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September 15, 2016

Summary of Findings:
Assembly Traders as Supply Chain Integrators for Smallholder Farmers

I. Summary

Research question: can the small-scale agricultural trader play a positive integrative function in the supply chain for smallholders, linking input markets for farmers to the desired end products? If so, how?

Working conclusion: small-scale traders as they exist today in an unsupported supply chain cannot play an integrative role for smallholders. They lack three crucial business assets: trust to secure buy-in from consumers and producers, access to high quality markets, and working capital to fund a cash business. However, two types of innovations hold promise to retool the small-scale agricultural trader into playing this more useful role; before these models can scale they must establish commercial viability outside the context of development aid, or develop a business model that intends to continue reliance on aid.

II. Baseline: how does the average supply chain today link smallholder farmers to markets?

The present system that flows goods in and out of rural Uganda is highly disaggregated. Both the inputs with which farmers sow and nourish their fields and the dry maize that is sold off farms in 100 kilogram bags change hands two to five times before sale to the end customer. The existing system is not broken, merely inefficient—a failing that could be easily overlooked were this supply chain not feeding and providing income for Uganda's most vulnerable population, smallholder farmers. The inefficiencies in maize, a low-value crop with a long storage life crucial to food security, are particularly acute and offer major development dividends.

The present inefficiencies in the maize supply chain hamper smallholder production in the following interrelated ways:

1. Reduce quality and quantities: limited visibility or even predictability into the future sale price of goods reduce farmer incentive and ability to invest in the inputs required to for robust yields.
2. Reduce income: two levers in the existing supply chain suppress smallholder income. Low quality maize produced by hard-to-reach farmers fetches lower prices per bag, and farmers produce smaller volumes to sell. Additionally, the present system includes about five handovers of grain before the crop reaches the end user; each changeover takes a margin. Competitive urban and international grain markets keep end prices fairly

consistent, with seasonal variation. The result, then, of a long supply chain is reduced payments to the farmer who originates the maize.

Economic shocks to smallholders farmers are main cause for poverty and can ruin a household's well being in a matter of one bad thing that happen: bad weather, crop disease or just lack of demand can make or break a family's future. It is no wonder then, that smallholder farmers desire to protect themselves using different behaviors such as planting low-cash crops like grains that can be food as well as income, and by reducing investment in inputs. However – these risk averse behaviors are a primary driver of continued poverty in rural communities. We believe that sharing or reduce the farmer's risk – we can improve the output of the supply chain, and the husk approach.

Hypothesis: The small-scale agricultural trader can play a pivotal role in integrating the smallholder supply chain to the benefit of the farmer. Assembly traders are underutilized, and often unfairly reviled, levers for improving the outcomes of smallholder supply chains. Assembly traders offer agility and experience in working with dispersed populations of smallholder farmers. They can play a role as an intermediary between market and producer, which offers opportunities for the trader to integrate upstream information about demand into his conversations with farmers, suggesting new varieties of an in-demand crop.

III. Identifying the constraints

What holds traders in the present supply chain from achieving a more efficient and integrated outcome for smallholder maize farmers?

Interviews with farmers, traders, NGOs, donors, and investors allude to three critical gaps that keep traders from offering tighter supply chain integration.

Trust. Traders have little trust or mechanisms to allow transparency to lubricate transactions with subsequent levels of the value chain. In a cash economy with scant transparency, credit sales are impossible, with means each businessperson is limited by the cash he can carry. The commodity-nature of the industry de-emphasizes the value of relationships. Buyers and sellers of low quality maize are fungible; accordingly traders do not often invest or behave in order to build trust in long-term partnerships.

Market Access. In our research we observed integrated supply chains functioning for smallholder farmers only when the chain fed into a high-value and high-quality predictable market. This is a logical follow on from trust; if traders must source high-quality grain not readily available on the market, their business depends on establishing long-term relationships with reliable and high-quality producers. These circumstances provide the incentives to establish farmer-trader trust that enables upfront investment in high-quality production.

Working Capital. Commodity trading requires access to working capital facilities that can be used to buy, store, and transport grain. Payment is made only upon delivery to the end user. Most traders build their capital base through successive traders, a slow process typically absent facilitation by any lender.

IV. Potential Solutions: existing innovations in the market that create supply chain integrating traders

Networks

One approach in practice that makes valuable supply chain integrators of traders relies on networks—both virtual and human. The virtual networks link the latter half of the supply chain, medium sized trader to high-value market, and human networks link the tech-limited farmers to smaller traders.

