticket sizes from Series A onward in ventures with a track record of profitability. Rather than crowding in private sector investment in pioneering sectors, DFIs now require private investors to provide pioneering finance before investing in de-risked ventures. Given their transaction sizes and the transaction costs involved, DFIs generally focus on big-ticket investments in agriculture. Nigerian agritech does not offer large commercial opportunities that would justify DFI investment.”¹⁶⁶

¹⁶⁵ Such direct contacting does already take place in an ever-increasing amount. To secure reliable delivery, offtakers might seek the support from service companies offering data-based value chain management like the Kenyan company *E-Prod*.

¹⁶⁶ GSMA (2020b) p. 28

Against this backdrop, the commitment and willingness to accept risks of many NGOs, foundations, and impact investors working to fill the gap is laudable.

In the course of analysing the case-study-platform companies, the paper also gained insights into the *impact* they have achieved (although this is not the central issue of this working paper). The responses to this research's questionnaire and all publicly available reports and data confirm the positive impact of platforms with regard to yield and income rise of farmers, financial security through insurances; pension schemes and job creation through the prolongation of value chains in the areas in which platform companies operate. However, independent and more comprehensive empirical research is required to determine the differential impact of platforms. Some platforms profiled in the case studies undertake a noteworthy effort to address the problem of an over-aged farmer community by targeting young people and trying to introduce them to the profession of farmer. To that purpose, they wish to influence the image of farmers, considering "agriculture as a business instead of just a means to survival"¹⁶⁷, and forging the notion of "agripreneur".¹⁶⁸ Furthermore, in order to render the profession more attractive for young people, AgroMall implemented a sub-platform (AgroCola) exclusively for young stakeholders in the agricultural ecosystem.

For the sake of completeness, one aspect should be mentioned with regard to which platforms have not yet made much progress - long-term finance for farmers, or "the main agricultural financing gap" as per GSMA.¹⁶⁹ While platforms have been successful in arranging short term finance i.e., loans bound to purchases of inputs, they do not provide long term financial services which would enable farmers to buy capital goods.

What could governments, DFIs, NGOs, foundations, impact investors do to support platform companies, so they achieve an even greater impact i.e., more jobs, in particular for youth and women and bringing more subsistence-farmers in remote areas into the formal economy? The responses of the platform companies in the questionnaire all steered in the same direction: These institutions should support platform companies with regard to the training and onboarding of farmers in remote areas. Grants or blended finance are proposed as the most suitable financing instruments to promote this. In the interviews, the need for a more broadly rolled out infrastructure was further emphasised both in terms of connectivity and a physical infrastructure. Under-investment in infrastructure in remote areas deepens the regional inequalities also in terms of access to D4Ag-services.

Data stewardship is another concern which the platforms companies, governments and international institutions should bear in mind. Platforms are collecting a vast amount of data. The data pool is the core asset on which platform companies base their offerings to the various user groups. As Francis Obirikorang informs AgroCenta's stakeholders on LinkedIn: "We have implemented a 360-degree farmer data that takes into account bio data, digital identity focusing on financial and trade activities even to indirect beneficiaries."¹⁷⁰ There is no reason for us to raise doubt concerning AgroCenta's willingness and capability to exercise an appropriate data stewardship. The above quote serves as illustration of the focus of the sector on analysing and utilising data, which does raise questions about data ownership and regulatory frameworks.¹⁷¹

Education was also mentioned in interviews as an area where above-mentioned institutions could provide support. IT-savvy personnel able to operate digital processes is scarce and expensive to hire. Therefore, respective human capacity building is fundamental to foster the digitalisation of the agricultural sector. Investments in education would simultaneously stimulate employment of young people in rural environments.¹⁷²

¹⁶⁷ Response to questionnaire by Michael K. Ocansey, CTO, received 18th January 2021

¹⁶⁸ CTA (2019) p. 10

¹⁶⁹ GSMA (2020a) p. 18; the issue is comprehensively laid out in Baumüller et al. (2020) section 7.2.1. pp. 138-144.

¹⁷⁰ Obirikorang, entry in LinkedIn: <https://www.linkedin.com/in/swapchief/detail/recent-activity>.

¹⁷¹ Baumüller et al. (2020) p.98

¹⁷² See also Baumüller and Kah (2020), p. 6

In summary, the rapid growth of digital agricultural platforms in terms of registered farmers reflects that they do appear to meet a demand: Farmers opt in for receiving advice on modern farming techniques, to gain access to financing and inputs and to secure sales of their products – all from one source. Subject to further research both with regard to theory development and empirical research on platforms (in particular with regard to the impact they have achieved), the paper concludes that there is a public interest that platforms continue to grow and speed up the onboarding of farmers, particularly in remote areas. However, the benefits of platforms should not lead economists, entrepreneurs, investors, development institutions and governments to underestimate the difficulties of building a platform (in a spirit which Cusumano et al. dubbed "platformania").¹⁷³ The paper has shown the tricky strategic decisions that need to be made in the course of launching digital agricultural platforms in SSA, especially with regard to building vertical structures into the business models which are required as long as the described features of the market exist. Securing sufficient capital is another ongoing challenge that platforms face - as this study has also shown.

¹⁷³ Cusumano et al. 2019 p.12

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