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Inter-organizational Ties, Community, And the Emergence of an Oyster Industry In New Hampshire

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Abstract

Through in-depth interviews with New Hampshire oyster farmers, this study examines how inter-organizational relations—in community form—can help emergent industries address challenges and collectively thrive. By examining the four main sources of uncertainty identified by the farmers, we are able to understand the way in which the farmers utilize their community to reduce those uncertainties. Their community functions as an inter-organizational network, where member participation is based on long-term, intangible benefits that complicate a simple instrumental exchange model. These benefits include open access to a pool of knowledge, sociopolitical legitimacy that enables regulatory influence, the existence of strong, community-wide norms that help to ensure high standards of quality and safety, and a buffering of opportunistic behavior in the event of a market fluctuation.

Keywords: communities of practice, inter-organizational networks, uncertainty, risk management, aquaculture, oyster aquaculture

1.0 Introduction

In the wake of a resurgence of small, locally focused food producers, oyster aquaculture has recently been gaining ground as both an environmentally sustainable and economically viable business venture (Food and Agriculture Organization, 2018; Woods Hole, 2007). Fueled by the locavore movement and armed with direct-to-consumer sales tactics and practices embedded in their local communities (Lyson, 2005), producers are finding success in local and national markets (Woods Hole, 2007). While marine aquaculture as a whole is expanding, in many areas, the oyster industry remains relatively small (Brennessel, 2008; Food and Agriculture Organization, 2018). This ‘newness’ can create additional challenges and risks unique to emergent industries (Aldrich & Fiol, 1994), altering the way in which they develop practices and function as inter-organizational networks. This makes investigation of how inter-organizational relations shape the formation and function of communities of oyster farmers an important area for sociological inquiry.

New Hampshire’s oyster industry, with only twelve farms in operation, illustrates how growers’ ability to collectively understand and balance economic and

environmental concerns affects the development of a regional industry. Building their businesses involved constructing the larger industry in tandem, which added multiple layers of uncertainty and risk. First, they faced uncertainty in their individual farming techniques and business strategies. Without established practices for growing shellfish in New Hampshire (NH) coastal waters, there was uncertainty and risk of failure for the oyster farmers. Second, as a new food producing industry, they faced underdeveloped and unclear regulatory structures. Changing regulations can threaten the establishment of growing procedures (Thompson, 1967; Kamps & Polos, 1999). Third, oyster farmers face the looming danger of shellfish-related illness. Since the majority of oysters are consumed raw, mishandling or mistimed harvesting can cause severe illness to consumers, at times resulting in death. While individual farmers can mitigate this risk significantly by properly handling their product, oysters have a place-based identity, thus the discovery of contaminated oysters or a case of illness can affect the sales of all farms in a particular region. Lastly, farmers must deal with the omnipresent fluctuations of the market. Though sales are predicted to remain steady, any dip in the market could certainly affect the viability of their businesses (The Hale Group, 2016).

Oyster farmers, like any business-owners, seek to mitigate risk and uncertainty. This is consistent with Thompson (1967), who argues that the driving force behind most business decisions is the reduction of uncertainty. Through in-depth interviews, the oyster farmers revealed that inter-organizational relationships—in community form—were essential in dealing with both economic and environmental uncertainty. Though no formal cooperative existed, as is the case in other areas, the farmers of New Hampshire's Great Bay functioned collaboratively. Through this collaboration, they (a) developed a resource of shared knowledge based on collective experience, (b) they worked together to develop environmental regulations and safety procedures, (c) they policed each other regarding safety, and (d) they created norms of cooperation that they hoped would keep opportunistic behavior at bay. Ultimately, they created a thriving community of practice (Lave & Wenger, 1991), anchored by a shared venture, propelled by their desire to learn and improve their craft. While Great Bay is certainly unique, structurally it is not unlike the wider industry. Much of the United States and Western Canadian shellfish industry is made up of small, family-run operations (Fisheries and Oceans Canada, 2017; Woods Hole, 2007). The patterns observed and the ways this community of practice functions offers broader insights about how community shapes oyster growing on a wider scale. More generally, this study adds to a growing literature exploring how community influences, and is influenced by, economic action and social organization.

In this study, we analyze data from in-depth interviews with Great Bay oyster farmers from all operating farms gathered during the summer of 2016. Great Bay offered a unique opportunity to capture the experience of farmers during the early stages of an emerging industry. Given the limited social scientific study of oyster farmers and revelatory nature of the project, we utilized qualitative methods (Yin, 2009). In-depth interviews allowed us to gather a deeper understanding of the farmers' every-day experiences, decision-making processes and the importance of relationships within this small community. Most striking, was the way in which community proved integral to their practice. Focusing on the challenges and risks recounted by the farmers, we examine how the farmers utilize their community, including local government, to mitigate economic and environmental uncertainty within their emergent industry.

2.0 Literature Review

2.1 Communities of Practice

Community has always been of paramount importance within sociological inquiry. From Durkheim's (1984) conception of interdependence driving cohesion to Sampson, Raudenbush, and Earl's collective efficacy (1997), theorists often have competing understandings of both their function, and how they maintain cohesion. Further, researchers continue to delineate between different forms of community, from traditional, place-based communities, to modern, virtual communities (Delanty, 2003). This community of oyster farmers is an embodiment of a unique type of community described by Lave and Wenger (1991)—a community of practice.