Akorion exemplifies this approach. It offers is a network of large scale regional town traders and assembly traders, rebranded as "village agents." This network sources and supplies farmers with inputs, including seeds, fertilizers, machinery rentals, agricultural insurance, and access to finance, and access to output markets. In theory, the agents would be gathering data on the farmers and feeding it back to Akorion, who could use the data to improve a bank's knowledge of a farmer's risk profile, but to date Akorion affiliates are only pulling data from the platform, rather than inputting.

- Trust: Akorion solves for trust by creating localized village agents who business success demands their ability to source from local farmers for years to come. The trust component leaves gaps by creating a highly uneven and unmonitored power dynamic between the farmers and the village agent; in theory it remains possible for the village agents to underprice grain bought in the village, and in fact even increases the leverage the traders have over the farmers by connecting these traders to loans for much needed inputs.
- Market access: Akorion provides market access through a mobile platform that can and should connect numerous traders and international buyers. The user-validated utility of this platform is still uncertain. It seems that many sales contracts are still facilitated by a central staff in Kampala, and the traders rely heavily on Akorion's contacts with the World Food Programme, an above-market high-quality buyer.
- Working capital: Akorion solves for working capital at the farmer level by offering access to lower interest loans through Opportunity Bank, subsidized in part by development guarantees. Traders continue to cite working capital as a key constraint to growth.

Assessment: Akorion is the highest potential project we saw, but is likely to remain a darling of development donors and fail to develop a sustainable business model. It is delivering excellent results to farmers at present, but based on subsidized inputs which may not be sustainable after the end of major aid programs like Feed the Future. Akorion's ability to sell profiling data to banks would be game changing, creating a sustainable revenue stream.

Integrated Outgrower Scheme

At the other end of the spectrum from networks which build infrastructure atop the existing supply chain, integrated outgrower schemes replace the existing traders with end-to-end service providers directly interfacing with smallholder farmers and offtaking their goods to sophisticated international markets.

Joseph Initiatives (JI) served as an example of this approach, which is relatively common in higher-value crops like coffee and tea, but is more challenging in a low value corner of the agricultural world like maize.

The model involves direct sourcing from smallholder farmers using village-level collection services, which include access to inputs on loan through microfinance orchestrated by JI, extension support, and a guaranteed market. JI secures minimum supply of maize as well as economies of scale in inputs with 3000 acre farm. JI source additional grain through local traders, offering more surge capacity in its sourcing. It ultimately sells maize to buyers elsewhere in East Africa with high quality standards, particularly Kenya and the Congo, as well as the World Food Program.

- Trust: JI solves for trust with local investment. They place physical collection infrastructure, renting land and building cribs, in their sourcing villages. Their external trust with buyers is buffered by continual staff travel to high-value markets and backing by limited partners in the U.S. Trust remains a paramount concern for JI's sell side, and increases their incentive to rationalize their upstream supply chain so that they can continue to deliver on contracts with high-quality grains.
- Market access: JI sources high-quality maize and has an employee who concentrates on sales contracts international. They manage and generate predictable demand for high-quality maize with long advance timelines through contract.
- Working capital: Working capital remains a key constraint to JI's growth according to their buying team. They are exceptionally well-positioned within the industry to access low-cost working capital loans. They have an industrial standard silo that could be used for commodity insurance and finance, and significant assets against which to borrow. JI is backed by American private equity funds, which presumably also provided start-up capital for a buying season.

Assessment: The model delivers impressive results to farmers in a short time. If it is achieving unit profitability it may present a promising way forward for large corporations to source directly from smallholders. However the company's support from donors raises questions about its ability to cover costs and continue to offer generous services to farmers.

V. Remaining Questions for Further Research

1. Are the existing models we observed profitable? Can Akorion and Joseph Initiatives function without donor support?
2. More broadly, is a rationalized smallholder supply chain profitable? Or must the Ugandan maize industry move toward consolidation seen in more developed agricultural economies?
3. Is relying on high-quality maize products for the long-term a viable strategy? Or once the market is saturated with a uniform quality product do traders lose the incentive to invest backwards into smallholder production?

