Chapter 10
Intermediates of Open Innovation in the Aquaculture Industry: A Glimpse at Knowledge Transfer and Trends

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ABSTRACT

Aquaculture appears to be the most adequate and logical way to suit the protein production problem. Basically, because unlike fisheries that are highly unpredictable, aquaculture rearing is based upon production protocols. This chapter developed an argument supporting the above rationale. As it stands, the evidence suggests that with the current use of information technology, it becomes a common practice to exchange aquaculture knowledge between firms, research bodies, or non-governmental organizations. The interaction between the whole set of stakeholders, where a broad range of know-how and intermediate products and services are developed, generates innovation. Sharing know-how creates open innovation. Open innovation, by its turn, seeks efficiency and generates more sustainable production processes. The way knowledge transfer is delivered and its trends are dependent upon dimensions such as economic, social, and cultural factors.

INTRODUCTION

Knowledge and technology are always improving. Capturing value from an early stage of technology is a key feature to have a successful business model (Chesbrough & Rosenbloom, 2002). The use of technology and its improvement through innovations add knowledge to society (Chesbrough, 2006). Thus, most

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of the times, in order to reach innovations is necessary some cooperation between two or more partners (Pries & Janszen, 1995). Innovations are triggered by human needs to refine daily use of products (either objects or foodstuff) and services (Dawson & Daniel, 2010). However, some firms in certain sectors of activity are not so prone to innovation and stand more in a conservative position having difficulties in the refinement of products. Thus, when they finally open up their search for new ideas, usually they'll find a positive effect in their performance results (Herstad *et al.*, 2010). Open innovation is in a broad sense an open share of ideas, facilitated by the information technology, in order to promote the development of goods and services (Chesbrough *et al.*, 2006). West *et al.* (2014) highlight that there are several trends in the future for open innovation. A specific aspect related to open innovation is user innovation. User innovation comes from the intermediate users (e.g. user firms) or by the demand side (consumer users). Many products and services are developed or refined by final users. Products and services aim to be developed in order to match as many as possible user needs. When given consumers are not satisfied with a certain product or service, they seek alternatives, or in the case of alternative absence, users tend to develop their own products and services (Bergvall-Kåreborn *et al.*, 2014).

In order to get a final good, the inclusion of intermediates in the production process is most of the times deemed as necessary. This happens because is important to employ some machinery developed elsewhere, or to use certain raw materials mined or harvested in another place, as well as co-products and sub-products in order to transform the whole components used in the production process into a final good (Kasahara & Rodrigue, 2008). As described by Johnson and Noguera (2012) the use of intermediate inputs in the production process reaches around two-thirds of the whole international trade.

By its turn, knowledge transfer seeks to create, select, manage or distribute knowledge among users not only at present time, but also for future users (Shankar *et al.*, 2013). Because knowledge can be found in the different people involved in processes and even the tools to carry out such processes, most of the times important knowledge is adaptable or even tacit (Rubenstein-Montano *et al.*, 2001). Despite the availability of high technology, transfer of knowledge is sometimes difficult even inside the firm due to laborious, resistance and time-consuming processes. As a result, is important to incorporate difficulty in the analysis of knowledge transfer, recognizing that a transfer is not an act, but a process (Szulanski, 2000). Argote and Ingram (2000) have studied that there are specific processes of knowledge transfer and factors that facilitate or obstruct transfer. There are also conditions where knowledge transfer modifies positively organizational performance and premises, eventually allowing competitive advantage for organizations (Argote &Fahrenkopf, 2016).

In the case of seafood or fresh water species production, it has been told to the consumer to increase fish consumption for better health and healthy aging (Mitchell, 2011). This fact may trigger an increase in seafood (or fresh water species) consumption due to the omega-3 fatty acids. Consequently, since this information has been in the public domain, some fish species such as salmon and mackerel became highly sought. The provenience of seafood such as the fish species above referred may differ. They either come from the wild fisheries or from aquaculture rearing. In brief, a*quaculture rearing can be defined* as husbandry methods used in the cultivation of living organisms, with particular incidence of fish, shellfish or seaweed, in natural or more controlled environments either in fresh, brackish or marine waters.

It is basically consensual that wild fisheries have reached the limits in terms of catches (Caddy and Cochrane, 2001), so aquaculture seems the plausible alternative to occupy the space left by an increasing demand for seafood. By its turn, the consumer is looking for either the traditional species (i.e., the ones locally consumed), or the most well-known ones (which are eventually those better-marketed worldwide) (Laroche *et al.*, 2001). Other aspect that attracts the consumer to select seafood items is based on the