What shapes food value chains? Lessons from aquaculture in Asia

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A B S T R A C T

In this article, we explain what shapes food value chains through the analysis of selected aquaculture industries in four key Asian producing countries. Worldwide production of aquatic resources has grown rapidly in the past few decades, and aquaculture production in Asia has played a decisive role in this growth. We examine the main forms of coordination found along these value chains and the role that institutional frameworks play in governing them. We observe that negative publicity, driven by NGO and media campaigns, has led to increased use of third-party certification and the adoption of public and private standards. We find that the most sophisticated aquaculture operations in Asia are found in value chains led by retailers and branded processors and where the quality of domestic institutional frameworks has facilitated compliance with increasing demands from buyers overseas. Finally, we reflect on the sustainability challenges of aquaculture and provide four broad observations on the governance of food value chains.

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Introduction

Seafood is one of the most internationally traded food commodities (Tveterås et al., 2012) and worldwide production of aquatic resources (excluding aquatic plants) has grown rapidly in the past few decades – from 141 to 158 million tonnes between 2007 and 2012 alone (FAO, 2014a). However, only about 3% of this growth can be attributed to growth in capture fisheries, while the aquaculture sector has continued to grow at an average annual rate of over 6% in the same period (FAO, 2014a). The contribution of aquaculture to total fish production has increased from only 13.4% in 1990, to 25.7% in 2000, and to 42.2% in 2012 (FAO, 2014a). China has remained the top producer in the aquaculture sector in this period (with 62% of the total), while the share of production of other Asian countries has grown from 21% in 2000 to 27% in 2012 (FAO, 2014a). Trade in aquatic resources has also grown significantly, with global exports increasing at an average annual rate of 8.3% per annum in terms of value (FAO, 2014a). About 39% of the value of world exports (or 50.4 billion USD) originated from Asian countries in 2011, more than doubling in value from 2002 (FAO, 2014b). Historically, the main importers of seafood have been the US, Japan, EU, and China. However growth in imports has been more rapid in China and the EU than in the US and Japan between 2002 and 2012 (FAO, 2014a).

This rise in aquaculture production has increased the attention for the environmental and social impacts in producing countries (e.g. Barrett, 2002; Naylor et al., 2000; Páez-Osuna, 2001; Stonich et al., 1997), as well as food safety aspects for consumers in importing countries (e.g. Bagumire et al., 2009; Sapkota et al., 2008). This has been accompanied by a proliferation in mandatory and voluntary standards and third-party certification schemes regarding both food safety and sustainability aspects in the value chain (Ponte, 2007; Washington and Ababouch, 2011).

In this article, we examine what shapes food value chains through the analysis of selected aquaculture industries in four key Asian countries (shrimp/prawn in Bangladesh, tilapia in China, shrimp in Thailand, and pangasius in Vietnam). Asia is the world's leading aquaculture production region (Asche et al., 2009) and these four countries belong to the top ten aquaculture producers worldwide in terms of volume (with China producing 41.1 million tonnes, Vietnam 3.1 million, Bangladesh 1.7 million and Thailand 1.2 million tonnes; 2012 figures; FAO, 2014a). Together, they represent more than half of total seafood exports from Asia and 20% of world exports (2011 figure; FAO, 2014b). Shrimp was among the first farmed species to be traded internationally, while exports of white fish species, especially tilapia and pangasius, have grown rapidly more recently (Asche et al., 2009). These four countries play a predominant role in production and trade of the species

selected for this study: 41% of the volume of globally traded shrimp and prawn originates from these four countries, with Thailand as the largest exporter; China dominates the international market for tilapia, supplying 82% of world exports; and Vietnam dominates the international pangasius market, with a 91% share (2011 data; FAO, 2014b).

We examine these aquaculture industries through the lenses of Global Value Chain (GVC) analysis, focusing in particular on institutional frameworks and value chain governance. The concept of governance in GVC analysis is based on the observation that value chains are rarely coordinated spontaneously through market exchange (Gereffi et al., 2005; Gibbon et al., 2008). Instead, they are shaped 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. The relevance of governance to GVC analysis is that it highlights the concrete practices and organisational forms through which a specific division of labour between lead firms and other actors arise and is managed. 'Lead firms' are groups of firms that operate at particular functional positions along the chain and that are able to shape who does what along the chain, at what price, using what standards, to which specifications, and delivering at what time. Much of the GVC literature has focused mainly on governance mechanisms that are carried out by internal value chain players – those dealing with the production, processing, trade and retail of products. In other words, much attention has been paid to the governance features shaped by 'lead firms' and other internal value chain actors. Many GVC studies have also included a thorough examination of institutional framework factors and actors, such as domestic and international regulation and the role of 'external actors' – those who can be influential but do not handle the product itself, such as NGOs and standards setters – in shaping value chains (see among others, Gibbon and Ponte, 2005; Nadvi, 2008; Neilson and Pritchard, 2009; on aquaculture, see Islam, 2008; Tran et al., 2013). But most studies have treated institutional factors as a 'frame' within which internal governance mechanisms are then examined in detail.

