Marine Policy 81 (2017) 375–380

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Towards the economic viability of local seafood programs: Key features for the financial performance of community supported fisheries

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ARTICLE INFO

Keywords:
CSF
Local seafood
Social media
Small business
Commercial fisheries
Community supported agriculture

ABSTRACT

Community supported fishery (CSF) programs are emerging as appealing alternatives to large-scale industrial fisheries for some seafood consumers and commercial fishers. While CSFs provide many social, economic, and environmental benefits to their local communities, the associated financial costs can make it difficult for such programs to remain solvent. The goal of this research was to identify specific features that influence the financial performance of CSF programs. Using data collected online and from surveys of past and current North American CSFs, this research identified a combination of three key features associated with positive profit margins: engaging in social media, offering a retail option, and having a fisher as a founding member. The potential reasons behind the influence of these features on financial performance is explored, and recommendations for how they can be incorporated into CSF programs are presented. It is hoped that through integrating these features, prospective and currently operating CSFs could potentially improve their long-term financial performance, enabling them to focus on their non-financial goals and increase their overall economic viability.

1. Introduction

Over the last century and a half, the environmental impacts and economic inefficiencies of large-scale industrial fisheries have resulted in an increased focus on alternative fishing practices [1–3]. Today, capture fisheries rely on large vessels, mechanization, and advanced technology to meet the global demand for seafood [4]. With current exploitation rates, these industrial fishing techniques are largely ecologically unsustainable [2,5]. The economic health of global fisheries is no better, as marine capture fisheries produce $50–60 billion USD per year in economic waste [6,7] and industrial fleets regularly rely on subsidies to remain operational [5,8,9]. While modern fisheries struggle with these environmental and economic problems, consumers seeking to make informed seafood purchases face barriers such as seafood mislabeling [10,11], long supply chains with little transparency [12], and conflicting definitions of 'sustainable seafood' [13–15]. Cumulatively, these issues have led to a push for smaller, direct market commercial fisheries that operate on local scales [2,16].

Community supported fisheries (CSFs) are a type of local seafood program that aims to connect small-scale commercial fishers with consumers [17]. Based on community supported agriculture (CSA), CSFs seek to provide fair compensation to small-scale fishers, increase access to locally caught seafood, and create shortened, transparent supply chains [18]. CSFs sell seafood directly to consumers, often through pre-payments (frequently referred to as 'shares') at the beginning of a fishing season [19]. Advance payment systems aim to help cover fishing costs, share food production risks, and assure sufficient sale volumes. Like other forms of seafood direct marketing, including farmers' markets and dock sales, CSFs try to minimize payments to 'middlemen', such as brokers, processors, and retailers, in order to increase the price that fishers receive for their catch [20].

Community supported fisheries can provide important social, environmental, and economic benefits to their local communities. Even before the first CSF was established, community-level processes and practices were identified as key elements for the future of ecosystem-based fisheries management [21]. The rise of CSFs coincided with the emergence of many community-level initiatives aiming to engage the skills and resources of local people, from grassroots endeavors conceived locally to projects initiated by global institutions like the World Bank and the Food and Agriculture Organization (FAO) [22]. Community supported fisheries are examples of such initiatives, and they provide a suite of market (e.g., employment and fair prices)

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http://dx.doi.org/10.1016/j.marpol.2017.04.009
Received 8 August 2016; Received in revised form 4 April 2017; Accepted 4 April 2017

and non-market values (e.g., traceability and education) that benefit both small-scale fishers and their communities [23]. Small-scale fishers typically earn less money for their fishery products than any other entity in the industry [24], and CSFs address this discrepancy by providing fair and consistent compensation to small-scale fishers for their catch [17,25]. Community supported fisheries provide environmental benefits as well; in addition to decreasing the carbon footprint of seafood, CSFs reduce environmental disturbances at local scales by supporting the use of lower impact fishing gear and developing markets for bycatch, fish waste products, and underutilized species [26]. Overall, many benefits that CSFs provide align with those of CSAs [18], which contribute to community vitality by giving consumers the opportunity to support their community's food producers and local economy [27].

