Part II
Knowledge Management and Intellectual Property Issues in Aquaculture

Introduction

Proponents of aquaculture sometimes jokingly contrast images of ‘fish farmers’ with the ‘fish killers’ of the capture fisheries, insinuating that aquaculture is more orderly and civilized than traditional fishing. One particular point of pride among fish farmers is the extent to which their enterprise is scientifically and technologically knowledge-intensive. This is not, many will hasten to say, to deny the knowledge of fishers, but to identify its proper place as the local or traditional knowledge of the hunter/gatherer who follows and understands a process, yet falls short of using knowledge to manipulate an entire process in the way fish farmers do. Aquaculture’s reliance on a scientific and technological knowledge-base is underscored by the interactions fish farmers have with research councils and university laboratories, from joint work to understand the physiology of aquaculture species to collaboration in understanding and breeding for desirable traits. Given aquaculture’s reliance on a range of scientific and technological practices which change constantly as competition drives innovation, aquaculture might be expected to rely on associated commercial practices including use of intellectual property rights to protect the knowledge which enables intensive aquaculture production. Here we arrive at this section’s motivating question: Does success in aquaculture involve extensive use of intellectual property rights?

Performing a search for ‘aquaculture’ in all fields for patent applications and patents granted on the United States Patent and Trademark Office (USPTO) website is suggestive about the importance of patenting in aquaculture. Since 1790, the search yields 1273 patents granted, 1261 of which were granted since 1976. From 2001 until the time of writing, 1205 applications searchable for ‘aquaculture’ were filed. Searching with terms arguably restricted to the context of aquaculture is also possible. ‘Finfish’ produced 59 hits for patents granted since 1976, and 63 applications since 2001; ‘netpen’ 13 and 15 hits respectively, ‘sea lice’ 18 and 14 hits respectively. To put these numbers in perspective, from 1976 to 2006, an average of 113,827 patents were granted by the USPTO each year, an average which swells in the period 2001–2006 to 181,798 patents granted per year (USPTO 2007). As for patent applications, from 1976 to 2005, 202,245 applications were filed with the USPTO, a number which again swells from 2001 to 2005 to 373,583.
Quick patent searches are not methodologically robust, and only severely limit conclusions can be reasonably drawn from the results. Nevertheless, aquaculture does not appear to be a patent-intensive field. Compare, for example searching for ‘canola,’ which generates 4338 hits for patents granted since 1976 and 5190 hits for 2001–2005 patent applications. The patent gap between aquaculture and agriculture is even more striking when considered in light of aquaculture’s tremendous growth. According to the Food and Agriculture Organization of the United Nations, aquaculture of food fish and aquatic plants increased in production 6.9% in quantity and 7.7% in value from 2002 to 2004, with a total value of US $70.3 billion in 2004 (FAO 2006). Truly impressive worldwide growth of a technology-intensive field is associated with very little patenting activity. What explains this surprising situation?

The context for this question is the broadly held view that patents and innovative activity go hand-in-hand. The idea is an old one. Patents provide limited-term, monopoly-like rights to inventors, thereby rewarding them for their efforts and risk-taking behaviour while enabling public disclosure of the invention for further use and development. The incentive-access paradigm, as this is known, is thought to fuel innovative activity because the patent system becomes a de facto incentive system. There are well-known problems with this view. Patents are sometimes used defensively to block innovation, and some believe they create resource anti-commons (Heller and Eisenberg 1998). Patents might just be outputs, not inputs that stimulate innovation. In this respect they would be similar to publications or commercializable products – tradeable, but not in themselves equivalent to money. Given, then, the incentive-access paradigm with its caveats, what can be said of aquaculture if patenting activity is generally low, but there is innovation-fueled growth worldwide?

The answer is ‘intangible assets,’ not patents, according to Keith Culver. Patents have long been over-used and abused as direct measures of innovation. States have become accustomed to relying on few measures other than patents counts to evaluate the return on investment from research and development (R&D) expenditure. Activity-based program evaluation by program funders does not get at the real goal of aquaculture R&D, which is to generate a competitive and sustainable industry. The innovative activity is necessary to achieve this goal sometimes shows up as patents, but they are like the tip of a firm’s iceberg of knowledge. The vast majority of the knowledge assets – the intangible assets held by a firm in contrast with its material assets – are unseen. They are not publicly disclosed, they are often not recorded in any formal way, and if recorded or ‘codified’ they are often protected as trade secrets, whose value is notoriously difficult to express.

Today, intangible assets can easily make up 70% or more of a firm’s total value, a shift from an average of 20% in the 1970s (Blair and Roe 1999). Accordingly, to really measure innovation, Culver argues that knowledge management techniques supporting long-term, competitively sustainable industries must be developed and deployed. With this, Brad Hicks agrees, although from his perspective as an industry insider his starting point is somewhat more abrupt. According to Hicks, there is very little in the aquaculture industry that can be patented. Important innovations are generally about husbandry know-how, which is not generally patentable subject matter. Even if it were, Hicks contends, small firms would lose control of the value they
create because they have limited resources to defend patents. Perhaps this will change if firms become larger through consolidation, and develop knowledge portfolios worth patenting. Tom Sephton is largely sympathetic with what Culver has to say about the need to have more meaningful measures of innovation and longer-term aspirations for research networks that support industry growth. Yet there is an undercurrent of tension between their views, since Sephton emphasizes the importance of attracting significant contributions to research and attracting international partners in industry. How and whether this will happen in a results-based management framework with intangible assets remains to be seen.

References