Lave and Wenger (1991) argue that communities of practice are unique in that they are essentially learning systems, bound by a communal desire to learn and innovate within a shared practice. Simply defined, they are groups of individuals who “share a concern or a passion for something they do and learn how to do it better as they interact regularly” (Wenger-Trayner & Wenger-Trayner, 2015, p. 1). They are the result of a sustained pursuit of a shared enterprise over time (Wenger, 1998).

Communities of practice are found everywhere—from families, to local hobby-based clubs, to groups of co-workers (Wenger, 1998). In his 1998 book, Wenger applied this concept to his study of a community of claims processors in an attempt to better understand how they collectively make sense of their working lives. Using this case, he was able to extend this concept, laying out a conceptual and technical framework for both the “theoretician and the practitioner” (Wenger, 1998, p. 10). Due to its applicability as an effective management strategy, this technical framework is often used in organizational sociology (Wenger & Snyder, 2000). Wenger promotes its use within organizations, arguing that as we move from a production-focused economy to today's knowledge economy, innovation has become a central objective (Wenger & Snyder, 2000). Considering research has shown that the development of communities of practice within organizations increases innovation (Brown & Duguid, 1991; Lave & Wenger, 1991; Wenger, 1998, 2000), an organization's “ability to design themselves as a social learning system” is essential to their success (Wenger, 2000, p. 225).

2.2 Inter-organizational Networks

While the intent of much of the research on communities of practice is to develop ways of supporting these communities to increase innovation within specific occupations (Wenger, 1998, 1998, 2000; Borg, 2012; Brown & Duguid, 1991; Verma, 2010; Whitaker, 2016), less research focuses on the effects of inter-organizational communities of practice, or communities existing between organizations rather than within. Organizational sociologists have however, examined inter-organizational relations. In this light, social network analysis within organizational sociology has demonstrated the importance of relationships and how networks can increase innovation (Powell, 1990), efficiency and speed (Porter & Fuller, 1986), trust (Granovetter, 1985), stability (Powell, 1990), and reduce opportunistic behavior (Powell, 1990).

Strategic inter-organizational alliances, the form of network most applicable to this sample, are most likely to proliferate within industries that require experience-based know-how, and reliable, efficient information (Powell, 1990). Dependence on this

information as an external resource is also a significant driver of these types of networks (Pfeffer & Salancik, 2003). New industries where conditions of uncertainty remain around the achievement of desired outcomes are also especially conducive to inter-organizational networks (Buckley & Casson, 1988). Often, organizations within developing industries find that knowledge sharing networks are often more efficient and cheaper than internal development (Porter & Fuller, 1986).

While classifying a small group of oyster farmers as an inter-organizational network may seem unconventional, the community of practice literature cannot fully explain the way in which farmers such as these in NH utilize their community. By understanding the farmers as a network of businesses we are able to see the unique challenges these businesses face and how they find solutions through their network. Like all businesses, they must deal with a multitude of risks. Thompson's 1967 work "Organizations in Action" provides an understanding of one of the main drivers of organizational action: uncertainty.

2.3 Uncertainty

Thompson's conception of uncertainty remains "squarely in the center of modern organization theory" (Shenhav & Weitz, 2000, p. 375). Essential to any business's success is the ability to mitigate risks, reduce uncertainty and maintain stability (Thompson, 1967). As business owners, the oyster farmers face business-specific challenges. They deal with unpredictable externalities like market swings and regulatory changes. Even further, they are farmers, and must deal with environmental variability, mortality, and the risks that come with working within a shared resource. Thompson (1967) argued, "environments are major sources of uncertainty for organizations" (p. 13). Organizations encounter both environmental constraints and fluctuations, constraints consisting of static uncertainties, like new government regulations, and fluctuations consisting of uncertainties like changes in demand for product (Kamps & Polos, 1999; Thompson, 1967). He argues that all organizations must face and mitigate uncertainty, and reducing this uncertainty is the main driver for organizational action (Thompson, 1967).

Building on Thompson's (1967) work, Kamps and Polos (1999) extend this theory beyond complex organizations to 'atomic organizations', or small firms that lack a 'technical core', much like the oyster farmers. They conclude that atomic organizations face the same uncertainties as the technical core of complex organizations and seek to maintain stability (Kamps & Polos, 1999). While Thompson's (1967) theoretical conceptions aid in understanding the role of uncertainty within businesses, the oyster farmers provide a unique opportunity for the application of this theory. They are a community of atomic organizations who demonstrate the way in which community can mitigate or exacerbate this uncertainty.

2.4 Contribution

Though only a small part of a much wider phenomenon, the oyster farmers provide an opportunity to develop a deeper understanding of one of the ways in which small-scale, locally focused food producers work to sustain success. Building on a growing literature examining the way in which community influences economic action and organization, this unique case necessitates a novel approach. While the community of practice literature offers a framework for understanding relationships centered around collective learning, it cannot fully address the way business-related challenges influence this community's formation and shape its function. Thus, we

utilize a second body of literature within organizational sociology: the study of inter-organizational relationships. Lastly, we draw upon Thompson's (1967) conception of uncertainty to address the underlying motivation and ultimate function of the oyster farmer's community of practice.