In this article, we seek to explain what shapes aquaculture value chains by integrating governance and institutional framework in our analysis, and by highlighting their mutual influence and collective impact. We examine value chain-relevant regulation (national, international and regional; and standards set by public authorities, usually referred to as technical regulations), media pressure and private standards (voluntary standards set by industry associations, NGOs and multi-stakeholder initiatives) and certification systems on food safety, 'Good Aquaculture Practices' (GAPs), social conditions of production and environmental sustainability – and related actors. This implies examining complex networks and interactions between business, civil society and the state – including not only internal value chain operators as agents of governance but also industry associations, lobbies, farmer associations, certifiers, multi-stakeholder initiatives, NGOs, social movements, expert communities, etc. (for recent contributions to these debates in specific relation to aquaculture, see Konefal and Hatanaka, 2011; Hatanaka, 2010, 2013; Pham et al., 2011; Tran et al., 2013).

A limitation of our approach is that we focus on value-chain-specific institutional factors and actors, which means that we do not explicitly address wider institutional and regulatory features (such as taxation and foreign investment regimes, management of public infrastructure, or exchange rate and other macroeconomic policies) that may also indirectly shape aquaculture value chains.

In the rest of this article, we first highlight our integrated approach to the analysis of institutional frameworks and GVC governance, followed by a short discussion of research methods. In the following two sections, we provide a summary of results presented in detail elsewhere in Working Paper format (Jespersen et al., 2013) on the institutional frameworks and governance features of the selected aquaculture value chains. In the last section, we highlight the common features emerging from the case studies and provide some concluding remarks.

Institutional frameworks and value chain governance

In a recent programmatic article, Ponte and Sturgeon (2014) called for an integrative approach to GVC governance that brings together various strands of analytical developments that took place in the literature in the past 20 years. They provided a modular framework on GVC governance at three scalar levels: a micro-level dedicated to understanding how linkages (or forms of coordination) and conventions are forged at individual nodes of the value chain; a meso-level to assess how easily mechanisms of exchange at one node 'travel' up- and down-stream in the value chain; and a macro-level dedicated to understanding how governance is shaped at the level of 'whole chain'. Due to space limitations, in this article we focus on the micro-level forms of coordination at various value chain nodes and the macro-level of 'whole-chain' governance. We also integrate the role of institutional framework factors and actors. This way, we can determine the key features of GVC governance (polarity, identity of key drivers and degree of driving) in a holistic manner.

In order to apply this framework, we take three steps. In a *first step* we identify the prevalent forms of coordination at various nodes in the value chain. To do this, we follow the well-known analytical framework developed by Gereffi et al. (2005), which builds on previous work by Humphrey and Schmitz (2004a, 2004b). This entails the identification of five possible forms of coordination (market, modular, relational, captive and hierarchy) that arise from the combination of three independent variables: the complexity of the information and knowledge required to sustain a particular transaction; the ability to codify and transmit efficiently this information between the parties; and the capabilities of the supply base in relation to the requirements of the transaction. *Market* coordination refers to spot or repeated exchange; *modular* coordination usually involves more specialized suppliers who finance part of production on the part of their buyer, but whose technology is sufficiently generic to allow its use by a broad customer base; *relational* coordination involves multiple interdependencies, often based on close social ties; *captive* coordination usually involves one-way dependency of suppliers, high levels of supplier monitoring and high costs of switching for suppliers; and *hierarchy* denotes vertical integration (Gereffi et al., 2005).

In a *second step* we identify the main institutional actors and factors, how they interact with each other, and how they contribute to shaping the specific value chains under consideration. Aquaculture value chain governance is shaped by regulation at multiple territorial levels: international, regional and by bilateral trade agreements covering tariffs and non-tariff measures. Examples include mandatory sanitary and phytosanitary standards and technical specifications covered by World Trade Organization agreements, national regulation determining food safety, a variety of social and environmental standards, industrial policy restricting or facilitating investment, tax regimes, and licensing requirements. We focus on key institutional framework factors and actors that specifically affect aquaculture value chains in the four selected countries, rather than covering all the possible institutional elements that may contribute in shaping value chains. For example, rather than examining the role played by import country regulation in general, we focus on specific issues, such as US import alerts and anti-dumping tariffs (which affected exports of tilapia and pangasius from China and Vietnam); rather than examining the