

Shoaling (School of Fish) As Competitive Strategy¹

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Shoaling can be considered a unique business strategy, because it enables a large firm to operate with the nimbleness of a smaller firm or it can allow small firms to effectively rally their resources against large rivals.

A shoaling strategy, on the one hand, reduces the opportunity cost of not exploiting emerging market opportunities and, on the other hand, reduces the investment risk that accrues due to large-scale integration.

A shoaling form enables multi-pronged competitive strategies, permitting a firm to develop unique or optimal strategy for each rival it encounters in the respective market or region.

As firms are witnessing uncertain business conditions and more thrust is being given to agility, speed, and market responsiveness rather than scale and size, operating in a shoaling form is a desired strategy across many industries.

Managers of established firms as well as those of emerging industry challengers continually seek new strategies that ensure better returns with minimal risk. While incumbent industry leaders struggle to sustain innovativeness and market responsiveness with firm size built to primarily secure cost advantages, emerging industry challengers search for innovations to break industry barriers. A ‘shoaling strategy’ (also referred to as disaggregation here), that will enable firms to operate in a synchronized manner like a school of fish to concurrently achieve scale economies as well as market responsiveness is proposed in this article. Shoaling strategy, on the one hand, reduces the opportunity cost of not exploiting emerging market opportunities and, on the other hand, reduces the investment risk that accrues due to large-scale integration.

There is a traditional saying in business that ‘big fish eats small fish,’ which suggests that a firm’s large scale will ensure higher returns and competitive advantage over rivals. A shoaling strategy, on the contrary, challenges this notion with the contention that ‘quick fish – albeit smaller – can eat large fish.’ The main premise of this argument is that a shoaling strategy (school of fish) to organize the value chain will be the most effective way to accomplish competitive advantage without large-scale investment commitment.

‘Small is beautiful,’ argued Schumacher (1973) while proposing an aesthetic and humanistic approach for designing economic, business, and production systems. With a similar rationale, it is suggested that the small scale has emerged into an alternative paradigm for building efficient, innovative, and dynamic models of business. Recent studies attest to this phenomenon, indicating the emergence of knowledge-centered global enterprises operating as ‘dispersed network[s] of smaller units’ and large firms being disaggregated and their boundaries becoming shrunk and permeable (Birch, 1987; Contractor *et al.*, 2010;

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Rossi-Hansberg and Wright, 2007). This paradigm change is augmented by the knowledge and information economy, where relatively more value is derived from intellectual capabilities than physical assets (Benkler, 2006; Boisot, 1999; Kogut and Zander, 1996; Nahapiet and Ghoshal, 1998; Teece, 2003).

In the context of the knowledge economy and complex industry environments, the disaggregation approach is considered quite significant in the configuration of manufacturing, R&D, marketing, or service delivery systems. As firms are witnessing uncertain business conditions and more thrust is being given to agility, speed, and market responsiveness rather than scale and size, operating in a disaggregated form is becoming a desired strategy across many industries. Disaggregation enables modularization, mass customization, employee empowerment, and proximity to customers or critical raw material sources (Liker, 2004; Spear and Bowen, 1999). A disaggregated strategy for managing the value chain will not only enhance dynamic capabilities, but

also will spur more innovations and growth (Andersson and Pedersen, 2010; Contractor *et al.*, 2010; Zenger and Hesterly, 1997).

Disaggregation, termed 'shoaling' here, can be considered a unique business strategy, because it enables a large firm to operate with the nimbleness of a smaller firm or it can allow small firms to effectively rally their resources against large rivals (**Figure 1**). A shoaling strategy can help a firm better exploit the emerging opportunities that markets avail without committing large assets or increasing investment risk. The economic and managerial rationale of 'shoaling strategy' and its significance in the context of knowledge economy and industry turbulence is contemplated in the following sections.

Review of modern organization and production

Right from the days of the Industrial Revolution to modern times, achieving economies of scale and high market share using mass production have been firms' primary