3.0 Methods

This study is based on analysis of a series of in-depth interviews with Great Bay oyster farmers. With only twelve registered farms growing oysters in 2016, we set a goal of interviewing at least one owner from each farm in order to capture a full census of the community. Using a census of growers increases the internal validity of the findings and reduces selection bias that might complicate studies relying on a sampling of a subset of a larger group of growers. This may not have been possible in states with larger industries; thus, Great Bay was well suited for this study. Further, this state's oyster aquaculture industry is in the early stages of development. By selecting this region as our focus area, we were able to witness the way in which farmers navigate the uncertainty of an emergent industry.

We gathered population information using a list of licensed oyster aquaculture businesses provided by the state of New Hampshire. We contacted all licensed businesses listed using a standard email only altered to reflect the farmer's name. The email explained the overall purpose of the study as well as the interview procedure. If the selected participant did not respond, we would attempt to contact them via telephone if their phone number was publicly available. Using this method, we were able to arrange and conduct twelve interviews with farmers from twelve operational farms—two being co-owners of the same farm—and one additional interview with a farmer who had sold their operation.

Though most interviews were conducted face-to-face, four interviews were conducted over the phone due to scheduling constraints. Prior to the start of the interviews, all participants read and signed an IRB approved human subjects consent form demonstrating that they understood the purpose and risks of the study. Most interviews were completed within an hour, though the duration varied based on the participant (range: 00:32:22 to 1:34:20). All interviews were recorded after obtaining participant consent. The interviews were conducted by either the lead author or another trained member of the research team. While questions were asked verbatim, the semi-structured format of the interview allowed interviewers to encourage participants to clarify or expand upon answers when necessary, thus producing richer data. The interviewers followed a common interview guide that contained a variety of questions regarding individual motivations, challenges, community relationships, regulations, risk perception, and health and safety issues. As the interviews were part of a broader project, we included questions about sustainability, environmental issues, water quality, and water quality management as well as community focused questions. Though not directly relevant to the focal areas of the current study, responses to all questions were analyzed and we found that often participants provided valuable information when responding to seemingly unrelated questions. For example, over 80 instances were coded for community. Many of these references were found in anecdotes presented when answering questions about water quality or use of science. The amount of unprompted data regarding the community speaks to its importance in the work lives of the farmers and increases the validity of our findings.

Interviews were transcribed using NVivo, a qualitative data analysis software which was also used to manage the data during coding. After developing a set of broadly defined codes, like ‘community’, and ‘health and safety’, we began to refine them as themes and patterns became apparent. Our final coding scheme included categories like ‘norms of reciprocity’, ‘uncertainty’, ‘trust and information’ and ‘place-based identity’. Considering the relatively small population size, gender-neutral pseudonyms were given to participants, and in this paper, ‘he’ will be used as a universal pronoun to protect participant identities.

3.1 Great Bay

The history and development of New Hampshire’s Great Bay over time has important implications for the development of its oyster aquaculture industry. In the 1970s, over 1,000 acres of live oyster reef covered the floor of the Great Bay estuary (The Nature Conservancy, 2017). Essential to the health of the ecosystem, oysters are filter-feeders, purifying the estuary by pulling particulates and excess nutrients from the water (Moeser, Patrick, Grizzle, & Ward, 2017). After three decades of pollution, disease and overharvesting, New Hampshire wild oyster populations dwindled by the early 2000s (Konisky, Grizzle, Ward, Eckert, & McKeton, 2014). With numbers at only 10% of what they once were, the bay had lost its natural filtration system, detrimental to many other species of marine life (The Nature Conservancy, 2017). In response, local conservation groups and the University of New Hampshire launched initiatives to improve water quality in the bay, one of which being the oyster shell restoration project. Advocates sought to increase oyster populations by introducing ‘spat-on-shell’ oyster reefs using inoculated recycled shell (Konisky et al. 2014). In tandem, oyster farming began gaining popularity in the bay as an environmentally sustainable and economically viable business opportunity. Today, nearly fifty acres of the Great Bay Estuary are occupied by oyster farms and that number continues to grow (Grizzle et al., 2017).

Though Great Bay is certainly a unique place, its story is quite common. Many areas have fought for a resurgence of wild oysters and improved water quality and have been successful at both in large part because of the development of shellfish farming (Wacker, 2007). This shared history makes case studies like this one useful in developing a deeper understanding of the challenges shellfish farmers face in developing industries.

3.2 The Farmers

While historical context is important, understanding who the Great Bay oyster farmers are in terms of demographic characteristics, individual motivations, and education and training provides important insights that inform this study. Though two of the Great Bay oyster farms have hired employees, most of the farms are owner or family operated. The work is labor intensive, time consuming, but according to the farmers, thoroughly rewarding. Most farmers described being on the water as the best part of farming (n=12), and a handful cited the gratifying nature of owning your own business (n=4). All farmers interviewed discussed the importance of the environmental sustainability of their practice (n=13), with most describing their craft as a “net-positive” for the ecosystem. While the farmers are environmentally minded, farming also requires a scientific understanding of the oyster and the surrounding ecosystem, and a scientific approach to growing them within that ecosystem. Farming requires (a) thorough record-keeping, (b) ongoing

research, (c) experimentation, (d) gear maintenance, and (e) constant monitoring. Oyster growers continuously evaluate, use, and produce scientific knowledge, requiring a moderate to high level of education or technical experience. Farming also requires access to capital. Though significantly less than the start-up costs of fin-fish aquaculture, oyster farming can cost up to \$60,000 per acre (Pacella, 2014). Though this number varies, start-up costs can act as a barrier for low-income individuals, shaping the population of people that are able to farm. Together, these factors have certainly influenced the demographics of those entering the field, as demonstrated by our population.

The Great Bay oyster farmers are highly educated, with all but one farmer holding a college degree (see Table 1). Of the thirteen, six hold a four-year degree, four have master's degrees and two have their doctorate. Unsurprisingly, most of the farmers hold degrees in the natural and agronomic sciences (n=10). Within this group, four farmers are female and nine are male. All of the Great Bay oyster farmers are white. Racial composition of the group is representative of the state, as over 90% of the population is white, according to 2016 census data (United States Census Bureau, 2016). The farms are all relatively new, the oldest farm being in its sixth season, the youngest still in the licensing phase (see Table 2).

Table 1. *Highest Degree (N=13)*

Education	Number of Farmers
PhD	2
Masters	4
Bachelors	6
Some college	1

Table 2. *Year Farmer Began Operating (N=13)*

Year Started	Number of Farmers
2010	2
2011	3
2012	2
2013	1
2014	4
2016	1

4.0 Results

4.1 A Community of Practice

It was a brilliant day as I walked from my car to a picnic table overlooking the marina. We were meeting Jamie, a local oyster farmer who was just beginning his third season on the water. While painting a picture of his experiences—the challenges, the uncertainties, his successes and failures—he continually referenced neighboring farmers and the importance of collaboration. “The key to good aquaculture,” he said, “is having a good community and support...you can’t do it otherwise.” Throughout our interview, he recalled a wide variety of situations that illustrated this. When he first started out, he recalled that other farmers were essential to his research. Oyster farming requires a thorough scientific understanding of the lifecycle of the oyster and the gear necessary to raise them to full size. Compounding this are the inherent risks that come with environmental variability. His social relationships with other more seasoned farmers proved essential as they provided important anecdotal information that allowed him to avoid costly mistakes. Over time, his relationships with others grew, as they began routinely getting together outside of the farm. Though still informal, the sharing of information continued, often over beers after work.

There's probably three or four that I work with. We go out for beers every three weeks and talk about, you know, how things are in the bay and what we can do to make things better and you know, some of the farmers are tight lipped about their farms but not for the most part. That's not the norm. Most of the guys—we go out, we talk about strategies, we talk about equipment. I build a lot of equipment for the guys too.

Regular meetings helped the farmers develop better strategies for managing their farms and even opened up new business opportunities for Jamie with equipment sales. By “sharing information [and at times simply] reaching out to other farmers, you know, asking them, like what the hell does that mean?” they also strengthened their relationships and developed trust. This trust extends beyond the exchange of information, as Jamie later describes an instance where neighboring farmers called to let him know his equipment was malfunctioning when he wasn't around. He trusts that his community will look out for him and his business.

Or you know, the other oyster farmer who's got his boat right there, he walks by my step every day and he's going to say to me, which he usually does, Jamie, your pumps sucking air. You know, “oh alright, I'm on my way.”

Equipment malfunction is a reality that oyster farmers must deal with regularly. In this instance, Jamie's community acts an extra set of eyes when he is away. He believes that this community support has been integral to his success—and he is not alone.

This sense of community was felt across the board. Pat, calling himself a part-timer, says there is “absolutely” a sense of community among the farmers, claiming they help each other out in various ways. “Everyone's pretty open to sharing their

successes and failures. And you know, we buy seed from one of the oyster farmers so, we also kind of do business with each other as well”.

The importance of their community was described by Dana, one of the newest farmers. His access to the community has provided him support and information useful in the early phases of his development as a business.

Yeah, huge sense of community. Super friendly, I don't feel threatened. There's a lot of comradery and sharing of knowledge. In fact, it's even part of the by-laws of some of the oyster growing associations. If you belong to them, part of your responsibility is to share knowledge because what we're trying to do is really just encourage and find out and discover the fastest and best ways to grow oysters.

Dana touches on three key elements of their oyster farming community. First, he demonstrates the community's willingness to accept new members. Community-wide norms of openness allow new members to enter and access the resources offered by the community, such as key information and social support. Second, even as a new member, he recognizes that the goal of the community overall is to find the best way to grow oysters. Common pursuit of this goal plays an important role in the cohesion of this community. Third, Dana's comment about the bylaws of regional associations shows how the value of collaborative knowledge exchange has transformed into the formal structures of their regional associations.

Regional oyster grower groups such as the East Coast Growers Association (ECGA) play an important role in connecting oyster farmers from across New England. While a number of Great Bay farmers mentioned ECGA, the connections forged between the farmers differ from those with the broader regional growing community. Those close connections enabled farmers to learn better ways to farm through regular face to face interaction and information sharing, that in turn created a thriving community of practice in Great Bay.

