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How Lowell Wakefield Created the US King Crab Industry

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Wakefield Seafoods turned king crab from an unwanted catch into a major industry by inventing harvesting methods, creating demand and surviving repeated setbacks.

While king crab fishing is among the most dangerous and lucrative activities in the world, it is only recent technology that makes it possible to extract this bounty from the sea, from global positioning systems that track the location of the crab pots to underwater cameras used to spot migrating king crabs on the ocean floor. This new technology even enables fishermen to know precisely where and how full the crab pots are before they are brought to the surface.

This has not always been the case. What is now known around the world as a culinary delicacy did not start out that way. In fact, before the mid-1940s, there were no king crab fishermen, no king crab fishing boats, and nothing that could be called a king crab industry. King crab legs simply were not widely consumed before the Second World War. Essentially, this industry was created through an evolutionary process executed by one man and his company, Lowell Wakefield and Wakefield Seafoods, Inc.

Opportunity Creation

One perspective of opportunities is the discovery perspective – to discover and exploit an opportunity within an existing market or industry. The alternative is the creation perspective. In this perspective, opportunities are created by the actions of individuals rather than existing independent of individual action. These creation opportunities do not exist until enacted by individuals. Further, research suggests that not only can some opportunities be created, but also that the actions taken to form and execute creation opportunities are different than the actions taken to exploit pre-existing externally derived discovery opportunities. The theory of opportunity creation suggests that the existence of opportunities – like selling king crab legs in restaurants – is not inevitable or fully predictable.

Those seeking to form and exploit creation opportunities act, wait for a response from their actions (usually from the context in which they are engaged), and then adjust their beliefs and react. During these iterations, selection and retention may occur. In short, in the creation perspective, entrepreneurial action is the simultaneous formation and exploitation of the opportunity.

A Not-So-Royal Beginning

Prior to Lowell Wakefield's involvement with king crab fishing, knowledge about king crabs as a food product came from the Japanese. The Japanese began fishing for king crabs in the Sea of Japan in the 1890s and later moved into the Bering Sea. At this time, the few fishermen who caught king crabs stored the product by canning. However, this method resulted in poor quality and a taste that was unacceptable in the United States, which limited the possibility for U.S. demand for king crab. In the late 1920s, fishermen from the Soviet Union also began fishing for king crab in the Bering Sea. They also canned the king crab, therefore doing little to increase acceptance and use of the meat. Because of this, king crab as a food product did not exist in the U.S. There was no data suggesting that there was an opportunity, and because of the poor quality and inferior taste, king crab was unlikely to gain acceptance in the U.S. By the 1930s, both Japanese and Soviet fisherman withdrew from the Bering Sea, effectively eliminating any possibility that king crab would be a viable product.

Prior to World War II, U.S. fishermen did not successfully harvest king crab meat. In 1938 the Pacific Fishing and Trading Company, a traditional salmon and herring company, began experimenting with king crab by purchasing crabs that were accidentally caught by salmon boats. They too followed the practice of canning the king crab meat, but were no more successful than the Soviet or Japanese in producing a quality product.

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In addition to the lack of demand, the dominance of the salmon industry also hampered king crab as a product. Well-established salmon industry practices made firm start-up, employee recruitment and sales relatively straight-forward. In comparison, the lack of knowledge about crab harvesting, canning methods, problems with quality control and lack of knowledge about the migration patterns and population dynamics of king crabs, paired with the lack of demand for king crab meat in the U.S., made this an unattractive product for U.S. fisherman.

An Accident Yields An Opportunity

Lowell Wakefield was the son of a herring fisherman. During his stint in the Navy during World War II, Wakefield supplemented his diet with whatever he managed to catch from the ocean. One of his catches was a king crab, and by chance he went ahead and ate it instead of throwing it back – and discovered it was tasty! When he returned from his Naval service, he had serious doubts about the future of the Alaskan herring industry; he also thought that the salmon and halibut fishing industries were overcrowded.

While Wakefield's original experience was accidental – he did not intend to catch a king crab – his following experimental action of eating the crab was purposeful. This experience and his reaction to it began the process of action, response, and reaction that in the long run led to the formation of the king crab product as an opportunity. The demand for king crab meat emerged out of this process that Wakefield started as he developed what was to become a *new* premium king crab product: frozen crab meat.

The Wakefield family observed the U.S. government conducting research near their fisheries regarding the viability of king crab as a food product in 1941. Their research resulted in not recommending this industry due to crabs' unappetizing taste when canned, their unattractive spider-like appearance and the difficulty of harvest. Had Wakefield been too closely tied to the idea of canned king crab (or if he had not tasted fresh king crab), he would have been aware of the lack of demand for king crab in the U.S., concluded that this was not the right product to pursue, and not engaged in the opportunity enactment process. In fact, if Wakefield had been too closely tied to the canned product or current harvesting process, his knowledge would have actually hindered the innovation necessary to create the opportunity.

In this setting, no one could know the possible outcomes associated with creating the opportunity for king crab meat or the probability of those outcomes occurring. It was only after several experimental actions, many of which failed, that Wakefield gathered enough information to estimate the risk and return associated with this new opportunity. Without this series of experimental actions, the data needed to estimate the risk and return of this new opportunity would not have been formed.

Harnessing Technology

Wakefield had commercial fishing experience through his family's herring business, but the technology to harvest king crab did not exist. King crab harvesting is significantly different from herring fishing, requiring a different set of skills, equipment and location. King crabs are large, live in the cold northern waters of the Pacific (mainly the Bering Sea between Alaska and Russia), and most king crab fishing takes place during the winter; these factors combine to make their harvest extremely difficult and dangerous. Wakefield's lack of knowledge of the old style of king crab fishing and canning ultimately was fortunate; such prior experience might have prevented him from pursuing the opportunity at all.

King crabs were difficult to harvest since fishermen required experience and technology that had not yet been created. Traditional means of fishing were not appropriate for the harsh conditions of the Bering Sea or the migratory nature of king crabs. Wakefield overcame this difficulty through an iterative process of technological innovation. He applied technology he had learned about during his days in the Navy and adapted his knowledge where necessary. He consulted experts from other areas to design new equipment not previously known to the fishing industry. He also created new fishing methods, and created entirely new employee skills to overcome the unique problems he encountered.

Fishermen also endured the difficulty of imprecise navigation systems. Traditionally, sailors in the Bering Sea used celestial navigation and depth finders as navigational aids. While in the Navy, Wakefield learned about LORAN, a navigational aid developed by Sperry Gyroscope, which helped the Navy vessels' officers determine their location. A ship's LORAN picks up radio signals transmitted from Coast Guard stations, which the onboard equipment can then use to pinpoint its

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location. By adopting LORAN, Wakefield was able to navigate the Bering Sea more precisely, going further out to sea than had previously been possible for ordinary fishermen, thereby fishing for longer periods and in more remote areas. This successful use of LORAN proved to be an early experimental success that allowed Wakefield to continue with enacting this opportunity.

Another technology Wakefield adapted was the use of radar to track king crab migration. King crabs migrate up to 100 miles across the ocean floor to mate in shallower waters. During this migration, it is difficult to know the location and trajectory of schools of crabs. The traditional trawling method, by which a net is dragged across the ocean floor, easily lost the moving schools of crabs. In 1950, Wakefield's fishing vessel the *Deep Sea* was fitted with a Sperry Mark II radar system. In addition to improving navigation, the system was applied in a novel way to tracking king crabs. When they located a "hot spot" (a school of king crabs), they marked it with radar-reflecting buoys which projected ten feet above the water. Radar could track these buoys in any weather, and together with sea maps, the *Deep Sea*'s captain could systematically mark the boundaries of an entire school of crabs and focus harvesting efforts. This enabled the crew to increase the catch 35 to 50 percent.

One of Wakefield's failed experiments involved modifications to fishing nets. The nets used for trawling were long and funnel-shaped, and had 1,000-pound doors that kept each net open. As crabs were picked up in the trawl, water pressure pushed them back into the narrow end of the net. The crew was concerned that the weight of the heavy trawls would crush the thin-shelled king crabs, so to prevent this, they attached wooden rollers to the trawls to support the weight as it passed over the ocean floor. Unfortunately, these rollers actually hindered harvesting by causing the trawl to roll just above the king crabs, resulting in very few being caught.

Dissatisfied with this outcome, Wakefield got advice from a trawling expert who was able to create new technologies to increase the catch. These innovations included a heavy steel footrope that weighed the net down to keep it on the sea bottom, and a new net end to improve its efficiency. Because these new trawls were considerably heavier, Wakefield installed a hydraulic deck winch which greatly facilitated lifting large weights. Because the winch was a highly complex machine and could not be operated like the old mechanical winches, Wakefield recruited winch drivers from fishermen unfamiliar with traditional methods and provided them with specialized training.

There were other failed experiments and innovations. Another technological failure and subsequent adaptation involved the cooking and processing of the king crabs. Prior to Wakefield's experiment, the industry norm was to make frequent trips between harvest and bringing the crabs back to shore for cooking and processing. Wakefield's idea was to use the *Deep Sea* as a floating factory. He believed it would be more efficient to process the crab on the ship while still at sea to avoid repeated trips to port. The deck crew would empty the nets onto the deck and butcher the crabs by hand. The crew continuously cooked the crabs and then passed them to the processing crew, who separated the meat from the shell. Problems surfaced in both cooking and processing; the cooker-elevator was unable to continuously process the crab. The crew adapted by cooking the crabs in batches, but this made the process less efficient. One successful improvement did result from this process, however, and eliminated the major bottleneck of removing the crab meat from its shell. This was originally done by hand, which was time-consuming and expensive. In 1950 the *Deep Sea*'s chief engineer invented the "crab shaker", a device that mixed water and compressed air to push the meat out of the long leg shells. The crab shaker proved a major breakthrough in crab processing by enabling one person to process three to five times as much meat than by hand.

Freezing crab meat instead of canning it was the other innovation that furthered Wakefield's creation of the king crab opportunity. No commercial fishery had done this before, and in Wakefield's opinion, freezing the meat would have advantages over canning because frozen meat tasted better and therefore potentially provided greater market potential. After the crab shaker process, crab meat was then cooked and quick-frozen in trays specially designed to exclude air and reduce the risk of freezer burn.

Perilous Waters for Investors

In opportunity creation situations, traditional capital sources are unlikely to provide financing for entrepreneurs due to a lack of information. Because of this, "bootstrapping" is a common financing activity for creating conditions since the lack of information and the flexibility needed throughout the creation process are

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likely not to be acceptable to formal sources of financing. In bootstrapping, entrepreneurs finance activities from their own funds or from friends and family. Entrepreneurs in creation opportunities rely on their personal and professional network connections to obtain access to many entrepreneurial resources helpful when bootstrapping a start-up, including financing. Unlike traditional sources of funding, investors in creation opportunities invest in the entrepreneur – in his or her character, ability to learn, flexibility and creativity – and not necessarily in a particular business opportunity.

Wakefield needed to raise $450,000 for the construction of the *Deep Sea* and the first year's operating expenses, and bootstrapping was the major financing source. Wakefield initially sought financing from Seattle's commercial banks, but even those specializing in Alaskan fisheries turned down his loan requests as too speculative. Realizing that he wasn't going to be able to obtain traditional financing, he turned to family and friends. In fact, at nearly every point in its early evolution, ties of personal friendship and bonds of business acquaintances provided Wakefield Seafoods with resources that aided its development. Personal and family connections combined with business ties provided Wakefield Seafoods with the bulk of its original equity financing. In fact, many of the firm's suppliers owned stock in the company and sat on its board of directors.

Four major groups invested in Wakefield Seafoods:

- Wakefield and his wife, who were the largest individual investors.
- A block of shareholders comprised of Jim Goodrich and Walter J. Butler, both marine architects. Wakefield learned of their interest through a former classmate at the Reconstruction Finance Corporation (RFC) and contacted them about the possibility of joining forces. Goodrich and Butler agreed and brought in other investors.

The RFC was an independent agency of the U.S. government established in 1932 to provide aid to state and local governments and loans to banks, railroads, mortgage associations and other businesses.

- A group of investors based in Seattle and comprised of several businessmen with connections to Goodrich and Wakefield. They attracted additional friends from Seattle to the investment.
- A group based in Chicago and connected to George Wrisley, president of Wrisley Soap.

In addition, individual investors (126 by 1950) comprised 25 percent of the stock, and Wakefield's friends and business acquaintances in the herring and salmon industries comprised another ten percent. No salesmen, brokers, or public flotations were involved.

The quick profits anticipated by the founders failed to materialize, raising serious doubts about the company's future. Despite a good catch in 1947, the firm lost more than $25,000 and lost $82,000 the following year. With nearly all of its capital committed to building the *Deep Sea*, the company lacked sufficient funds for operations. The firm renegotiated their RFC loan, but by 1948 had defaulted and was nearing bankruptcy. It faced $432,000 in liabilities and its assets, consisting mainly of an unsold inventory of crab meat, amounted to $141,000. Cash on hand was $14. Obviously, large-scale refinancing was required.

By mid-1948 the firm was operating without operating capital and remained in business only at the sufferance of its creditors; the most critical factor being the support of the RFC administrators. The RFC, which held the first mortgage on the *Deep Sea* as collateral, allowed the firm to continue to operate for several reasons. First, the agency realized that it had little to gain by foreclosing on such a specialized vessel and hoped the firm ultimately would earn a profit. Secondly, personal relations once again proved invaluable, and these ties in combination with "complete disclosures" to the RFC persuaded them not to foreclose. Other creditors followed the lead of the RFC and delayed collection of debts, both out of a concern that they would lose more than they would gain from a bankruptcy, and from the consequence of personal and business ties.

Of course, not all creditors were so forbearing. Standard Oil, who had advanced Wakefield Seafoods fuel credits, threatened to place a lien on the *Deep Sea* to prevent the ship from sailing. Once again personal connections came into play. One of the investors was informed of Standard Oil's intentions, had the ship quickly fueled up at Standard, gathered a crew and sailed north into the night, avoiding the lien.

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By the fall of 1948 Wakefield Seafoods was in serious financial condition, and despite Lowell Wakefield's continued optimism, two-thirds of the stockholders voted to sell the *Deep Sea*, hoping that the sale would be enough to reimburse the firm's creditors. Although this decision was not unanimous, the firm hired the International Shipping Company to sell the ship. It was on the market for several months and there were several potential buyers. However, it became apparent that they might not find a purchaser, so the officers of the company began pursuing other avenues to keep the firm in business. They petitioned the federal government to subsidize the firm to protect the government's investment made through the RFC, but to no avail. Seemingly unable to even liquidate their company, the owner-managers reached their lowest point during the winter of 1948-1949.

In April 1949, Wakefield Seafoods managed to arrange a charter agreement with the Apex Fish Company, a herring company owned by Wakefield's father. Under the charter's terms, Apex provided operating funds for the *Deep Sea* and paid the crew for king crab fishing through July. When the crab pack was sold, Apex's operating expenses were to be paid first. Remaining proceeds would then be divided evenly between Apex and Wakefield Seafoods. This agreement was not very advantageous for Wakefield, but did allow the firm to avoid dissolution.

The day after the charter agreement, the *Deep Sea* left Seattle and within two weeks located heavy concentrations of king crab off Amak Island in the Bering Sea. By mid-May, enough crab had been caught to cover the advance from Apex. Fishing remained strong for the duration of the charter, and in the fall, the Deep Sea sailed without charter arrangements, but with financing in the form of a loan from Apex. The vessel rediscovered the abundant crab sites encountered in the spring, and in December the *Deep Sea* docked heavily laden with crab.

A major turning point came in 1949. Due to the good fortune of finding large schools of crabs and to solving certain processing problems, the Deep Sea harvested 404,000 pounds of crab, more than twice that of the previous year. After showing losses for three years, the firm reported a net positive return of $25,000 on the year's operation. Wakefield recaptured his optimism and while acknowledging that challenges remained, particularly their cash position, he felt that the year proved they were on the right track. And he was right – the firm emerged as a viable concern in the 1950s.

Putting King Crab on the Menu

Since the king crab opportunity was a creation opportunity, demand for the product could not be estimated, and there were no existing channels of distribution or data on customers and their preferences. Wakefield Seafoods initially approached the marketing of king crab as they would a more established product such as salmon, and chose established firms as distributors. These distributors tried to sell king crab through their standard networks of field brokers in large cities. However, because king crab was a new and unknown product, these early marketing arrangements were not successful.

A market had to be formed for king crab, and customers had to be cultivated. This undertaking required more effort than anyone anticipated, as they soon learned that well-established techniques for marketing fish did not work for such a novel product as king crab. The novelty of this product required specific direct marketing techniques, personalized to educate the consumer. Because of its similarity to lobster and the skill required for preparation, king crab was targeted to the restaurant trade as opposed to retail. However, Wakefield found there wasn't one chef in a hundred who would try it, so once again he had to rely on personal networks. Wakefield had a business acquaintance, Dudley Slocum of New York. As a favor to Wakefield, Slocum persuaded his friend Ralph Hackney to serve king crab at his restaurant in Atlantic City. Hackney's large restaurant could serve several thousand at one seating, and its acceptance of king crab paved the way for further gains on the East Coast. After the success of the Atlantic City experiment, Wakefield and Slocum partnered in marketing king crab.

William Blackford, captain of the Deep Sea, was also pressured to promote king crab. Billing himself as "sea captain from the frozen North", he traveled from city to city showing restaurant and hotel chefs how to prepare the crab. He fit the trunk of his Mercury convertible with freezer containers designed to hold two or three cases of crab, and conducted a 100-day road trip throughout the eastern seaboard and southern states, visiting 300 establishments. He also held "crab feeds" for seafood brokers and press in his hotel rooms, setting the air conditioning at its coldest level as a gimmick to evoke the "frozen North."

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These personal demonstrations educated consumers (chefs) about the product. This built demand for crab meat, and by 1952 New York City was consuming half of the king crab produced by Wakefield Seafoods. By 1959, the demand for king crab outstripped demand for Dungeness crab in the U.S. for the first time. Demand for Dungeness crab continued to decline; by 1963 king crab sold about ten times more than Dungeness crab, and the value of Alaska's king crab production exceeded even the established halibut industry.

Enter the Competition

As the market formed, a limited number of competitors entered the fray. Wakefield Seafoods, with its first mover advantages and high quality standards, remained the leader. Their product was considered top-of-the-line. Wakefield Seafoods generated so much value that competitive swarms soon entered to capture some of it. The decade from 1950 to 1960 was of significance to the Alaska King Crab industry, and marked the beginning of the possibility for discovery opportunities.

After Wakefield developed the necessary technology to harvest and process king crab, created demand by cultivating and educating new consumers, and established product quality control standards, a market void now existed that discovery entrepreneurs could exploit. Major fisheries now had enough pre-existing knowledge and an established context enabling them to enter the king crab market – and Wakefield was well aware of this emerging competition.

Along with major fisheries, smaller players entered the industry; they were derisively known as "beach boilers." They often hastily selected plant sites and quickly constructed buildings. Because they lacked adequate capital and networks, they came and went with the seasons. They were informal operations that bought crab from independent fishing concerns, processing the meat with little concern about quality standards and safety. This motivated Wakefield to seek federal legislation to assure quality control. By influencing the institutional rules at the industry level, Wakefield shaped the nature of competition.

After the market developed through Wakefield's actions, demand for the king crab product was insatiable. Subsequent entrepreneurs could now use traditional techniques to analyze the industry and market demand. Although Wakefield Seafoods remained the most significant U.S. firm, by 1964 it faced 13 major competitors running 25 shore plants in Alaska. By 1966, approximately 20 processors were vying with one another for Alaska's king crab catch, and by 1967, 28 were competing for the catch in the city of Kodiak alone. The Japanese and Russian entrepreneurs who had once abandoned the king crab industry returned to the Bering Sea. By 1963, Wakefield Seafoods had firmly established the U.S. market for king crab and was opening new markets in Denmark, France and Great Britain.

Summary

Wakefield Seafoods' development of this creation opportunity created a language that allowed the world to join an emergent conversation about a new market and understand the king crab opportunity. Wakefield's story began as "a heap of guys led by Lowell" searching for "the world's deadliest catch" in their custom boat, resulting in a world-spanning king crab industry. Wakefield created his own self-fulfilling prophecy.

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