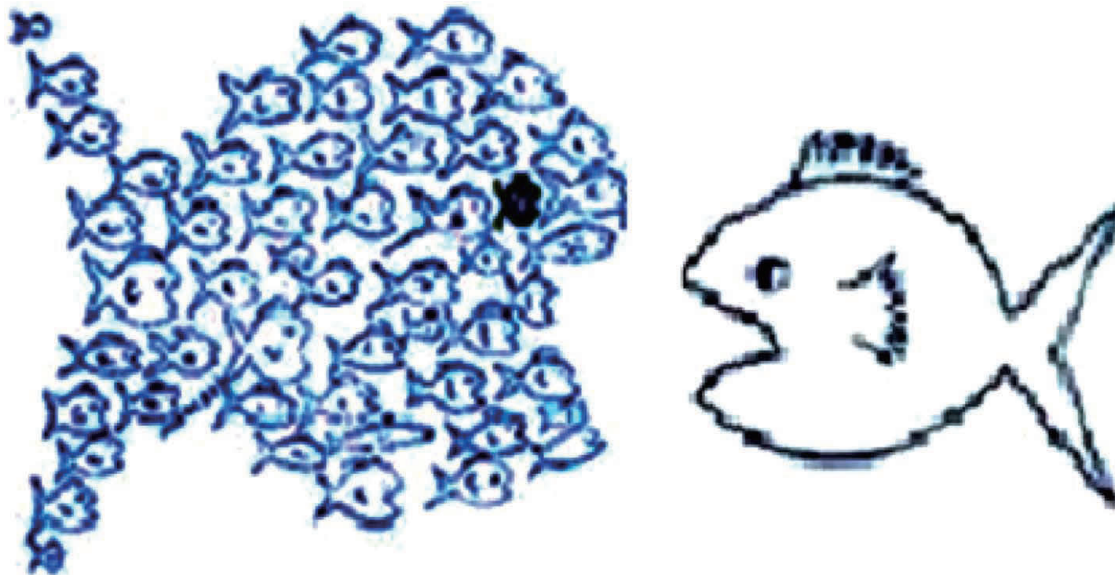


Figure 1. Shoaling strategy vs. integration strategy. (Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com).

strategic thrust (Adler, 1995; Chandler, 1962, 1990; Dunning and Lundan, 2009). Despite the cost advantages, large-scale production and organization have been cited as the source of several managerial and economic problems. With a high degree of asset integration, the fixed costs and investment risk increase immensely, whereas combining all business operations into one or a few locations results in asset concentration, which in turn increases organizational complexity and bureaucratic cost (Chandler, 1977; Williamson, 2002). Moreover, larger the organization, less responsive it becomes to dynamic markets that require continuous product or technology variations (Adler, 2001; Canbäck, 2004; Tushman and Anderson, 1986). In large firms, organizational change faces inherent resistance, because (i) the change has to be system wide because of high asset integration, (ii) the cost of change is very high, and (iii) as the hierarchical distance between top management and business operations widens, managerial responses are belated (Williamson, 1975). Large firms have also been cited as having adverse human and social consequences (Fullan, 1970; Susman, 1972). For instance, large-scale industrial activities have been reported to have engendered damage to the environment, industrial accidents, unhealthy business–community relationships, strained management–labor relations, social conflicts (e.g., intensive urbanization with class divisions), and health disorders (Kinghorn, 1985; Shrivastava *et al.*, 1988).

In recent times, however, many innovations in production and supply-chain logistics have enabled businesses to lessen the adverse social impacts in addition to securing performance-driven advantages. Beginning with the auto industry during the 1990s, through home appliances to consumer electronics and healthcare, flexible manufacturing systems, lean production, modularization, and continuous improvement techniques have transformed the industries by enhancing quality, product customization and variety, and quality of work life (Liker, 2004; Womack *et al.*, 1990). These techniques have increased the substantive contribution of suppliers,

retailers, and intermediaries in the whole value chain of buyers/original equipment manufacturers and allowed large companies to operate like a constellation of small firms and alliances (Gladwell, 2002). For instance, modularization, lean production systems, flexible manufacturing, and supplier alliances have all been identified as sources of competitive advantage to firms such as Honda, Dell, HP, Toyota, Nike, and Levi Strauss (Robertson and Ulrich, 1998).

Knowledge economy and firm disaggregation

In the scale economy, vertical or horizontal integration was considered a ‘thumb-rule strategy’ across many industries for increased control over costs and market share (Williamson, 1975, 2002). The paucity of managerial or technical expertise among suppliers, and the trust chasm that prevailed among buyer–supplier firms (given concerns over opportunism between transacting parties), had led to a *praxis* that integration – despite the high investment risk – offers better strategic control (Coase, 1937, 1960; Williamson, 1975). As firm sizes expanded, and increasing returns to speed, revenues, and cost savings accrued, so productivity and profitability increased (Adler, 1995; Dunning and Lundan, 2009).

However, in recent years, growth through integration is increasingly viewed as a high-risk and economically unattractive strategy, as firms experience demand fluctuations and market fragmentation (Child, 1973; Riordan and Williamson, 1985). It is also increasingly recognized that there are limits to firm size, which can offset returns to scale and trigger the diseconomies of scale arising from employee alienation, dysfunctional employee relations, coordination lapses, information delays, compounding of errors, and bottlenecks (Arrow, 1983; Blau and Meyer, 1987; Canbäck, 2004; Child, 1973; Riordan and Williamson, 1985; Williamson, 1975).

Scholars in many disciplines are acknowledging that a paradigm shift from scale economy to knowledge economy is occurring across many industries.

The knowledge economy refers to the rise of knowledge-intensive high-tech firms with production and service operations that generate more value from intellectual capabilities than physical resources. This shift is quite evident in the increasing share of knowledge industries in the gross domestic product of many industrialized nations (Abramovitz and David, 1996).

The knowledge economy has created new strategic alternatives for business growth without increasing firm size or fixed assets. First, the knowledge economy drastically flattens transaction costs through reducing information asymmetry and enhancing power and interdependence among transacting parties (Adler, 2001; Felin *et al.*, 2009). Second, with the advent of miniaturized and modular production systems, firms can now operate in a flexible and market-responsive manner. Third, firms equipped with information technology (IT) and a networked computer infrastructure can easily operate in a decentralized and dispersed manner, thus reducing both bureaucratic costs and transaction costs, and the overall coordination costs. It is now widely accepted that the knowledge economy is gradually moving the cost equilibrium – in relation to firm size – in a reverse direction (Muthusamy and Dass, 2014). Nike is a prime example of a beneficiary of globally dispersed organization design coordinated with IT infrastructure. Nike manufactures more than 1000 styles of shoes, operating in 51 countries, working with 700 contract factories, employing 500,000 employees.

Economists observe this trend as 'organizational disaggregation,' meaning that the size of the subunit and the entire organization is decreasing (Birch, 1987; Contractor *et al.*, 2010; Rossi-Hansberg and Wright, 2007). Organizational disaggregation is occurring whole economy wide, as well as within firms. Concurrently, there is also an increase in entrepreneurial activity; as studies confirm, the number of entrepreneurial firms – measured by new business filings – has increased radically (Baumol, 2002; Bhide, 2000). The industry structure and performance of manufacturing firms in the US economy

also attest to the shift in economies and firm strategies. Despite stable economic growth over the entire 20th century, many large US firms in manufacturing industries could sustain neither their market dominance nor their profitability (Council of Economic Advisers, 1998, 2002; Fortune, 1995; Panzar, 1989).

Shoaling as competitive strategy

As industries are witnessing a shift toward the knowledge economy, an alternative paradigm in industrial organization is fast emerging, which suggests that organizing the firm as a *shoaling or disaggregated* form of operations in a wider spatial domain offers multiple advantages compared with a large integrated structure. Shoaling has been made possible by the lean production, flexible manufacturing systems, modularized production and organization structure, and emergence of alliance clusters. With the diffusion of management knowledge and the availability of technological expertise on a global scale, dispersed operations are confirming both economic returns and market responsiveness. Although dispersion increases the coordination complexity, the bureaucratic problems that hamper the innovation and productivity are minimized in a shoaling form with the help of new-age technologies including the Internet, electronic data interchange, teleconferencing, telecommuting, and decision support systems. Shoaling also enables the entire business value chain to be designed to match with, or correspond to, the patterns of market size and distribution, and thus allows a firm to match its production system with its multi-market strategy choices.

There are several ways that advantages emerge from the value chain organized in a shoaling approach. Shoaling or disaggregation, may allow for placing certain value-adding operations closer to customers, and thus would enhance market responsiveness while lowering transportation and inventory costs. Dispersed operations allow for variations and enable more innovations in process or product design. As learning capacity is enhanced in a

dispersed system because of its market orientation, managerial effectiveness is quite high within a disaggregated value chain compared with a typical integrated structure. Thus, notwithstanding its enormous complexity, the coordination cost and investment risk are relatively lower for the disaggregated form. The shoaling form reflects a distributed form of organizational intelligence equipped with dynamic capabilities (Adler, 2001; Garud and Kotha, 1994).

The organization of Kyocera (Kyoto Ceramic Company), Japan can be considered an excellent example of the shoaling strategy. Kyocera is a large global firm, with \$15 billion sales revenue and 70,000 employees operating as a collection of small, customer-focused business units. Kyocera's organization design is called the 'Amoeba management system' (or the 'Inamori way'), developed by its founder Kazuo Inamori, and has more than 3000 amoebas (small units), with each unit empowered to operate independently and at the same time reinforced to cooperate with other amoebas to achieve synergy and profit growth (Adler and Hiromoto, 2012; Inamori, 1999). Kyocera's organization design has enabled market agility, enhanced customer service, and entrepreneurial drive.

