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The Blue Revolution in Asia: Upgrading and Governance in Aquaculture Value Chains

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Summary. — In this article, we examine the upgrading trajectories of selected aquaculture value chains in four Asian countries and the links between upgrading and three factors of value chain governance: coordination mechanisms; types of drivers; and domestic regulation. We find instances of improving products, processes, and value chain coordination—while "moving up" the value chain is rare. We also find that the type of value chain driver and the quality of the domestic regulatory framework are main facilitators of upgrading. We conclude by highlighting lessons on the potential, limits and risks of upgrading the "blue revolution" in Asia.

Key words — upgrading, governance, global value chains, aquaculture, Asia

1. INTRODUCTION

Global value chain (GVC) analysis is an analytical tool that has been widely used, especially in the past decade, to explain the dynamics of economic globalization and international trade. It is based on examining discrete "value chains" that are explicitly governed, to different degrees, by one or more groups of "lead firms". Value chains represent the full range of value-adding activities that firms, farmers and workers carry out to bring a product from its conception to its end use and beyond. In development studies, GVC analysis has been employed to understand the wide variation of benefits accruing from participation in different value chains and end markets. Overall, this literature suggests that while participation in GVCs can offer handsome rewards, these may come at a high cost in terms of increased risk and greater vulnerability. Two analytical issues have attracted particular attention in development studies-oriented GVC analysis: how upgrading takes place along GVCs; and what types of GVC governance are more likely to facilitate successful upgrading.

In GVC analysis, the term *upgrading* has been used to highlight paths for developing country producers to "move up the value chain". The upgrading process is examined through the lenses of how knowledge and information flow within value chains from lead firms to their suppliers (or buyers) (Gereffi, 1999; Gibbon & Ponte, 2005), sometimes in combination with horizontal interactions in clusters (Giuliani, Pietrobelli, & Rabellotti, 2005; Humphrey & Schmitz, 2002, 2004; Murphy, 2007). A recent literature has also been exploring the interactions between economic and social upgrading (Barrientos, Gereffi, & Rossi, 2011; Rossi, 2013) and between economic and environmental upgrading (De Marchi, De Maria, & Ponte, 2013). Due to space limitations, we will focus on economic upgrading in this article.

The concept of *governance* in GVC analysis is based on the observation that value chains are rarely coordinated spontaneously through market exchange (Gereffi, Humphrey, & Sturgeon, 2005; Gibbon, Bair, & Ponte, 2008; Ponte & Sturgeon, 2014). Instead, they are governed as a result of strategies and decision-making by specific actors, usually large firms that manage access to final markets, but also at regional and national/local levels. GVC governance analysis highlights the practices and organizational forms through which a specific division of labor between lead firms and other actors arises and is managed. So far, GVC analysis has focused mainly on governance mechanisms internal to the value chain, treating the institutional framework (including state regulation) within which these value chains operate as "background". In this article, we continue a focus on internal governance mechanisms and how they relate to upgrading trajectories. At the same time, we also highlight the role that regulation and public sector support can play in facilitating upgrading. In separate work (Jespersen, Kelling, Ponte, & Kruijssen, 2013), we examine a wider set of institutional framework actors and factors [1] and how they interact with value chain governance.

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In the rest of this article, we analyze selected aquaculture value chains originating in Bangladesh, China, Thailand, and Vietnam and terminating in the EU. Aquaculture is one of the fastest growing agro-food sectors globally – a phenomenon often referred to as "the Blue Revolution", following an eponymous article in The Economist (August 9–15, 2003).[2] The four selected Asian countries are among the top ten world producers. The EU, together with the US and Japan, is a top import destination. In Section 2, we expand the discussion on upgrading and governance, laying out our analytical approach. In Sections 3 and 4, we provide some background analysis of aquaculture and discuss our methodology. In Section 5, we examine the upgrading trajectories we observed in aquaculture value chains for the selected countries and species. In Section 6, we examine what aspects of GVC governance can help explain these upgrading trajectories—including types of predominant coordination mechanisms, and types of lead firms and related levels of driving. In Section 7, we reflect on the role of domestic regulation and public sector support in promoting upgrading, before turning to a set of conclusions in Section 8.

2. UPGRADING AND GOVERNANCE

The GVC literature has developed a well-known classification of (economic) upgrading based on four categories (Humphrey & Schmitz, 2002; Schmitz, 2006): (1) *product upgrading*: moving into more sophisticated products with increased unit value; (2) *process upgrading*: achieving a more efficient transformation of inputs into outputs through the reorganization of productive activities; (3) *functional upgrading*: acquiring new functions (or abandoning old ones) that increase the skill content of activities; and (4) *inter-chain upgrading*: applying competences acquired in one function of a chain and using them in a different sector/chain.