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August 2016

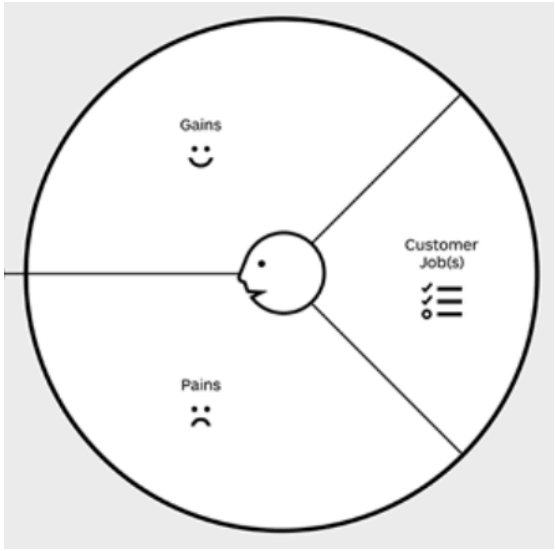
Value Proposition Canvas

How supply chain stakeholders deliver value to customers

Methodology

Developed by Stratigizer, the Value Proposition Canvas (VPC) profiling, designed as a tool to help design solution based on customers needs.

Customer profile



- **Jobs** that our customers need to preform in their lives (task, problem or a need to satisfy)
- The related **pains** – the negative aspects of the 'job'(cost, risk, emotion)
- The related **gains** – the positive elements and outcomes and benefits (cost saving, emotional gains)

Important questions to ask Is/how our solution:

- help to preform jobs
- Is a pain reliever
- Is a gain creator

The customer profile allows us to examine the actual needs and desires of the target market and to examine current solutions as well as to propose a new onw

Farmers

Pains	• Inputs, including seeds, fertilizer, and labor are unreliable and expensive • Access to finance: pressing family needs for cash cause farmers to sell too early or to forgo inputs sufficient for high quality harvest • Market access: low level of infrastructure, long distances result in high cost of transport • Uncertainty: around yields, weather/climate change, and price fluctuations
Gains	• Harvest with good yields, particularly with high-quality maize • Purchasing a good that boosts social well-being; often these are non-agricultural goods like motorcycles • Access to programs that subsidize improved productivity • Enabling child's success: "I love the soil because it sent my kids to university." • Social activity around agricultural goods • Rains on time
Jobs	• Production tasks • Familial care

Local Trader

Pains	• Access to capital both for inventory and improved storage • Transportation: problems with trucks en route • Kampala market levels price across the country regardless of local conditions • Competition from quality-oriented traders • Security while moving money to rural areas
Gains	• Opportunity to sell high after buying low • Establish longstanding business relationship with strong farmer • Access to low-cost transportation • Access to grain storage • Increased social capital in village
Jobs	• Moving grain to aggregate across rural area to a central point • Processing grain for sale

Kampala Trader

Pains	• Uncertainty around time interval for price stability • Access to capital both for inventory and improved storage • Transportation; problems with trucks en route • Access to sufficient quantity of high quality maize to service short-term contracts • Security in moving money
Gains	• Opportunity to sell high after buying low • Establish longstanding business relationship with strong farmer • Access to low-cost transportation • Access to storage
Jobs	• Deliver on contracts on time • Processing grain for sale

Miller

Pains	• Cost of electricity or diesel fuel for mills • For large Kampala mills: ensuring grain quality before milling
Gains	• Sell maize flour high and buying maize grain low • Win long-term milling contracts • Get a good deal on machinery
Jobs	• Source maize • Approve maize quality or dry to adequate moisture content • Process maize into flour

Unmet Needs Across Value Chain

- Working capital
- Quality inputs
- Financing timed to agriculture
- High cost of transport
- Price instability
- Weather fluctuations
- Yield uncertainty

- Access to capital
- Security for cash
- Quality pressure

- Cost of fuel
- Uncertain supply of quality inputs

Reliable supply of quality inputs and access to finance are needed across supply chain

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Innovation Report

Approaches to Improving Supply Chain Integration for Smallholders

Two approaches to supply chain integration

Need: connect supply and demand for low-value food crops (maize), offering buyers reliable access to specified quantity and quality, and farmers the predictability required to invest in improved production.

Indirectly offer market linkages

- Use existing supply chain players, including traders
- Rely on ICT to link players

Offer guaranteed market

- Single buyer secures premium
- Buyer offers services including inputs, loans, and extension to suppliers

Pros: leaving existing system in place increases sustainability
Cons: slow tech adoption, difficulty of monitoring prices, require subsidy to secure buy in

Pros: immediate improvement in farmer incomes and quality
Cons: significant upfront and ongoing costs may require donor reliance

Akorion	
Status	Implemented small scale
Geography	Uganda
Innovation	Cut out the middleman by relying on ICT; make lending more feasible through profiling
Source	Ugandan recent college graduates
Model	Offer inputs, including seeds, fertilizers, machinery rentals, agricultural insurance, and access to finance, and to output markets by relying on village level agents equipped Akorion software on smartphones. In theory, the agents would be gathering data on the farmers and feeding it back to Akorion, who could use the data to improve a bank's knowledge of a farmer's risk profile, but to date Akorion affiliates are only pulling data from the platform, rather than inputting.
Impact	Increased income within farmer pool by 57% and production by 45%, 43% reduced post harvest loss, reaching 42,000 farmers
Partners	USAID (Feed the Future—CPMA), World Food Program
Assessment	Akorion is the highest potential project we saw, but is likely to remain a darling of development donors and fail to develop a sustainable business model. It is delivering excellent results to farmers at present, but based on subsidized inputs which may not be sustainable after the end of major aid programs like Feed the Future. Akorion's ability to sell profiling data to banks would be game changing.

Link to website

Joseph Initiative (JI)	
Status	Implemented large scale
Geography	Masindi, Uganda
Innovation	Outgrower scheme around an anchor farm with intensive support and loan monitoring, facilitated by a quality premium available through export market
Source	American impact investors
Model	Direct sourcing from smallholder farmers using village-level collection services, which include access to inputs on loan through microfinance orchestrated by JI, extension support, and a guaranteed market. Secure minimum supply with 3000 acre farm. Source additional grain through local traders. Sell to buyers elsewhere in East Africa with quality standards as well as World Food Program.
Impact	JI reaches 25,000 farmers; farmers report a 100% quality premium offered by JI over local traders
Partners	DFID, U.S. private equity firms including MF Africa Ventures, Agilis Partners, USAID, Food Trade
Assessment	The model delivers impressive results to farmers in a short time. If it is achieving unit profitability it may present a promising way forward for large corporations to source directly from smallholders. However the company's support from donors raises questions about its ability to cover costs and continue to offer generous services to farmers.

Link to website

Till	
Status	Implemented small scale; raising money
Geography	US, operations include Nigeria
Innovation	Cut out the middleman to directly link agricultural sellers with farmers through a mobile and online platform
Source	U.S. businessmen
Model	Supply chain management software that connects brands directly to farmers
Impact	The company projects saving agribusiness sourcing companies 1% of operating costs; social impact to be demonstrated
Partners	Chicago Council, Kirchner Foundation
Assessment	Till will be a valuable tool for growers with significant scale working in high-value export crops, and potentially for smallholders working in niche crops organized into cooperatives. It is unlikely to be helpful to smallholders growing low value food crops like maize due to fungible and low-cost local grain supply and the limited technological access of disaggregated smallholders.

Link to website

Tech 4 Farmers	
Status	Pilot
Geography	Uganda
Innovation	Online marketplace for agricultural commodities facilitated by mobile payments
Source	2 Ugandan students
Model	Offer a trading platforms to connect between warehouses and farmers. The warehouse will be
Impact	Projected to reach 150,000 farmers in Uganda by 2020 (founders' estimation)
Partners	Not clear
Assessment	Early stage, founders report there are many partners committed to the platform and they are confident in their ability to raise money. The team was selected to participate in the Techstars accelerator program so they got good exposure, but their model is not proven yet, unlike the JI and Akorion who already have results in the field.

Link to website

eKutir	
Status	Implemented large scale
Geography	India
Innovation	ICT platform that connect over 200 micro entrepreneurs to high quality agriculture knowledge, inputs and buyers, supporting ovr 50K famers in rural india.
Source	Indian Business men
Model	Micro entrepreneurs are acting as a trusted advisors and as a reliable middleman for farmers to buy high-quality inputs and sell the crops in fair prices.
Impact	Connected over 54K farmers to the eKutir network
Trader role	Micro entrepreneur is substituting the small traders / aggregator. Traders can buy from the micro entrepreneurs.
Partners	Unilever, Grameen-intel
Assessment	Similar to Akorion, this model demonstrates high level of impact with solid model for scale. After couple of years of slow growth, the revenues increased 8 fold. eKutir successfully expanded into retail product distribution and sanitation.

Link to website