In the following section, I would like to highlight the economic and managerial rationale supporting the shoaling approach. Although it is known that asset concentration and the integration of businesses enhance the economies of scale, it can be juxtaposed that a high degree of asset concentration results in increased bureaucratic costs and investment risk. As the asset concentration increases, the number of bureaucratic layers increases, and delays and errors in information processing compound. Further, large organizations suffer from power conflicts – that is, managers engaging in political coalitions to increase their influence – as managers often become more concerned with acquiring resource control than with optimally allocating resources.

Also, the coordination costs in the scale economy and the knowledge economy exhibit different patterns. As

firms experience more turbulence and uncertainty in the knowledge economy, the failure of large integrated structures to provide market responsiveness accelerates the rise of bureaucratic costs. On the contrary, the transaction costs have declined drastically because of the global dissemination of managerial knowhow and alliance and collaborative strategies among buyers and suppliers (Rossi-Hansberg and Wright, 2007; Zenger and Hesterly, 1997). In the scale economy, as the firm size increases, marginal increases in bureaucratic costs are smaller. In the knowledge economy, on the contrary, the marginal rise in bureaucratic costs is much steeper, but that of transaction costs is lower and flatter.

Besides the cost and coordination effectiveness, several managerial benefits result from the disaggregation of firm operations. With shoaling or disaggregation strategy, a firm can distribute its decision-making processes to operational managers, enhancing autonomy. With disaggregated operation of the value chain, there is more opportunity to franchise the firm ownership with contract suppliers and operational/divisional managers, thus reducing the cost of capital and investment risk. A shoaling form enables multi-pronged competitive strategies, permitting a firm to develop unique or optimal strategies for each rival it encounters in the respective market or region. Owing to the strategic advantages that emerge from new coordination methods, firms are pursuing a dispersed form with regard to production, marketing, and distribution. For example, Pepsi-India is locating its manufacturing facilities for many of its product lines on a wider spatial domain using franchise and contractual operators (Business Standard, 2012). The new design is a paradigm shift from the old PepsiCo system, where manufacturing will move closer to consumption, delivering a quicker response to competitive challenges. The rise of microbreweries offers another interesting example of how small craft brewers are breaking the industry barriers and competing effectively with the shoaling form in a highly consolidated beer industry (**Box 1; Figure 2**).

Box 1. Craft beers in the USA – breaking the industry barriers

The US beer industry totals \$90 billion in sales (United States Brewers Association Statistics, 2012) and employs about 1.9 million people in the USA. The top three large-scale beer manufacturers (with production volume ranging from 6 million barrels to 125 million barrels) – Anheuser-Busch InBev (ABI), SAB Miller, and Coors – account for 80% of US market share. The recent \$52 billion merger between US Anheuser-Busch and Belgian/Brazilian InBev helped the now global leader ABI to control more than 50% of beer sales in the USA. Despite high consolidation, the US beer industry has faced tough times in recent years due to a steady decline in sales volume of about 1% per year. However, in contrast, the craft beer manufacturers are growing at a rate of 10% yearly in sales and consumption volume. In 2011, the craft brewers grew by 13% in sales volume and by 15% in dollar sales, with their market share steadily rising from 1% to more than 10% of the beer market in the USA. The craft brewers include ‘small and microbrewers,’ with production volume ranging from 15,000 to 1 million barrels per year. According to the Brewers Association of America, there are more than 1500 craft brewers in the USA. The growth of craft brewers suggests not only a change in consumption patterns, but also a paradigm shift in the manufacturing and marketing of beer. Deregulation in the late 1970s, in combination with the craft brewers hosting innovations of flavor and quality, helped bring about ‘beer connoisseurship’ (Bertsch, 1994; Carlson, 2011). The stories of two successful craft beer companies, Boston Beer Company and SweetWater Brewing, who are pioneering the microbrewery revolution, are presented here.

Boston Beer Company is the number one craft brewer, with a sales volume of 2 million barrels per year within a span of two decades from its inception. Founded by Jim Koch in 1985 with a family recipe, Boston Beer Company entered the market with a crafted brand ‘Samuel Adams Lager.’ This brand was initially brewed in small batches with an obsession for quality, freshness, and flavor. Instead of locking all their capital into production assets, Boston Beer Company has grown primarily through microbrewery production methods and contracting with third-party packers and franchisees to produce all its brands. With this shoaling approach, operating in a decentralized and dispersed chain of contract brewers, Boston Beer Company was able to market its specialty crafted beers nationally without incurring high shipping expenses (www.bostonbeer.com). The success of Samuel Adams has become an inspiration to other small and micro craft brewers.