4.2 Environmental Variability, Information Exchange and Cohesion

Oyster farming requires a thorough scientific understanding of the biology of the oyster, the environment in which they live, and the technology needed to support their growth from seed to sale. While this is a challenge on its own, it is compounded by regional environmental variation. Growth data from one region is inapplicable to other regions. In fact, according to Lee, growth rates are much slower in the bay compared to neighboring states, only an hour's drive away. Tidal patterns vary, nutrient contents vary, temperatures vary, and the harvest window varies depending on the region. This variability makes obtaining relevant research difficult for new farmers. While they could turn to other industries for best practices, often, as Taylor describes, regional differences render much of the available research inapplicable.

So, you want to kind of stand on the shoulders of giants, I guess, and emulate them, but you also have to keep in mind that farming is so site specific that you cannot, it's not cookie cutter. You cannot just take what Island Creek in Muscongus Bay are doing and move it to Great Bay, New Hampshire.

You have to figure out how to use your site, and that's the real, one of the real challenges of growing oysters.

Different ecosystems present different challenges, requiring farmers to tailor established best management practices to their own specific site requirements. Similarly, outside information is often inapplicable. For this reason, farmers in Great Bay depend on locally produced, experience-based knowledge created by the community members themselves. Especially in their formative years, they relied on each other—exchanging notes, discussing the outcomes of different techniques—and began to build a community-wide social competence of farming in the bay (Wenger, 1998). Sam describes the way they shared and constructed this knowledge at regular meetings between an early group of farmers.

Well it used to be pretty specific—we wanted to just compare notes so to speak. So we had no agenda or anything. So we would just, well I shouldn't say, we would have an agenda like this, but we didn't have a mission or anything for the group. But you know, we would meet at a bar we would have a beer, uh, some would have more. And then the meeting became better...so it was just this good loose, informal, information exchange.

Their need for locally-relevant information led them to turn to community members, creating cohesion and reciprocity. When asking farmers where they accessed information essential to their business, most responded like Sam, citing other farmers as their primary resource.

The most useful information comes from within the community, generated through experience, and transferred through social relationships. Out of thirteen interviews, nine farmer mentioned other growers as a resource for information. Four discussed the local university as a resource, one referenced a specific person at New Hampshire Department of Environmental Services, and one farmer who only made it through the permitting process, but ultimately decided not to farm, referenced scientific papers. Their need for Great Bay-specific information encouraged interaction and collaboration among farmers. They depended on each other for information essential for their success, and ultimately, this dependency creates cohesion within their community.

According to the farmers, the need for site-specific information also influences the way they interact with regulatory agencies, outside the bounds of their community. Considering oyster farming is such a new industry in Great Bay the most seasoned farmers, in operation for only six years, clearly recall the formative years as equally challenging for regulatory agencies. Like the farmers developing best practice strategies, the agencies tasked with regulating the industry had to develop their own systems and protocols. At first, as Robin recalls, they looked to neighboring states with more established industries for guidance.

So they had to take someone, put them in the shellfish department. She had to basically write these procedures which were federal, so it's jumping through billions of hoops, and so she researched, from what I know, all of

the agencies up and down the east coast and figured out what their rules were and their timeframes for like, how long they could sit on your deck, how long before you have to get them onto ice, how cold do you need to get them and why.

Yet, as the farmers often pointed out, in terms of the biological and physical setting, every region varies greatly and often processes that work in one region will not work in another. Casey, who farmed briefly in 2012, remembered confusion surrounding the adopted permitting process.

I don't think Fish and Game had a great idea of what they were looking for. They had a permitting process outlined online. It was very vague, very outdated. I think they took a lot of their information from other states and then just tried to make it work for our area.

Regional environmental differences made simply adopting other state's policies difficult. Instead, government agencies sought to work with the farmers to create processes that made sense for their region and satisfied all involved parties. This dynamic has continued throughout the years. For example, many of the farmers discussed working together with the New Hampshire Department of Health and Human Services [NHDHHS] on a new vibrio plan after a major outbreak in a neighboring state. Vibrio, a dangerous group of bacteria found in raw or undercooked seafood, causes an average of 80,000 illnesses resulting in nearly 100 deaths per year (Center for Disease Control, 2017). Pat recalls meetings held to develop a Great Bay-specific prevention plan.

They are working with us well. They have meetings where they presented the vibrio plan and asked for our feedback and so we worked out some things that weren't necessarily clear in the document. So that process is really encouraging and really positive. I really like how they are engaging the actual people that are doing the work.

Alex discussed the vibrio plan as well and described how this process of developing procedures has helped to create a collaborative dynamic between governing agencies and the farmers. "I think Fish and Game, DES and DHHS have been very receptive to having us. They provide us with a meeting space and we can come address problems that we have".

Early collaboration between agencies and the farmers has contributed to the farmers' perceptions of accessibility. The farmers feel comfortable bringing issues to the agencies, believing the agencies will respect their feedback and work with them to find a solution.

While the need for regionally specific information necessitates knowledge exchange among farmers, it has also promoted collaboration between farmers and government agencies tasked with regulating their industry. As the industry is still in its infancy, knowledge gained through experience remains vital to the farmers' success and the efficacy of regulating agencies. The desire for this knowledge promotes collaboration,

continuously reinforcing the need for their community of practice, while their dependence on each other for this knowledge simultaneously creates cohesion.

4.3 Place-Based Identity

In addition to their need for relevant information, farmers reveal how the place-based identity of the oyster influences the way they work together as a community. Oysters are inextricably tied to the region in which they are grown. Not only are they often identified by their geographic area, but their physical characteristics and flavor profiles are directly determined by the environment—much like the ‘terroir’ of wine. ‘Merroir,’ terroir’s maritime adaptation, was often brought up as an opportunity for differentiation (De Master, LaChance, Bowen, & MacNell, 2019). Dana describes in his interview that ‘merroir’ is especially important because most of the oysters grown along the East Coast are the same species—*Crassostrea virginica*, the Eastern Oyster.

The only difference is the location. It’s sort of like the wine. It kind of goes back to that where, you know, it takes in the character of the soil or in this case the water and where it’s located.

Additionally, Dana describes that many farmers in Maine and New Hampshire buy their seed from the same hatchery. He reiterates that what differentiates a New Hampshire oyster from any other is the environment.

While the farmers seek differentiation from the wider industry, interestingly, it appears less important within their local industry. Though many of their farm names reflect specific areas in the bay, overwhelmingly, the farmers refer to their own product as ‘Great Bay’ or ‘New Hampshire’ oysters. Robin discusses advising a local store that carries his product to specify that they are Great Bay Oysters.

There’s another store right here in Dover and they don’t put local oysters on it and I don’t know why and I told them the other day, I said, you write it on the window, it says oysters, you know \$1.50 or whatever it is. I said put local Great Bay Oysters and you’ll sell more. Howie’s sells a ton more when we put ours, when we put Great Bay ones in there.

Instead of encouraging them to write ‘Robin’s Oysters,’ he calls them local, ‘Great Bay Oysters.’ The farmers have capitalized on the opportunity to develop a regional identity, creating a collective, yet informal, regional brand. Jamie discusses this explicitly.

Well, I think New Hampshire has a huge opportunity to....have a brand that's known, like I said oysters are known for where they come from, so really creating a brand for NH that's got a good reputation and a higher standard and that hopefully makes the industry more productive and also you know makes it more profitable for the state.

The farmers believe that building a region-based brand with a reputation based on quality will help their industry grow. This positive reputation, they argue, will help their region gain legitimacy and popularity. As New Hampshire becomes better known and is recognized as a producing region, their industry will grow and their farms will reap the benefits. The farmers demonstrate their commitment to this regional branding through an industry-wide goal. Using Jacobson's (2007) "Geography of the Oyster" as a marker, Jamie, among others, describes the importance of pushing their regional brand.

And I think the other thing would be just, we've talked about this as a group is trying to market the New Hampshire brand oyster, you know not necessarily call it the Granite State Oyster, but you know trying to get New Hampshire on the map as far as oyster farming. There's a book, I can't remember what it's called but it's like the geography of the oyster or something like that, and every state is on it on the seacoast, or the East Coast except New Hampshire. They passed us by! And so that was our goal for like 2020 is to have them revise the book, put us in there.

4.4 Risk of Illness

While in this case, the place-based identity of the oyster provides an opportunity for the farmers to build their industry, it is also a risk. Farmers recognize that their collective reputation could be easily tarnished by a single mistake. If one farm sells poor quality, or worse, contaminated oysters, the entire region suffers. New Hampshire Oysters would suddenly be a risky purchase for customers, even if the outbreak was due to improper handling within a single farm. Lee describes this threat plainly. "The biggest risk you run into is if there's a sickness associated with the oysters. Suddenly the demand would plummet, and price would go down."

Just as they would thrive together with a strong and positive place-based identity, the farmers realize that they would suffer collectively if the reputation of Great Bay or the quality of the environment were questioned.

The farmers took pride in the fact that there had never been an outbreak associated with New Hampshire oysters. As Jamie pointed out, their community worked hard to maintain "a good reputation and a high standard." They emphasized the importance of individual farmers following standards set by government agencies. Though they are legally required to follow these standards, they also recognized that there is a level of trust that they will comply without constant agency oversight. In order to mitigate the risk of non-compliance, the farmers engaged in self-policing, as described by Alex.

I think you know keeping that stigma that New Hampshire is disease free in terms of the health of the people that are eating our oysters and making sure we want to police each other as much as the government does because we don't want someone to screw up and leave their oysters out on the deck too

long and get someone ill because you know, [then] we can't say New Hampshire never had a case of shellfish poisoning.

By actively holding each other accountable, they worked collectively to ensure the safety and value of 'Great Bay' oysters.

However, the efficacy of the oyster farmers' collective efforts was called into question the following summer when a customer of a local restaurant claimed that they became ill after consuming a Great Bay oyster. Though they were unable to conclusively determine whether the illness was related, the farmers were shaken. Three interviews conducted after the incident gave us a sense of the community's response.

According to Morgan, the incident "brought the farmers closer together" by reinforcing their collective values surrounding safety and surveillance.

We talk about having to be vigilant about it you know so every time something happens we are all like 'ok we have to be icing down our oysters, we have to be doing this, it kind of brings us closer, you know?

Morgan also brought up an additional consequence surrounding an outbreak—the social repercussions of a government-mandated shutdown. For safety, regulatory bodies often close harvesting until the source of contamination is identified. The social consequences of being the one responsible for an extended shutdown encourages vigilance.

We have to be dedicated. Cooling the oysters down, doing our steps, recording every single thing, you know, temperatures, everything. You don't want to cause anyone to get sick, but you also don't want to cause your industry to shut down for three months.

It is clear that illness is a real threat that is exacerbated by the place-based identity of the oyster. The reputation of the region as a whole can be threatened by the actions of one, and it is this risk that pushes the farmers to work together and hold each other accountable to maintain their reputation.

4.5 Market Forces

In recent years, demand for oysters has grown exponentially and farmers are keenly aware. Although most express uncertainty regarding how long the trend will last, currently they are far more concerned with having enough oysters to sell than finding outlets for excess product. Taylor explains how a booming market has shaped their social relationships.

The thing that keeps us from you know, any animosity I guess or being overly competitive is that the oyster market is so strong right now that we're not really competing with each other. We can all easily sell at this point, knock on wood, all of the product that we have, so we're not competing with

each other at this point. So, there isn't that, you know secret keeping and animosity and all of the negatives that come with being competitors.

Yet even without any concern over making sales, as many of them point out, they are still competitors. While a healthy market certainly lessens the negative social effects of competition, as Glen points out, any change could threaten their collaborative dynamic.

I think there is a fair amount of comradery. But there's competition too. I mean we're competitors so to speak, we are, we're competitors. The market has made, has lessened the competition because most of us can't produce as much as we can sell. So as long as it stays that way, any business venture, everyone is happy go lucky and fine. But once the two start bumping against one another, we're out here making money.

Though questions on the effects of future market changes remain, thus far the farmers agree that ample demand for their product has lessened competitive behaviors within their community. The lack of competition has allowed for collaboration, sharing of knowledge and openness that is uncommon in highly competitive industries. Questions also remain regarding capacity—with room for more farmers, how will an influx of newcomers affect their collaborative dynamic? While this is an important consideration, the potential for exponential growth is hampered by the space available in Great Bay. Water depth and areas protected for eelgrass limit the acreage available for aquaculture (Grizzle & Ward, 2012).

5.0 Discussion

With the resurgence of small-scale, locally-focused craft food producers, sociological inquiry is critical to understand how social relationships may both support and constrain the growth of these operations. This case study of the emerging NH oyster industry, while only examining a small piece of this much wider phenomenon, reveals the role of community in economic action and organization in an emergent craft industry. Findings from this study demonstrate how environmental variability, the place-based identity and value of NH oysters, the risk of illness and market forces shape and necessitate the existence of a community of practice.

Environmental variability increases the value of reliable, experience-based knowledge that is specific to their area. Considering oyster farming is a high skill, knowledge intensive activity, access to a pool of public knowledge is essential to their individual success. Exacerbating this is the youth of the industry. New farmers rely heavily on the experience of others. The place-based identity of the oyster strongly encourages collaboration because of opportunities for regional growth and the residual effect this growth would have on individual businesses. Collective risks from illness also encourage collaboration, as the farmers believe that they need to secure a regional reputation for safe oysters. The pressure of maintaining this reputation requires peer surveillance. Lastly, a booming oyster market has reduced opportunistic behavior among the farmers. Though they are competitors, they have yet to seriously compete.

On the surface, these findings demonstrate that a community of practice exists and outline the external and internal forces that shape and necessitate its existence.

However, examining this community as an inter-organizational network proves useful in deepening our understanding of the way in which community relationships can affect economic action and economic organization, complicating a simple instrumental exchange model of interaction (Powell, 1990). Understanding this community as an inter-organizational network highlights the complexities of the role of social relationships within their industry and how they aid in reducing risk and uncertainties that often are exacerbated in a new industry.

5.1 Environmental Variability & Procedural Uncertainty

Through highlighting the importance of collaborative learning, the farmers revealed four key sources of uncertainty. First, is procedural uncertainty. Without established best practices catered to their geographic area, the farmers are forced to generate their own knowledge. With an industry less than a decade old, this knowledge is still being developed. As Dana says—they are still “trying to figure out the best way to grow oysters”. Lack of reliable, geographically-specific information introduces risk on multiple fronts. Inexperience often results in high mortality rates. While some loss is expected, throughout the interviews we often heard “you aren’t a farmer until you’ve killed your first million.” Extensive loss can be costly in multiple ways. First, and most obviously, with mortality comes the loss of expected revenue. Ten thousand oysters lost means ten thousand dollars in revenue foregone. Yet even more detrimental, massive die-offs can set farmers back years in their development. Taking two to three years to reach full size, oyster mortality can result in a waiting game, during which the farmers still have to pay the bills.

Thus, acquiring the knowledge and skill necessary to avoid such losses is key to farmers survival—and their community provides this. While the community of practice literature highlights the way learning-centered communities are highly innovative, understanding their community as an inter-organizational network prioritizes their role as businesses and shows how their community functions as a strategic resource network. These network ties enable “small firms to gain an established foothold almost overnight...serv[ing] as [a] conduit to provide small firms with the capacity to meet resource and functional needs” (Powell, 1990, p. 299) Knowledge is a key resource—especially experience-based knowledge generated by reliable network members (Lorenzoni & Ornatì, 1988; Powell, 1990). While oyster growers face uncertainty in their formative years because of lack of experience, their community of practice as an inter-organizational mitigates this uncertainty by providing access to this pool of reliable knowledge (Thompson, 1967).

5.2 Environmental Variability & Regulatory Uncertainty

A second source of uncertainty is rooted in regulatory procedures. As farmers launched their operations, New Hampshire’s governing bodies tasked with developing and enforcing policies needed to create oyster-related regulatory guidelines from the ground up. While they could lean on the guidelines developed by other states, the farmers pointed out how bureaucratic isomorphism—where organizations within a single industry adopt the practices of other successful organizations—is ineffective due to environmental variability (DiMaggio & Powell, 1983). Further, Thompson (1967) argues that regulations are always a source of ‘static uncertainty’ as changes can upend procedures and threaten market outlets (Thompson, 1967; Kamps & Polos, 1999). In a new industry like oyster farming in

NH, the threat of regulatory changes is heightened as governing bodies figure out the most effective ways of ensuring food safety and fairness.

To combat this static uncertainty, the farmers utilized the legitimacy of their developing community to work together with government agencies—and their testimonies reflect their success. Aldrich and Fiol (1994) indicate that new industries struggle disproportionately with gaining sociopolitical legitimacy, or the process by which “key stakeholders, the general public, key opinion leaders, or governing officials accept a venture as appropriate and right, given existing norms and laws” (p. 648). The oyster farmers demonstrate their success gaining this form of legitimacy by the way regulating bodies recognized them as key contributors to policy development rather than simply the subjects of enforcement. By working as an inter-organizational community, they were able to increase their influence and manage the uncertainty of potential changes in regulation. If changes needed to be made, their community would have a say.

5.3 Risk of Illness

A third source of uncertainty is the risk of shellfish related illness. Though the farmers deal with this on an individual level, most illness-related risk can be reduced through good management, safe harvesting procedures and adherence to regulatory guidelines. While farmers have control over their own practices, they have less control over their neighbor’s. As the findings show, the identity of the oyster is place-based. Research confirms this, showing that oysters are often regionally defined (Jacobson, 2007). Thus, the farmers fear that any instance of contamination could be detrimental to their regional reputation.

Their inter-organizational network helps to mitigate this threat through two key components of networks: norms and sanctions (Powell, 1990). On many occasions the farmers discussed the importance of their regional reputation for safety. Prior to their first—though unsubstantiated—associated illness, the farmers were adamant about maintaining their record. Behavior that reflected their values of safety and quality was normative—and behavior that did not was sanctioned. After the incident, the farmers doubled down, reinforcing normative behavior regarding safety and warning each other of the consequences of bad management practices. ‘Policing each other’ reflects a signature element of inter-organizational networks—they “establish psychological contracts” (Ring & Van De Ven, 1994, p. 100) rather than formal contracts with sanctions being “typically normative rather than legal” (Powell 1990, p. 301). The social repercussions of breaking these ‘psychological contracts’ appears to be a valuable motivator for compliance, demonstrating the effectiveness of norms and sanctions in reducing the uncertainty associated with shellfish-related illness (Ring & Van De Ven, 1994).

5.4 Market Forces

The fourth source of uncertainty is purely economic—the threat of a market crash. Though the market is strong, and this is expected to continue, the farmers recognize that market fluctuations are always a risk. Though there is little they can do to prevent such fluctuations, the establishment of collaborative norms within their community can prevent opportunistic behavior that would exacerbate the negative effects of increased competition (Powell, 1990). They have created norms of cooperation and openness and in the process have engendered trust—a key component of networks (Granovetter, 1985; Kilduff & Brass, 2010; Powell, 1990).

While the farmers recognize that their community dynamics might change with a narrowing of the market, they use their community to buffer the effects. The literature confirms this, as Powell (1990) argues that in a network with established norms, members will “forego the right to pursue their own interests at the expense of others” (p. 303).

6.0 Conclusion

Like all organizations, the oyster growers face uncertainty and risk. By examining four main sources of uncertainty outlined by the Great Bay oyster farmers, we are able to understand the way in which these farmers utilize their community to reduce those uncertainties. Their community functions as an inter-organizational network, where member participation is based on long-term, intangible benefits that complicate a simple instrumental exchange model (Powell, 1990). These benefits include open access to a public pool of knowledge, sociopolitical legitimacy that enables regulatory influence, the existence of strong, community-wide norms that can help to ensure high standards of quality and safety, and a buffering of opportunistic behavior in the event of a market fluctuation. Additionally, the stability provided by collective risk reduction can “encourage the search for new ways of accomplishing tasks [and] promote learning,” (Powell 1990, p. 303) an essential part of their community of practice. Clearly, “there are gains to be had by the pooling of resources” (Powell 1990, p. 303).

While this research focuses on a small population in a local area, the way this community of practice functions offers broader insights about how community shapes oyster growing on a wider scale. As oyster production in North America grows in tandem with demand, this study demonstrates how inter-organizational relations—in community form—can help these emergent industries thrive. While each industry faces unique challenges and variable risks, unlike formal organizational structures, community is inherently malleable and can adapt to meet the needs of its members. In new industries, this is particularly useful due to the lack of existing support structures. In this study, the oyster farmers demonstrate the way in which a community can buffer both internal risk and external forces inherent to their practice. Case studies, like this one, are an essential part of our growing understanding of community influence on economic action and economic organization.

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