Despite the demonstrated and potential benefits of CSFs to fishers, consumers, and their communities, small-scale commercial fishing operations can find it difficult to compete with large-scale industrial fisheries and their supply chains in a globalized seafood marketplace [2,28]. CSFs face market competition for consumers, product supply issues (e.g., seasonal or failed stocks), high start-up costs, and practical challenges when integrating supply chain operations, including the processing, transportation, and storage of their products [20,23]. In many cases, the costs of these challenges make it difficult for these small businesses to maintain operations after their start-up year [29–31]. Identifying key strategies that CSFs can use to remain financially successful is critical for the long-term viability of these programs.

1.1. Study goal

The goal of this study was to highlight key features that influence the financial performance of CSFs. These types of programs are still evolving, with the first CSF having been established within the last decade [17]. The rapid and recent emergence of CSFs presents an opportunity to examine the factors that can improve the financial performance of these businesses while best practices are still being established. Establishing positive financial performance is necessary for the long-term financial viability of CSFs, and along with social and ecological factors like public outreach and product sustainability, it is a critical component contributing to their overall economic viability [32]. There is large variation in CSF structure [19], including differences in the products they sell, their social media presence, and the payment options they offer. There is also variation among CSFs in terms of their financial stability, with some CSFs becoming well-established and profitable, and others being unable to attract enough shareholders to achieve profitability [17]. These financial differences could be linked to CSF structure, but to date there has been no research examining the relationship between program design decisions and the resulting financial performance of these businesses. By identifying features of financially successful CSFs, this study aims to fill this gap in the literature and provide insight for prospective and current owners in the development, growth, and viability of their programs.

2. Methods

To assess features important for the financial performance of CSFs, this study identified North American CSF programs and collected data related to their finances and operations. There is no standard definition for a CSF [20]; rather, the diversity of CSFs is such that a single definition would be insufficient [19]. Acknowledging this diversity, this study established criteria for programs to be included in the study, only collecting data from programs in North America that self-described as CSFs and that strived to: 1) provide a transparent chain-of-custody from fisher to consumer; 2) increase access to locally caught/produced seafood to consumers; and 3) provide at or above market prices to fishers for their catch. A list of CSFs that met these criteria was compiled from online local seafood networks [33,34], published literature, grey literature, and online media sources, and was used as the study's sample.

2.1. Survey methods

Data used in this study were collected in two ways: 1) directly from CSF websites and their social media platforms in December 2014, and 2) through phone and email surveys between January and June 2015. Online data were collected for the 47 North American CSFs that met the study's criteria (see Section 2), including programs that were no longer operational at the time of data collection. Surveys were distributed after online data collection to obtain additional information that was not accessible from online sources. Surveys were sent electronically to all 47 CSFs, with 24 CSFs returning completed surveys or opting to respond by phone (see Section 2.2 for types of data collected and Appendix A for a list of the survey questions). Surveys contained only questions to which objective, factual answers could be given; no opinions or personal information were asked of respondents. Identifying information, including CSF names, has been excluded from this manuscript and all Supplementary Materials to maintain the anonymity of the respondents.

2.2. CSF features

The CSF data collected online and through surveys were broken down into four main categories and ten total features within these. The first category was the CSF's online and social media presence, which included whether the CSF had a website, whether it offered online sales, and the number of social media accounts held by the CSF (e.g., Twitter, Facebook, Instagram, Pinterest, YouTube). The second category involved the purchasing options offered by the CSF, including the furthest distance from seafood landing sites to sales locations, and whether the CSF offered retail sales as a payment option. Retail sales allow customers to purchase seafood directly from the CSF without a prepaid share; this option has also been termed ‘a la carte’ [19] and ‘pay-as-you-go’ [35]. The third category concerned the CSF's financial and advisory support, including information on whether a fisher was part of the founding team and whether the CSF had external funding (e.g., through government or non-governmental grants). The final category examined the CSF's infrastructure, specifically whether it was self-sufficient in its product storage, processing, and transportation. Appendix A provides a complete list of the study's survey questions.

2.3. Profit margin and analysis

Financial performance was quantified using each CSF's profit margin. Of the 24 CSFs that responded to email or phone surveys, 19 supplied their profit margin for their most recent year of operation. Profit margin for a CSF was calculated as the ratio of its total annual income (including grants) to its total operating costs [36]. Profit margin was used in this study to measure financial performance as it is a simple way to quantify the financial health of a business, and requires easily accessible data for respondents.

Key features for financial performance were identified by exploring the relationships between the features described in Section 2.2 and CSF profit margins. Features that were associated with a minimum 50% increase in mean profit margin were considered to have a strong influence on profit margin. To determine whether profit margins were significantly greater than zero for CSFs with different combinations of these identified features, a one-tailed *t*-test was used. See Edgar et al. [37] for an analogous exploratory analysis.