Initially, GVC scholars expected that developing country firms would follow a "high road" to upgrading, one eventually leading to performing functions in a value chain that have more skill and knowledge content (functional upgrading) (Gereffi, 1999). But much of the more recent literature has highlighted a more complex set of upgrading (and downgrading) trajectories (Cattaneo, Gereffi, Miroudot, & Taglioni, 2013; Gibbon, 2001; Gibbon & Ponte, 2005; Giuliani *et al.*, 2005; Mitchell & Coles, 2011; Ponte & Ewert, 2009; Schmitz, 2006).

In order to provide more nuance to the established upgrading trajectories, our analysis in this article is based on two points of departure: (1) analyses of *product upgrading* should include effects on product quality that do not necessarily lead to higher value added; conversely, there may be strategies related to the product itself (forward contracts, volume premia) that can have beneficial effects without changing anything in the nature of the product itself; and (2) *process upgrading* needs to include "improved" practices that do not necessarily make processes more "efficient", but that can allow developing country players to improve their position in value chains or even just maintain it in periods of restructuring. These include: matching strict logistics and lead times (time-to-market), delivering supplies reliably and homogeneously time after time (a major challenge in agro-food products), being able to supply large volumes (improving economies of scale), being able to supply a variety of qualities (improving the economies of scope), and complying with environmental management, food safety and sustainability standards.

As a result of these reflections, in this article (see Section 5) we examine upgrading trajectories in two broad categories (see also Bolwig, Ponte, du Toit, Riisgaard, & Halberg, 2010):

(a) *Improve product, process, volume, and/or variety (in the same value chain node)*

This group of trajectories is about "doing things better or bigger" through improvements in technology and/or management. It can include "defensive" strategies devised to retain an established position in the chain, such as responding to lower prices through cost reductions. Combining strategies related to process, product, volume, and/or variety (of both products and end-markets) can be mutually reinforcing—for example, increasing volume may enable investment in processing equipment needed to raise quality.

(b) *Change and/or add functions (up- or down-stream; in several nodes)*

This group includes the more "traditional" trajectory of functional upgrading, but can also be carried out through taking on a new function in the value chain that is considered of lower value added, whether it is upstream or downstream from where they operated originally. It also includes instances where actors decide to abandon one function in order to focus on a new one, instead of incorporating the two functions through vertical integration.

But what can explain different trajectories of upgrading? The existing literature has highlighted the links between different forms of GVC governance and the possibilities for upgrading, particularly functional upgrading. Much of the discussion has been focused on linking various forms of coordination along a value chain, or at least the dominant forms in key nodes of the value chain, and upgrading trajectories. The forms of coordination are generally those developed by Gereffi *et al.* (2005), also building on previous work (Humphrey & Schmitz, 2004; Schmitz, 2006). Five forms of coordination are commonly distinguished in the literature, which arise from a matrix of three independent variables: the complexity of the information and knowledge required to carry out an exchange; the ability to codify and transmit such information between buyer and seller; and the level of capability in the supply base in relation to the requirements of the transaction. Gereffi *et al.*'s (2005) matrix provides five possible forms of coordination: (1) *Market*: low informational complexity, ease of codification of information, and high supplier capabilities; (2) *Modular*: high informational complexity, ease of codification and high supplier capabilities; (3) *Relational*: high informational complexity, low ability to codify information, and high supplier capabilities; (4) *Captive*: high informational complexity and ease of codification but low supplier capabilities; and (5) *Hierarchy*: high informational complexity, difficulty of codification and low capabilities among independent suppliers.

The literature linking upgrading to specific forms of coordination suggests that in chains characterized by captive relationships (elsewhere also characterized as "quasi-hierarchical"; Humphrey & Schmitz, 2004), significant product and process upgrading by "local producers" takes place, often with an active engagement from buyers. At the same time, in captive relations, functional upgrading is either discouraged or limited to some functions but not others (Bair & Gereffi, 2001; Gibbon, 2001; Gibbon, 2008; Giuliani *et al.*, 2005; Mitchell & Coles, 2011; Schmitz, 2006; Schmitz & Knorriga, 2000). Thus, the "high road" to upgrading, when followed at all, is only partial and its rewards are either unevenly distributed or have a limited timeframe (see Bair & Gereffi, 2003; for an exception, see Tokatli, 2007). In chains characterized by market transactions, functional upgrading is more likely to