Innovation patterns in complex product systems industry - the case of shipbuilding

Jouni Saarni
University of Turku
Turku School of Economics /Centre for Collaborative Research
jouni.saarni@utu.fi

Mikko Pohjola
Utrecht University School of Economics & University of Turku
UTU: Turku School of Economics /Centre for Collaborative Research
mikko.u.pohjola@utu.fi

Abstract

Coping with the complex technologies and organisations has become a vital way of keeping businesses going. This
requires relying heavily on innovative behavior. The nature and profile of firm?s innovative activities have been presented as either industry-specific (Pavitt 1984), or firm-specific (Leiponen & Drejer 2007). The more recent synthesis (Peneder 2010) leans towards supporting intra-industry heterogeneity but with an industry dependent emphasis. So far the studies of innovation patterns haven?t sufficiently dealt with modern networked, project-based industry set-ups in detail. This paper studies the innovation patterns of a specific complex product system (COPS) industry, namely shipbuilding. The study adopts the system integration framework (Prencipe et al. 2005) and distinguishes the different firm roles in a COPS affecting firm? innovative behavior.

Complex product systems are capital-, engineering-, and IT-intensive, business-to-business product entities including e.g. transportation or power related systems. Shipbuilding can be considered as a textbook example of a COPS industry. Along the lines of other COPS, the shipbuilding production system characteristics have vastly changed in last decades. Traditional shipyards have vertically disintegrated into a networked production model with hundreds of suppliers. Nowadays, ships are multi-technology, multi-component products produced in a system of multi-firm alliances. Such a system as a whole can be comprehended to include several complementary innovation patterns.

Shipbuilding presents a paradox within the innovation literature. On the one hand, literature on innovation in shipbuilding has argued that it has low innovation intensity. On the other hand, in the literature, COPS are considered highly innovative and witness rapid technological development. This paper suggests that one resolution to the paradox is a misunderstanding of the innovation patterns in shipbuilding. Therefore this paper sets out to show that when considered as a SI business the true nature of innovation in shipbuilding is put into its proper context. Drawing on a firm-level innovation survey conducted within Finnish shipbuilding sector with over 130 observations we analyze the innovation patterns with multivariate analysis and multinomial logit regression. The survey adopted elements from for example the Community Innovation Survey (OECD 2005) and other indicators measuring innovation inputs and outputs and activities.

In line with the literature on COPS, our results show that specialized shipbuilding suppliers are highly innovative actors and that the locus of technological development is dispersed around the production system, with the actual system integrators not being the most explicitly innovative. The capabilities of systems integrators are more related to coordination and interaction activities, which are not as visible in traditional product-focused innovation sense. Major suppliers on the other hand address competition by constantly offering new products and services, which makes them appear explicitly innovation oriented.

References:


