Upgrading and allied impacts on contract seafood producers

Bernard F. Monnaie
University of Seychelles, Seychelles
Corresponding authour: bfmonnaie@gmail.com

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Abstract: Upgrading is thought to afford an enterprise better opportunities for improving its business prospects. The purpose of this paper is to analyse the upgrading processes that a small-scale enterprise may undertake - for entering a foreign market, and their associated impacts as a mixed-methods study of small-scale contract fishers of Seychelles inter alia reveal. A model and two assumptions were developed based on the Global Value Chain (GVC) literature and the resourced-based view of the firm, respectively. In the study, data from a structured survey helped assign 36 randomly-selected sole-vessel producers to a Managed Value Chain (MVC) – a chain exhibiting deliberate supply-demand alignment processes, and 34 randomly-selected other producers to an Open-market Value Chain (OVC) – a chain displaying no intentional supply-demand alignment processes. Difference of means tests (t – tests) were subsequently undertaken on 5 months' of production level, capacity and efficiency data of the two independent groups. Four of the highest-producing MVC producers subsequently provided a semi-structured interview on their production-related attributes. The difference of means tests show overwhelming statistical support of a strong impact (at $p < 0.01$) of upgrading on the production capacity and level of its beneficiary, but no support (at $p > 0.10$) for a similar predicted impact on its productivity. The semi-structured interviews inter alia suggest that the MVC producer tends to be an expansion venture of a firm from another economic sector and its productivity is shaped by its directly-controlled as well as marine resources. The firm venturing into fishing tends to upgrade its production process to secure supply contracts from MVC buyers, particularly the exporters, by leveraging access to finance, information and market. Later, for reasons partly linked with governance and environmental sustainability threats, the MVC contract producer downgrades its production process to also target native markets too. While the ensuing multi-chain operations help the contract producer to sustain its viability, they appear to subsequently increase both the supply risk of the MVC buyers and their horizontal competition. A practical recommendation is that a seafood chain can make business gains by strengthening its supply-demand alignment and the environmental sustainability of its exploited resources. The study is the first of its kind in small-scale fisheries in Seychelles, and perhaps in the World, to uncover two characteristic business expansion processes, namely, production process 'scale upgrading' and 'scope upgrading'. In response to opportunities and/or threats, small-scale contract producers tend to combine them to seek economies of scale and/or scope gains through intra/cross chain multi-buyer operations.

Keywords: Barriers of entry; Contract producers; Process upgrading; Seafood chains; Value chains

Introduction

A developing-country small enterprise wishing to thrust into world markets is likely to come under pressure to improve at least its production quantity and, often quality too. Upgrading assumedly fast-tracks such improvements, allows the enterprise to gain access to exporters and is facilitated by the industrial policies of its home country as well as control instruments of its developed-world buyers. Upgrading has indicatively helped a few small-scale firms in Seychelles to thrust into some EU fish markets, through their local intermediaries.

FAO (2010) estimates that fishing firms tend to be small-scale and exploit coastal and inland fish resources. FAO (2014:5) adds that capture fisheries achieved its second highest global production of 93.7 million tonnes in 2011 and the production of fish in the Indian Ocean maintained its long growing trend in 2012. Delgado et al. (2003) further

contend that fish exports from the developing to developed countries annually fetch a net value of US$15 billion, which exceed the value of many other traditional agricultural exports of the developed world.

Partly because of its scale disadvantages, which Harper (1984) suggests are associated with its relatively small and price-sensitive market, the developing-country commodity producer usually undertakes batch/cyclical production runs, each of which experiences variability in sales and production conditions. In addition, the batch production of a highly perishable commodity that cannot be stored for a considerable period carries important wastage risks, which are associated with post-harvest preservation challenges and untimely sales, plus high cash-flow fluctuations - peaking from post-harvest sales and decreasing significantly during production. The producer may reduce such risks by targeting a highly dependable demand, typically nearby its production site. It is perhaps for doing so that the small developing-country enterprise tends to target lower-income customers, as Harper (1984) argues. However, such customers inter alia limit the enterprise's business prospects, which it may improve by more aggressively 'managing its demand' for perhaps targeting higher-income buyers.

The small-scale fresh and frozen fish (FFF) sector is the animal protein source of choice for natives of Seychelles, whose per capita fish consumption is - according to FAO (2016), around 60kg and among the top 10 in the world. However, the sector's production appears to be lagging behind demand. Seventy two per cent of harvesters operate vessels with lower production capacities and tend to trade with lower-income, road-side customers. The remaining 28 per cent of harvesters do not only have higher production capacities but also contribute 61 per cent to the production of the whole sector. In addition, roughly 11 per cent of harvesters having higher production capacities use more sophisticated production systems; tend to have supply contracts with larger buyers, including fish plants, hotels and airline caterers targeting foreign customers, and situate their base nearby the largest local fish buyers, the fish processing-exporting plants. Such institutional buyers tend to manage their fish demand to a higher quantity and standard. Moreover, since early 1980's, the FFF sector has been strongly supported by an increasing array of export-orienting industrial policies, including numerous subsidies to its capital and variable costs, particularly, below-market capital, taxes, fuel and ice; sickness benefits; free-of-charge water and other port facilities, monitoring and surveillance services.

The production of the FFF sector peaked in late 1980s - a few years into its partial export-oriented industrialization, and has since been unsteadily declining. Interestingly, the CEOs of the fish plants contend that the harvest contracts that they have with some of the few larger-capacity producers help to lower their persistent export-grade fish supply risks. Such a contention, set against the higher-returns potential of the targeted foreign markets, help strengthen a hypothesis - often found in the Global Value Chain (GVC) literature, that harvesters that upgrade to trade with foreign customers have better business opportunities than those that do not upgrade and target native customers. This paper analyses the upgrading processes that a small-scale developing-country fish producer may undertake - for supplying foreign markets, and their allied impacts. It overviews the conceptual discussion on upgrading and subsequently discusses some of the results of an empirical study on key upgrading processes in the FFF sector of Seychelles. A comparable investigation has not been traced but in related subjects in other economic sectors, such as in agri-food (Lee et al, 2012) as well as apparel and car manufacturing (Gereffi, 2001).

A commercial product realizes its inherent consumer value, when purchased. Hence, a commercial producer is destined to fail without sales and is consequently pressured to remain focussed on demand. Being typically customer-facing and low on resources, a small-scale enterprise tries to produce what it anticipates will sell-out quickly, a strategy that constrains it to target the right customer need/value. In this sense, while a producer helps link customers with their sought benefits/value, purchasing completes that link. What's more, while consumer value flows from producers to consumers, money – representing the demand/value of a product, flows in the opposite direction. Now, since products are conventionally assumed to flow from left to right, a supplier-customer link is both a *downstream value portal* and *upstream demand/revenue portal*.

Drawing on the arguments of Stokes (1994), such a value-demand portal is otherwise dubbed a 'chain'. By extension, every business is a micro chain as its internal suppliers and customers also engage in value-demand exchanges. In addition, a sequence of independent businesses engaging in value-demand creations and exchanges is also a chain, albeit longer, more geographically-dispersed and complex than a customer-facing enterprise. As a way of highlighting the separate value, demand and supply creation properties of a chain, different schools of thought label it as a 'value chain', 'demand chain' and 'supply chain', respectively.

This paper draws mostly on the value-creation property of a chain. Schmitz (2004) identifies 4 categories of value chains: those that (1) deal with each other in arm's length transactions (2) co-operate and have complementary competences without control over each other; (3) engage in captive or quasi-hierarchical relationships; (4)

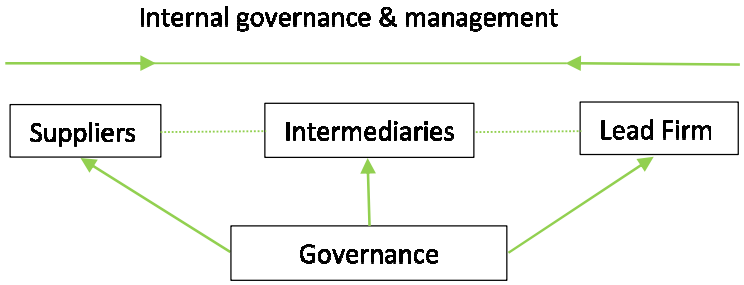
participate in a hierarchy if they are vertically integrated. In this paper, all value chains are viewed as being either managed or open-market, depending on whether they exhibit deliberate supply-demand alignment processes. The participants of a managed value chain (MVC) intentionally collaborate for the purpose of aligning chain supply and demand. By contrast, businesses operating in an open-market chain (OVC) do not deliberately collaborate for matching supply and demand and maintain open relationships, instead. A type of MVC that is the focus of many studies is a Global Value Chain (GVC). It is a value-demand portal involving cross-border suppliers and customers. On the arguments of Gereffi (2001), Humphrey & Schmitz (2001), Van Dijk (2012) reviewed, while many GVC commodity suppliers are in developing countries, their customers tend to be in developed countries. Thus, in such GVCs, value-creation starts in developing countries and demand-creation starts in developed countries. Adding to this, Humphrey and Schmitz (2001) argue that GVC customers may work for, or act on behalf of, major retailers or brand-name companies. Such 'lead firms' insist on decreasing cost, increasing quality and speed. According to Lee et al. (2012), in order to increase their flexibility to source high-volume, low-price, diversified products all year round; facilitate traceability; ensure food safety and quality, lead firms in agri-food GVCs work with a small group, generally large-scale suppliers that have the capacity to meet their stringent and costly requirements. Bourlakis et al. (2004) add that the pressure on the food industry is to inter alia cut lead time and deliver on-time to meet consumer needs better, faster and at less cost and respond to the challenges to quality posed by the distance between suppliers and consumers.