SweetWater Brewing, founded by Freddy Bensch and Kevin McNerney in the mid-1990s, has its roots in Boulder, Colorado. After finishing college, Freddy and Kevin headed off to the American Brewers Guild in California – also known as Brewing School – to sharpen their knowledge of ‘fermentation science.’ The 1996 Summer Olympics, and the opportunities it offered, brought Freddy and Kevin to Atlanta. The friends found this town to be in need of a West Coast-style brewery that would allow them to experiment with innovations in brewing hoppy, aggressive ales. The friends named the brewery after Sweetwater Creek, a tributary of the Chattahoochee River in Georgia, and adopted the official motto ‘Don’t Float the Mainstream’ as a tribute to its namesake. SweetWater Brewing began in January 1997, with brand names such as SweetWater 420. Two years later, this company hosted the ‘World Beer Cup,’ an international brewing competition. In 2002, SweetWater Brewing won Small Brewery of the Year at the Great American Beer Festival in Denver, Colorado. In 2004, SweetWater Brewing outsourced its distribution operations to United Distributors, one of the largest volume beverage distributors in the USA, increasing SweetWater Brewing’s distribution from 200,000 to 700,000 cases in six years. Now, SweetWater Brewing is recognized as one of the top 50 craft beer brands, selling close to half a million barrels per year.

The exemplary performance of microbrewers like Boston Beer Company and SweetWater Brewing serves as a testament to the effectiveness of the shoaling strategy or the dispersed operation of manufacturing, marketing, and distribution. The success of craft brewers suggests that companies can operate profitably on a smaller scale, disaggregating their core activities to offer variety, quality, uniqueness, and customization. This strategy can effectively be replicated in a range of businesses and industries such as food processing, consumer durables, and construction to achieve innovation and growth (Carlson, 2011). Working as a band of contract brewers, bottlers, and distributors, like a ‘school of fish,’ craft beer sales and production in the USA have increased dramatically in the last 10 years.



Figure 2. Increase in craft beer sales (US Brewers Association data). (Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com).

Conclusion

Managers are increasingly realizing that an integrated corporate architecture is becoming less pertinent in the knowledge economy as challenges arise from high-velocity competitive environments and disruptive technologies. The cost of lacking agility and organizational inertia would be very high in dynamic industries. Corporations have to function in a nimble and responsive manner, and they should build capacity to absorb new knowledge. Shoaling or disaggregating, and operating in a dispersed mode, will help companies exploit the fleeting market opportunities without risking high investment. Given the paradigm shift to a knowledge economy and flattened transaction costs, it is better to conceptualize the firm as a school of fish or a constellation of value-generating units or alliances, rather than a hierarchical structure. The knowledge-driven dispersed organization can enable a firm to organize its core activity and functions in the form of networked franchises or alliances providing the necessary autonomy, entrepreneurial dynamism, and innovativeness.

While disaggregation and dispersion offer several strategic advantages, there are a few limitations and boundary conditions that managers need to be aware. There are industrial, geographical, and locational contexts where too much disaggregation and dispersion may increase the

complexity of the interface between dispersed units, thus increasing the coordination costs. For example, Contractor *et al.* (2010) have observed that in global outsourcing and offshoring of value-chain operations, too much dispersion results in sub-optimization. Moreover, disaggregation and dispersion may not provide an environmental or sustainability advantage in all situations. Despite a reduction in the cost of externalities, there are industrial settings where disaggregation and dispersion may result in asset idleness, waste, and proliferation of hazardous technologies.

In this light, the post-bureaucratic organization designed to enhance knowledge-based advantages should stress the relevance of mission, vision, and strategic controls more than ever. While the mission and vision would help reinforce the shared goals among internal and external constituents, strategic controls need to be judiciously designed to ensure self-regulation, given the autonomous nature of relations within a shoaling network. Mission, vision, and control systems need to emphasize the norms that strengthen the bonds among member units, and communicate the collective benefits that would accrue to the actors within a shoaling network. The knowledge-era organization design should incorporate new corporate functions such as alliance management and employ boundary-spanning features across functions and subunits, and facilitate roles that are multidimensional and flexible. In addition to delineating property rights and contractual obligations, specifying the value of the knowledge created and shared by member units should become a strategic task in post-industrial knowledge-era organizations.

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