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**Following Harold Demsetz: Encapsulation of Knowledge as a Generator of Efficiency and Risk**

Abstract

Our paper aims to expand on the contributions of Harold Demsetz (1988) in “The Theory of the Firm Revisited.” to the field of knowledge economics. We argue that one important section of this influential and widely cited article—on the need to minimize the costs of producing, transferring and using knowledge—has been glossed over. One of the most effective ways of accomplishing these lays through knowledge encapsulation. Knowledge encapsulation compresses full knowledge into a cost-efficient and easily transferable form, which requires “only functional knowledge for its utility” (Van Den Berg 2013: 165). Demsetz provided examples of knowledge encapsulation in the form of algorithms, such as directions and instructions issued within a firm. However, he cut his analysis quite short, and since then, the concept of knowledge encapsulation, and, in particular, its connection to cost minimization, has not received sufficient scholarly treatment, notwithstanding mentions in Grant (1996), Mokyr (2002), Walker (2010), Van Den Berg (2013), Dekker and Kuchaȓ (2022), and Maltsev and Yudanov (2022).

We investigate the Demsetzian concept of knowledge encapsulation and go beyond its initial applications to develop a Knowledge-Cost-Minimization approach (KCM approach) to the firm. We argue that the organizational structure of the firm itself, its routines, and rules form an outstanding cost-efficient two-level knowledge encapsulating structure.

On the first level, the firm’s encapsulation dictates to an individual employee a correct action algorithm for successfully operating at a particular stage of a production process, and so minimizes the local costs of knowledge. An employee working within a firm’s hierarchy does not need knowledge about previous stages of the business process. Similarly, this employee does not need to consider the future transformations of the product and is freed from the need to possess knowledge about the entire business. In mathematical terms, such a production process resembles a Markov process (Kemeny and Snell 1976): “For a Markov process, knowing the outcome of the last experiment we can neglect any other information we have about the past in predicting the futuree… This condition says essentially that, given the present, the past and future are independent of each other.”

On the second (organizational/administrative) level, the overall knowledge of a firm’s trajectory and firm’s goals are encapsulated via its employees and the establishment of a specific character of their interactions. The cells in organizational matrix and their connections determine almost the entirety of the firm’s functioning, while individual contributions determine close to nothing, which e.g., explains the easiness of replacing one employee with another. This structure enables the firm to make correct decisions, despite the overwhelming share of agents within it not being possessed of full knowledge. While a firm’s hierarchy in conjunction with action algorithms does remove the costs to the employee of memorizing the production process, it also economizes on setting business goals and choosing a correct path to future results. De facto, the firm’s hierarchy itself contains a process’s memory and a stage-by-stage path toward a goal, which makes the corresponding knowledge requirements redundant.

Within the hierarchy of the firm, we seemingly encounter a Hayekian situation of dispersed knowledge, though that term is usually used to describe spontaneous market processes. No single participant in the market process has the full breadth of knowledge necessary for decision-making; nevertheless, with few exceptions, people manage to act correctly and the overall system functions well. Paradoxically the same is true for the firm. For both the firm and the market, this occurs because encapsulated knowledge provides each of the participants with correct action algorithms.

However, a system based on encapsulated knowledge has certain disadvantages too. The most obvious is rejection of progress by agents who rely on incomplete knowledge. Change and innovation is hard to realize endogenously when there is a risk of going against existing instructions. Without full knowledge, an agent cannot properly judge whether a seemingly sensible change in a routine at the time will lead to negative effects in other parts of the system.