Such processes readily suggest that, the typical GVC targets higher-returns markets requiring more advanced technologies than a small-scale customer-facing enterprise. Moreover, UNIDO (2009) points out that a major hypothesis of the GVC approach is that national development requires linking up with the most significant lead firms in an industry. However, in the arguments of Harper (1984) the developing-country small firm serves the poor, who limits its market, inclining it towards small-scale, labour-intensive, flexible and locally-made technologies. Keesing and Lall (1992) in Humphrey and Schmitz (2001) further add that developing-country producers are expected to meet requirements that frequently do not (yet) apply to their domestic markets. The situation creates a gap between the capabilities for supplying the domestic and export markets, respectively. Thus, parameter setting and enforcement may be required to ensure that products and processes satisfy required standards.

Humphrey and Schmitz (2001) contend that at the heart of the GVC approach is the concept of 'governance', which captures the relationships between chain participants and institutional mechanisms through which the non-market coordination of chain activities takes place. Without governance, a chain would merely be a sequence of market relations. Therefore, governance implies that some chain participants set and/or enforce parameters under which others within it operate. It can be exercised in different ways, and different parts of a chain can be governed in different ways. It becomes particularly essential when a chain starts to source supplies from - particularly developing-country, firms that have little experience in the global economy. The critical parameters for value chain governance are: what is to be produced and how to do so. Lead firms inter alia transmit best practices and provide hands-on advice on how to improve layout, production flows and raise skills.

By implication, a developing-country small enterprise wishing to venture into exports – perhaps by supplying a local GVC intermediary, for example, must substantially improve its production scale and standard. According to Lee et al. (2012), the presence of multiple governance structures and stringent private food standards shape the strategic options available to smallholders, who confront three basic choices: upgrading, downgrading, or exit. Van Dijk (2012) further argues that upgrading in developing countries increases the benefits that they derive from being linked to world markets and that more control allows a country or its companies to earn more money, which facilitates upgrading of these value chains. Furthermore, Van Dijk and Trienekens (2012) contend that successful upgrading mostly requires attention for multiple business aspects, such as combined attention for product and process upgrading or collaborative product upgrading in combination with contractual arrangements. Product and process upgrading are most common in developing-country value chains; functional (value-added) and inter-sectoral upgrading occur less as most developing-country producers are still commodity suppliers for Western value chain partners.

Figure 1 Export-oriented value chain governance and management



For upgrading its production, a developing-country enterprise requires access to not only expansion resources - including growth finance, management expertise and higher level production skills, but also to a higher-yielding market for sustaining its ensuing higher-cost operation. Drawing on the above arguments of particularly Humphrey & Schmitz (2001) and Lee et al. (2012), governance helps facilitate access to such resources. While access to production process design, including layout and flow, appear to be enabled predominantly through intra-chain governance, the institutional environment is instrumental in supporting access to growth finance, human resources, management expertise and the market.

By inference, although GVC demand creation is mostly shaped by the developed world, its value creation is impacted by the developed world as well as market and non-market players in developing countries as Figure 1 illustrates. According to Gereffi (2001), in buyer-producer chains production processes are fashioned by parameters set by retailers and brand-name firms that focus on design and marketing and do not necessarily possess any production facilities. Lee et al. (2012) add that in producer-driven chains the responsibility for potential safety failures lies with the developing-country processors that implement production controls. As such, a GVC is shaped by both national and international market and non-market governance forces, as Figure 1 illustrates. The potential misalignment of those forces provokes resistance (illustrated by the left-to-right arrow) to intra-chain governance & management (represented by the right-to-left arrow). Nonetheless, the arguments of Gereffi (2001) and Lee et al. (2012) compellingly suggest that demand strongly impacts on GVC behaviour. Hence, GVCs tend to not only coordinate higher-returns world markets but also value chains thrusting into them. For example, upgrading is a mechanism that typically helps the developing-country value chain to access world markets primarily through local intermediaries of GVCs.

Upgrading thus serves as a GVC access key for a small-scale enterprise. In order to supply a GVC the enterprise must have the appropriate resources, including infrastructural, natural, human and financial. While basic business infrastructure is typically available as public services - including roads, utility and port networks, access to growth finance and human resources vary widely across countries and may not always be readily accessible. For instance, Harper (1984) argues that unknown profits of the small firm potentially explains why it is unattractive to lending institutions. Therefore, to access capital, the small-scale firm typically requires external assistance, including from both state and non-state organizations. In the views of Van Dijk and Trienekens (2012), upgrading tends to help a developing-country small-scale enterprise to improve either its production process or product range. These different developments have been dubbed process and product upgrading, respectively. While process upgrading helps raise the productivity of production, product upgrading enables the production of a higher value-added product.

Nonetheless, drawing on the arguments of Barney and Hesterly (1999), the production potential of an upgraded small enterprise cannot be assumed to be impacted exclusively by the chain in which it participates. According to the resource-based view of the firm, such a potential may be influenced by unique resources of the enterprise too. Cooney and Malinen (2004) adds that the profile of the firm is a reflection of decisions taken by the entrepreneur. And in the views of North (1994), firms that grow reflect the opportunities offered by the institutional environment, including formal constraints - rules, laws, constitutions, for example, informal constraints - norms of behaviour, conventions, self-imposed codes of conduct, for example, along with their schemes of enforcement.

On the environmental sustainability of the FFF sector in context, Gutierrez (2015) cautions that fish exploitation intensity is not only elevated but there is also a predominance of juveniles in sampled decreasing batch and cumulative outputs. Worse still, on accounting for production monitoring & control challenges, Robinson et al.

(2007) indicate that actual exploitation intensity may be 15-30% higher than recorded. In the views of Van der Elst et al. (2004), such findings are clear indicators of overexploitation and drawing on the arguments of UNEP (2011), those indicators are also linked with state interventions in the FFF chain by way of production subsidies, being instruments of industrial policies. Gutierrez (2015) adds that although fishing activity in the FFF sector has been identified as the main threat to the decreasing production trend, climate change and coastal development may exacerbate impacts. Focussing on the potential negative pressure of pollution on the decreasing production trend, Michel and Sticklor (2012) argue that oceans have become more acidic as a result of absorbing between 25 and 30% of society's cumulative carbon dioxide emissions – since the dawn of the Industrial Revolution.

Drawing on the GVC literature, the small-scale Fresh and Frozen Fish (FFF) sector of Seychelles was conceptualized as comprising two independent value chains: the Managed Value chain (MVC) whose participants - including around 50 harvesters, intentionally cooperate for fish supply-demand alignment purposes and improving allied economic gains plus an Open-market Value Chain (OVC), whose participants – including around 400 suppliers, do not deliberately cooperate but instead maintain mostly open business links. The around 50 MVC suppliers were assumed to enjoy more sophisticated production systems thanks to intra-chain governance, industrial policies governing the MVC and their internal resources. The FFF value chain was thus defined as an inter-firm network comprising businesses exploiting marine fish stocks for both native and foreign consumers and operating in an institutional environment shaped by both national and international governance instruments.

In addition, MVC intra-chain synergizing activities were assumed to be crucial for the small enterprise to upgrade and access foreign markets. On the assumption that MVC exploits commercially productive resources, disadvantages of small-scale fish producers, including their lower production scale and inexperience in foreign markets suggest that those synergizing efforts should be directed at structural improvements, particularly production process upgrading. Now, as the higher-returns MVC sources supply from only upgraded suppliers, in theory they are economically healthier than their OVC counterparts, and the best estimators of their upgrading advantages are their measurable business outcomes. However, upgrading and its associated advantages are likely to be impacted by factors outside the MVC too, including industrial policies and unique resources of the suppliers. For example, production subsidies help reduce the cost of both MVC entry and operation. In addition, all harvesters are de facto not obliged to record their production data, let alone report them to the authorities. Instead, government field technicians undertake daytime evaluations of their landings, 6 days a week, for monitoring productions. Such a resource management scheme is likely to not only elevate exploitation intensity but in practice also eliminates access to potentially informative financial data of the harvesters. Consequently, only variables associated with landings of the suppliers are available for comparison, namely, production capacity, level and efficiency.

The study: objective, question, hypotheses

On the basis of the above discussion, the MVC positively influences upgrading and its associated higher production potential. However, as also discussed, such a hypothetical relationship is likely to be mediated, including by unique resources of the supplier, and also moderated, including by industrial policies. The primary objective of the study was to empirically test the significance of that relationship and shed some light on its key mediating and moderating variables. The question asked was: How does a managed value chain impact the production of its small-scale producers? It called for not only a comparison of testable business outcomes of producers that had and had not upgraded, respectively, but also the attribution of such outcomes to MVC participation and other potential factors. Hence, a quantitative-qualitative investigation was ideal for elucidating the question. Moffatt et al. (2006) argue that, in spite of their paradigmatic divisions, combining such methods in a single investigation is not uncommon in social research. Tornikoski (1999) adds that from the positivist point of view the goal of research is: to search for regularities and test in order to predict and control and, according to subjectivism it is: to describe and explain in order to diagnose and understand.

Three hypotheses guided the quantitative phase of the study. The first was motivated by the potential link between production and its targeted market/demand. Assuming fish resources are productive, the quantity and standard of fish that a supplier produces in theory are strongly impacted by its vessel type. However, drawing on the arguments of Harper (1984), the vessel employed too is equally influenced by the targeted market. Supporting this inference, harvesters with lower-capacity vessels in context tend to be day-trip suppliers of fresh whole fish to lower-income native customers, and those employing higher-capacity vessels tend to be multi-day suppliers of rudimentarily processed and cold-stored fish to higher-income foreign customers in the MVC. As such, participation in the MVC seems to be structurally sustained; in order to supply the MVC, a supplier indicatively upgrades its production process by at least increasing the size of its vessel and associated scale of production. The ensuing first testable hypothesis is: *the output of MVC suppliers is likely to exceed that of their OVC counterparts.* Now, since MVC and

OVC suppliers seemingly use larger-capacity and lower-capacity vessels, respectively, the associated second hypothesis is: *The production capacity of MVC suppliers is likely to surpass that of OVC suppliers.* Another not-so-evident practical difference between the MVC and OVC suppliers is their production objectives. OVC suppliers trade in fresh whole fish. Associated high perishability rate and also buying behaviours limit their sale period to between noon and around 18:00hrs. Both factors help pressure the suppliers to not only restrict their exploitation efforts but timing too - particularly when to start and stop them. After all, the viability of a particular harvest that is landed after its sale period is seriously compromised. However, as MVC suppliers are multi-day operations, their harvesting and landing operations are not as time-bound. They are able to negotiate their landing times with their buyers and continue to harvest until they achieve their full production capacity. Such differences in production objectives compellingly pointed to a third testable hypothesis: *MVC suppliers are likely to have higher individual efficiencies than OVC suppliers*.

The qualitative part of the study helped identify the potential sources of those hypothesized quantitative impacts. Two assumptions helped keep it focussed on production related attributes: the MVC is a market that attracts (1) already higher producing small-scale suppliers (2) small-scale suppliers with an individual higher production potential.

Materials and Methods

The quantitative part of the study required the mapping of supplier-buyer links; sampling comparable groups of small-scale MVC and OVC suppliers and comparing the distribution of their respective production level, capacity and efficiency. Comparability was ensured by selecting single-vessel participants. Only those suppliers whose buyers confirmed contended contractual arrangements were assigned to the MVC. Suppliers targeting the public were assigned to the OVC. Normality was ensured through random selection of study participants. Production level was estimated by the landed kilogram fish weight; production capacity was estimated by the kilogram fish load that a vessel was designed to carry; and efficiency was estimated by the per cent of (landed fish weight)/(production capacity) for the whole period of observation.

The quantitative part tested the nominal variable, the FFF value chain, for a significant mean difference between its independent MVC and OVC subgroups, on three related dependent variables: production level; capacity and efficiency. The 'Nature of demand', i.e., managed versus open-market, was the independent variable. The tested parameter was the difference in the means of the two unrelated populations. As the standard deviations of the dependent variables were not expected to be equal, all three hypotheses were tested using the unequal-variances t-test. The qualitative part of the study involved interviewing the owners of 4 highest producing MVC suppliers, as the quantitative phase revealed. The content analysis technique, as described by Krippendorff (2004), was used to individually analyse the interviews.

On request, the two exporters provided their cumulative list of 50 suppliers. A second list of 50 other suppliers were randomly selected from a database of those licenced to fish in Seychelles. Sorted by their communities, the owners of the suppliers were individually invited by phone to participate in a screening survey. In all, 36 and 34 owners from the first and second list of suppliers, respectively, accepted the invitation. They were subsequently individually interviewed - with confidentiality assurance, on six categorical variables, namely, their harvest disposal – whether/not for sale, harvest landing site, production capacity, point of sale, main buyer, and supplier-buyer link type. If an owner reported supply arrangements with its typical buyers, it was assigned to the MVC, and if not, to the OVC. The second phase of the study was the weighing of landings of the selected firms over 5 months of their peak fishing season, November 2013 through March 2014. The third part of the study involved semi-structured interviews with four MVC participants with the highest recorded outputs.

Descriptive analysis helped assign the 70 selected participants to the MVC (n = 36) and OVC (n = 34). The main procedure for evaluating the production of the OVC suppliers was the weighing of a sample of their individual landed species and subsequent multiplication by the total quantity of each respective specimen. The process was carried out six days a week by trained government field enumerators with the aid of a hand-held spring-balance scale of 25 kg capacity. Landings of the MVC suppliers were weighed by their buyers, with the aid of digital scales having a capacity of up to 3,000 kg.

On completion of the field evaluation, the landings dataset compiled was first cleaned from zero returns. Data collected from an MVC participant that lost its vessel and crew at sea were also eliminated on ethical grounds. The process reduced the independent samples to 34 MVC and 32 OVC harvesters. Table 1 summarises their key characteristics. As illustrated, MVC suppliers tend to trade with the fish plants. OVC fishing firms tend to sell their

produce primarily to the general public. The average production capacity of the few MVC firms trading with different buyers is greater than for those supplying the fish plants. In the OVC too, suppliers targeting fish traders have an average production capacity far exceeding that of firms trading with the general public.

Results

Table 1: Key attributes of investigated fishing firms

Customers	Participants (Nos)		Mean Fish-hold (MT)		Mean Crew Size (Nos)	
	MVC	OVC	MVC	OVC	MVC	OVC
Fish plants	22	0	4,061	0	5	0
Various	7	2	6,029	1,075	7	3
Traders	5	1	1,300	6,000	3	5
Public	0	29	0	1,139	0	3

Independent samples t-tests were subsequently undertaken on the gathered output, capacity and efficiency figures of the two groups. The t-test, at $p < 0.01$, overwhelmingly supported a statistically significant difference in the mean production levels and capacities of the MVC and OVC suppliers. However, at $p = 0.14$, it rejected a statistically significant difference in the mean efficiencies of the two groups.

The content analysis of the subsequent semi-structured interviews uncovered a total of 34 exclusive characteristics of the MVC suppliers, 80% of which were shared. In respect of their personal attributes, all of the owners: were between 20 and 50 years of age; aspired to grow their firm, and contended that they are dedicated to their MVC business. All of the firm owners also reported to have different sources of finance, were encouraged to join the MVC by its insiders and expressed a sense of responsibility to maintain fish supplies to native customers. Most of the firm owners: kept another business in a different economic sector, reportedly highly valued their MVC business and hoped to upscale its production. Half of the firm owners shared ownership of their MVC business with a blood sibling. In the area of business strategy, all of the MVC harvesters reportedly: located their base nearby their main buyers – particularly, the fish plants, adjusted their operations in response to shifts in demand & output; had relatively open-ended supply contracts with particularly the fish plants, tapped into various sources of finance, remunerated their staff on a piece-rate basis and managed their wastage risks by partly trading with OVC customers. Most of the harvesters reportedly: targeted only upmarket fish customers and were servicing a loan. Half of the harvesters: were over five years old and had family origins. About their harvest and staff, all of the MVC suppliers reportedly: experienced seasonal variations of their production; had fluctuating species composition; employed post-harvest preservation facilities; used their sole skipper as operations and oftentimes as sales managers too; had staff who were unskilled, lived off fishing, regularly changed jobs, were casually employed and trained mainly on the job. In terms of their fish capture attributes, all of the MVC suppliers reportedly employed selective fishing technologies. Most of the suppliers had more than 3.9T of average production capacity and exploited various but primarily offshore fishing grounds. Fifty percent of the MVC suppliers used some advanced harvesting technologies, including GPS and fish finding equipment.

Discussion

The quantitative tests indicate that, partly supporting a common hypothesis of the GVC approach, upgrading positively impacts on the production capacity and associated output but not on the efficiency of an MVC supplier. The qualitative analysis suggests that while such positive outcomes of upgrading may be attributed to intra-MVC governance, the efficiency of the supplier is strongly impacted by other factors, particularly those associated with its unique resources and the institutional environment.

The qualitative part of the study compellingly suggest that most of the upgraded suppliers experience similar challenges in the area of human resource management (HRM): their owner-managers are not only outsiders to the MVC but also manage their fishing business on a part-time basis, alongside another business of their own in a different economic sector; plus they employ unskilled and transient workers who circulate around the fishing industry. In addition, upgrading seemingly limits the opportunistic behaviour of an MVC supplier: helping improve

the supplier's production system - in size and technology, to meet the higher quantity and quality attributes of MVC demand; and as the supplier subsequently exploits fairly remote sites – reportedly, some 100 miles from its nearest buyer, its associated higher production cost pressures it to secure MVC production contracts. Nonetheless, the harvester appears to face hostile production conditions: its commercial resources are subject to variable natural factors, including weather, time and depth of exploitation and emerging impacts of human pollution, including climate change; and those resources are also managed by local authorities on an open-access and common-pool basis, a scheme that incentivizes overfishing - whereby harvesters exploit as much as they can, and as Gutierrez (2015) also cautions, is also indicatively decreasing batch and cumulative productions. These conditions do not only tend to apply an upward pressure on the harvester's baseline production wastage risks, including its loss of in-process, in-storage and in-transit harvest but also readily suggest that viability concerns pressure every production run to use a fair amount of iterative and improvised decisions and activities. Hence, those production conditions are likely to not only make up the key inefficiency risk factors of the supplier but subsequently limit its ability to consistently fulfil supply contracts. From this perspective, those production conditions also help explain why the upgraded supplier maintains an open-ended rather than a firm supply contract with its main buyer: the supplier is challenged to guarantee that it will deliver on a production contract and the buyer is equally challenged to guarantee that it will purchase the supplier's whole production. Viability pressures of both the suppliers and buyers help stimulate horizontal competitions in both the MVC and OVC: MVC buyers multi-source supply and the upgraded suppliers multi-source demand for managing their supply and demand risks, respectively. To elaborate, MVC buyers tend to compete with each other for supplies from the few upgraded suppliers that also partially downgrade their production process, or upgrade the scope of their production, in order to compete with independent OVC suppliers for OVC demand. The findings thus suggest that the typical MVC supplier is a multi-chain business that trades with multiple buyers in both the MVC and OVC. On the gathered evidences, in order to target the OVC, the MVC supplier tends to accommodate within its production system some OVC-targeting equipment and less often acquires a stand-alone OVC-targeting production system.

Those results thus suggest that there are at least two business models among MVC suppliers in context. In the first, the enterprise starts out as a lower-capacity operation to supply fresh whole fish to the OVC then diversifies into supplying the MVC. In the second, the firm starts out directly as a higher-capacity operation within the MVC and subsequently diversifies into the OVC. To adopt the first model, the small enterprise acquires a new and more sophisticated offshore-reaching vessel. In order to undertake such process upgrading the firm taps into its own or external growth resources. This is aptly reflected by the contention of an interviewed enterprise owner *"…as it was a huge investment, I teamed up with my brother; we got a loan that was offered by the Europeans and ordered construction of this vessel"*. In order to adopt the second business model, in some cases, the firm makes relatively minor adjustments to its operation, including vessel or fishing gears, or acquires a smaller vessel that is capable of capturing bottom-dwelling species as another enterprise owner contends *"….then we also go out fishing with a smaller boat"*. Interestingly, finding OVC buyers in these cases is reportedly not challenging as yet another interviewed firm owner argues: *"….there's always a demand for fish"*. Hence, it appears that the MVC supplier occasionally switches to its in-built OVC-targeting operation, particularly when the foreign fish demand that it principally targets is either weak or impossible to supply. However, the switch arguably helps raise the returns of the supplier but not its efficiency, which stays sub-optimal - owing partly to the inherent constraints of using a production system designed for exploiting offshore species, targeted by the MVC, for harvesting near-coastal species for the OVC. This is fittingly reflected by another common contention made. For example, when asked about the availability of fish around the coast, an interviewed firm owner replied: *"There are, but it's a bit difficult to catch due to the large size of the boat"*

It may be clear that the first business model is one where a relatively labour-intensive OVC fishing firm expands into a relatively sophisticated market segment, the MVC. Hence, the supplier only partially upgrades its production process. The second business model is one where a relatively less labour-intensive MVC supplier expands into the OVC - a less sophisticated market segment, for which it partially downgrades its production process. Whether or not the firm splits up into two branches depends on the sales volume that it targets for its MVC & OVC segments, respectively. On the one hand, if an OVC enterprise intends to target a relatively large buyer nearby its base, like a village restaurant or hotel, it may partially upgrade its production process by acquiring some basic preservation equipment - like an ice-box, degutting tools and other appropriate gears. As an interviewed firm owner reveals, this way it can occasionally sell its rudimentarily-processed produce to the institutional buyer while routinely selling cheaper fresh whole fish to roadside impulsive buyers. However, if the fishing enterprise intends to target a larger OVC customer base it may replicate its business model by acquiring another OVC-targeting vessel of a desired production capacity. If the enterprise intends to target a larger MVC buyer, like the exporters, it has no alternative

but to acquire a separate, more sophisticated vessel. In the latter case, the small enterprise tends to retain its OVC-dedicated operation and invests in a new MVC-dedicated production system. On the other hand, much like in the above scenario, if an MVC fishing firm intends to target a relatively small OVC segment, it may acquire a vessel that it can accommodate into its larger one and equip it for this purpose. However, if it intends to target another MVC buyer, like the exporter or a sizeable OVC segment it has to acquire a dedicated vessel in both cases.

Gathered evidences suggest that the predominant business expansion strategy in context is partial downgrading or upgrading of its production scope by an MVC supplier - in response to its viability threats - so as to supply the OVC. Arguably, the strategy faces practical and efficiency limitations. Drawing on the contention of an enterprise owner that *"….we can't finish selling the quantity of fish we carry on the local market….."* it is evident that if an MVC supplier enriches its harvest by accommodating an OVC operation into its vessel, both operations have to share the same fish-hold, designed for MVC production. By implication, the firm has to inter alia reduce the quantity of fish that it supplies to the MVC but perhaps more importantly, it has to restrict the quantity of fish that it harvests for the OVC, owing to associated lower demand. Hence, partial downgrading automatically reduces the fish-hold utilization of the MVC supplier. Nonetheless, the relatively larger vessel of the MVC supplier is unable to land its catch nearby the vast majority of OVC roadside fish markets – along the coast. Such a physical barrier of access to OVC buyers pressures the MVC supplier to target mostly the central and usually higher-yielding fish market, which is accessible to all local fishing firms. The two business expansion pathways, both lead to an OVC-serving and more labour-intensive operation running alongside a less labour-intensive MVC-dedicated operation. The pathways thus highlight the apparent central role of native fish demand on all harvesters. Even as it upgrades to supply the MVC, an OVC harvester keeps trading with native consumers. Firms that upgrade to thrust directly into the MVC too eventually venture into an OVC operation. Such behaviours draw attention to apparent characteristic upgrading processes in the chain context. They are (a) intra-chain production scale upgrading, whereby a firm acquires a new production system to increase the production volume for its existing market (MVC or OVC); (b) cross-chain production scope upgrading, whereby a firm modifies its existing production system to increase its product range for targeting different markets (MVC and OVC) and (c) cross-chain production scale upgrading, whereby the firm acquires a new production system to increase the production volume for its different markets (MVC and OVC).

The results of the study thus suggest that an MVC supplier is a small enterprise that upgrades its production capacity by leveraging access to MVC demand and business expansion resources – including its profit ambition and growth finance, and that its allied improved production capacity helps raise its output. Those findings readily support both the hypothesis that upgrading positively impacts on the business prospects of a small enterprise and also strengthen the assumption that the MVC attracts a small enterprise with a higher-production potential. Other factors, especially the enterprise's unique resources and the institutional environment assumedly conspire against its efficiency. They include its weak business leadership, unskilled labour, high labour turnover and lastly, production subsidies & climate change that have been associated with indicatively-increasing scarcity of fish stocks. Therefore, the MVC supplier seemingly faces important strategic, HR and operations management challenges. In particular, it appears to experience serious inefficiency risks in all micro-stages of its production. At its input, value-adding and output stages, respectively, those risks are: HR challenges, relatively high baseline wastage - linked with inaccessibility and indicatively-declining productivity of fish, and quasi-independent MVC demand. The findings thus indicate that the MVC effectively impacts more strongly on the long-term, not-easily-changed structural attributes of its small suppliers, namely, their size and technology of production.

Conclusion

Upgrading arguably increases the foreign-market entry opportunities of a developing-country small enterprise. As commodity markets seem to be increasingly dominated by GVCs sourcing supplies from developing-country small-scale enterprises, for customers in developed countries, the transfer by a lead firm, and adoption by these enterprises, of export-orienting production systems tend to not only help upgrade their value-creation process but to also link them up with higher-returns demand.

Tested evidences all suggest that in order to link up with the MVC, a small-scale enterprise upgrades its production process. The single most important factor that initially drives upgrading is purportedly the higher-economic potential of the MVC. The strategies of choice for participating in the MVC tend to be inter-sectorial production scale upgrading and subsequent upgrading of the scope of production. Typical MVC suppliers are expansion ventures of firms from other economic sectors and, in subsequent response to viability threats in the MVC, they partially downgrade their production process to target the OVC too. Arguably, the key viability threats of the upgraded supplier are associated with the precariousness of its production and MVC sales. Those threats seemingly pressure

both the suppliers and buyers in the MVC to settle for indeterminate production orders, which allow both considerable leeway in managing their demand and supply risks, respectively. Those dynamics help stimulate horizontal competitions in both the MVC and OVC. Reportedly, buyers multi-source supply from different MVC producers and producers multi-source demand from buyers in both the MVC and OVC.

However, such higher-level specialization by a small producer reportedly increases its viability risk especially if the accessibility and productivity of its exploited resources are relatively poor and the demand for its quasi-customized higher-standard produce is volatile. As a way of keeping up its efficiency in its relatively highly hostile business environment, the upgraded small producer tends to diversify its operations and multi-chains, thus transforming itself into a more agile firm. In the MVC context, mechanisms that allow the supplier to multi-chain appear to be upgrading of the scale and scope of production, through which the firm combines production systems for exploiting a variety of produce, for MVC and OVC buyers. However, barriers of OVC entry, particularly poor accessibility and profit potential of its segments, prevent the economically stronger OVC-targeting branch of upgraded suppliers from completely muscling out the independent lower-resource OVC enterprises and monopolising both the native and foreign markets.

Among other things, such dynamics shed light on the potential impact of strong structural integration in the MVC context on 'value' and 'demand' creations. Indeed, as the demand-creator, the lead firm appears to be instrumental in predominantly fashioning the production capacity of the small enterprise - in size and technology, allowing it to upgrade its value-creation process. However, other forces, including supplier unique resources and the institutional environment, seemingly undermine the process, increasing the supply risk of the MVC and viability risk of its suppliers. Arguably, as a way of managing its viability risk, the small enterprise multi-chains by upgrading both the scale and scope of its production. Hence, the study suggests that a small upgraded supplier is a predominantly homogenous impact of its targeted MVC - in partial agreement with a hypothesis often found in the GVC literature - but also a heterogeneous impact of non-market forces, within the institutional environment – as the resource-based view of the firm predicts.

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