3. Results

As of December 2014, 47 CSF programs meeting the study's criteria

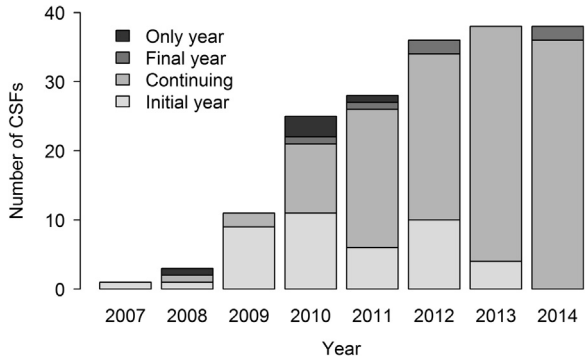

Fig. 1. Number of active CSFs in North America since the inception of the first CSF in 2007. The darkest bars indicate CSFs that ceased operation in the same year that they were established.

(see Section 2) had at some point operated in North America; of these, 38 were active in 2014 (see Fig. 1). The first North American CSF was established in 2007, after which the number of active CSFs grew at a declining rate before peaking in 2013. The annual rate of establishment reached its maximum in 2010 and has decreased since. New businesses are still being established, with at least two new CSFs beginning operations in 2015. As of December 2014, there were 11 CSFs that were no longer operational; five of these programs ceased operations in the same year that they were established. Five of the six non-operational CSFs that responded to the survey ceased operations for financial reasons.

3.1. Features of CSFs

In general, the CSFs in this study had a strong online presence; 77% had websites, 70% had at least one social media account, and 63% offered an online ordering option (Fig. 2). Despite the local focus of many CSFs and the advance payment system that defined early programs [17,20], 68% sold products out of town (as defined by the respondent) and 36% had an option for retail sales. Initial financial and advisory support was varied, as only 42% of CSFs had start-up funding and 42% had a fisher as a founding member. There were also varying levels of self-sufficiency, with 68% of CSFs processing their product in their own facilities, 58% having their own cold storage, and 37% distributing goods with their own transportation capacity.

3.2. Financial performance

Three features were associated with a mean profit margin increase

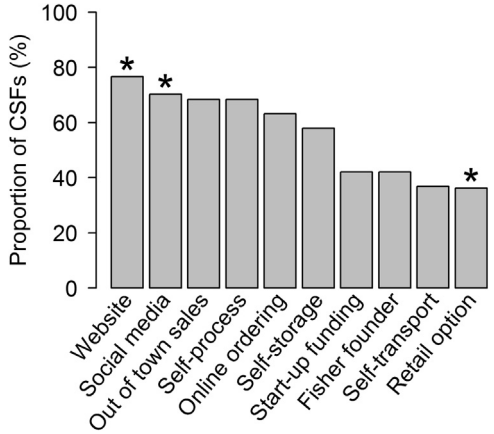

Fig. 2. Features of CSFs that may influence financial performance, and the proportion of CSFs that possessed them. Proportions indicated with an asterisk were calculated from the study's dataset for all 47 CSFs that have operated in North America. Unmarked proportions were those calculated from the 24 CSFs that responded to the study's survey.

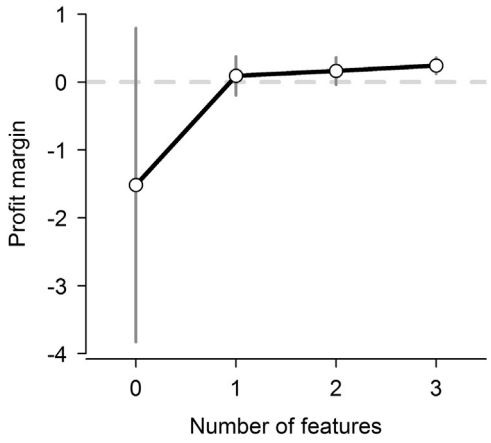

Fig. 3. Mean profit margins of 19 CSFs with different combinations of the three key features found to influence financial performance: (1) a retail sales option, (2) a fisher founder, and (3) at least one social media account. Grey error bars describe 95% confidence intervals.

of at least 50%: offering an option for retail sales, having a fisher founding member, and using at least one social media account. Although sample sizes were small and inference on this relationship should be made with caution, having more of these features led to higher profit margins (Fig. 3). CSF programs with all three features were the only group to have profit margins significantly greater than zero ($t = 3.97$, df $= 2$, $p = 0.03$).

4. Key CSF features and program recommendations

Ten features that could plausibly lead to improved financial performance of CSF programs were investigated. Among the 47 North American programs meeting the study's criteria for being a CSF, there was large variation in the adoption of these features (Fig. 2). The combination of three of these features – using social media platforms, offering a retail sales option, and having a fisher founder – was associated with statistically positive profit margins (Fig. 3). Given the relatively recent rise of CSF programs in North America (Fig. 1), it is not surprising that there is large variation in program structure among CSFs [see 19]. As not all variations of the CSF model have remained financially successful, including five of the six discontinued CSFs that responded to the survey, it is worth exploring how and why the use of social media platforms, retail sales options, and fisher knowledge could be beneficial to these programs.

4.1. Social media presence

In today's digital world, online social platforms are essential modes of daily communication [38], making them useful marketing tools for small businesses like CSFs in a number of ways. Social media platforms allow businesses to create public accounts that, unlike websites, allow users to interact continuously with both the business and a network of like-minded consumers [39]. These networks, such as Facebook and Twitter, can be comprised of millions of users and allow CSFs to use electronic word-of-mouth promotion to increase their reach to a much larger community [20,40]. Social media is particularly important for reaching younger individuals [41], the largest user group of social media and the most likely to rely on social media platforms to inform their behaviour as consumers [42].

Online platforms are useful tools for meeting the financial and non-financial objectives of CSF programs, specifically for marketing and promoting community and customer involvement. Many CSFs aim to educate communities about local food movements and fisheries [19], and social media platforms on which users can share opinions and information lend themselves well to community engagement and

participation [43]. CSFs can use social media to make information about their business (e.g., their supply chains), local fisheries, and seafood sustainability readily available to the public. Unlike websites, which need to be accessed directly, social media allow for updates on product availability and upcoming events that can reach a larger audience on platforms that customers are already accessing frequently. Social media also enhances customer engagement by promoting multi-directional information transfer between CSFs and their customers, allowing programs to solicit feedback on their services. These platforms are often free to use, and offer an ideal online marketing method for CSFs operating on low budgets.

To effectively use social media as a marketing tool, CSFs need to both access these platforms and maintain a strong and consistent presence on them. While 31 of the 47 CSFs examined in this study had accounts on the social media platform Twitter, over a third of them had very low activity on their accounts, with fewer than 100 posts each as of December 2014. By comparison, the most active users had over 1600 posts. This lack of online activity could be a result of organizers not having a background in or time for digital communication or marketing, so incorporating staff or volunteers with this expertise could add to the success of a CSF. Many CSA programs have developed guides [41,44] and workshops to help promote the use of these platforms, and these could easily be adapted to fit CSF programs and disseminated to individual businesses through CSF umbrella networks like LocalCatch.org. When CSF websites and social media platforms were examined for this study, it was often difficult to locate basic information such as the payment systems offered, the types of products sold, and the cost of products; standard guides could facilitate transparency and communication by listing standard information that CSFs should provide to customers online.

4.2. Retail sales options

While community supported local food programs generally use advance payment systems to distribute risk among producers and consumers [17,45,46], CSFs that employ additional payment options may be increasing their profitability. The reasoning for this is not fully apparent, but likely depends on consumers' individual preferences for their shopping experience, which vary widely. For instance, retail sales options may help CSFs attract consumers that are averse to financial risks associated with advance payment systems, which include financial loss due to unreliability in product variety, unwanted or wasted products, or even the failure of the CSF program entirely [17,35]. While advance payment models can have benefits for all parties involved in CSFs, especially for fishers needing financial support at the beginning of a fishing season, consumers generally prefer to minimize uncertainty and risk in their purchasing decisions [47]. In CSA programs, consumers often prefer to pay higher prices for products than suffer potential loss in future product quantity [48], and the majority of members participating in CSAs with a retail sales option do not order products weekly, preferring instead to receive produce on an as-needed basis to minimize the risk of wasting food and money [35]. While CSFs and other food initiatives may rely on advance purchasing by consumers that are already inclined to buy locally, the monetary risk of an advance payment system may deter other potential consumers [49], such as risk-averse demographic groups like older and higher-income individuals [50]. A retail sales option may encourage these risk-adverse groups, or those that are financially-limited, to participate in CSFs, and potentially make them more likely to transition to an advance payment system in the future.

Traditional retail sales options, such as product sales at a farmers' market, provide a more familiar payment system to consumers than pre-paid shares or other forms of advance payment. Maintaining an aspect of that familiarity may be appealing to consumers that enjoy the experience of gathering as a community to buy their produce in a market-like venue [51,52]. Finally, a retail sales option may also help CSFs retain members by giving consumers more choice in the products that they receive [53]. The use of shares and pre-paid boxes can give consumers limited product choice, so options that allow consumers to customize additional purchases may help maintain customer satisfaction in the long-term [53,54].

4.3. Fisher involvement

Challenges faced by new businesses are best solved when there is a diversity of backgrounds on the founding board [55,56], as businesses rely on expertise in a variety of relevant fields. It could be expected that local food initiatives would consistently include a food producer as a founding member, but for CSFs this is not the case (Fig. 2). Although fishers may have different skillsets than traditional business founders, they can provide the expert knowledge necessary for these programs to succeed. CSFs founded or run by at least one fisher may gain considerable advantages in program planning, including integrating into the local fishing community, understanding the intricacies of the fishing industry, predicting seafood availability, recognizing the requirements and limitations of certain products, sourcing products, and recruiting other fishers as suppliers. These factors all have the potential to improve CSF operations, especially when such expertise is available from the inception of the program [56].

It is likely that CSF members will have more confidence in programs founded on local expertise. For risk-averse customers (see Section 4.2), knowledge of a local fisher's involvement in a CSF could provide them peace of mind that products will be regularly supplied and delivered. By involving fishers in CSF operations there is also more opportunity and incentive to engage with members "dockside", which can function similarly to the farm visits and active participation that CSA members find so important to developing trust and involvement within CSA programs [57]. Indeed, it has been postulated that the biggest advantage of 'harvester focused CSFs' – those typically owned and operated by fishers, with fisher-focused goals – is their ability to "provide a 'face' for their fish" [19].

4.4. Community-specific features

While CSFs are businesses that aim to maintain at least a minimum level of financial performance, they typically also aspire to provide social and environmental benefits for their local communities [17,19,26]. To support their communities, which vary widely in terms of seafood availability, size, and demographics [19], CSFs must adapt to local values. Therefore, some CSF features (e.g., products offered) may be tailored to suit the values of individual communities, rather than being motivated by financial performance. For example, a CSF specializing in shellfish alone may have a smaller consumer market than a CSF sourcing from a variety of fisheries, but sourcing more product options may not uphold the social and environmental values of that particular community if those other products would have to be caught by non-local fishers or harvested using higher impact gear. Additionally, the decision for CSFs to process, store, or transport their own products is likely motivated as much by the existing infrastructure in their communities as by the potential for increased financial performance, an argument that is supported by the results of this research. Ultimately, there are some features that are probably universally beneficial to CSFs (as highlighted in Sections 4.1–4.3), but for decisions surrounding community-specific factors like seafood products and infrastructure, CSFs must evolve from and adapt to the specific needs and values of the communities in which they are operating.

5. Conclusions

Three features were identified as potentially important for the financial performance of CSFs, which are local seafood programs that can provide considerable social, economic, and environmental benefits

to their communities. The first important feature was social media engagement, likely because it is a simple and cost-effective method of marketing to a larger audience, stimulating community and customer involvement, disseminating information, and connecting with younger consumers. Secondly, offering a retail sales option (e.g., selling products at a farmers' market) may provide publicity for CSFs in venues that cater to locally-minded consumers, as well as a payment alternative that allows risk-averse consumers to participate in a CSF before committing to an advance payment system. Third, having a fisher as a founding member may bring expertise and personal investment to the management of CSFs, which might help develop stronger ties to their communities and build trust with customers. Cumulatively, these three features suggest that a diverse skillset in the core group of a CSF is a major determinant of financial success, and programs should consider integrating leaders with experience in communications, business, and fishing.

Despite the stakes involved for their owners, staff, fishers, consumers, and communities, CSFs can struggle financially, and several have ceased operations due to monetary constraints. Financial success is not always the main goal of CSFs [19], as many operate with community and environmental priorities, but to continue supporting their non-financial goals, CSF programs must remain financially viable. This research is the first to evaluate the influence of program features on the financial performance of community supported local seafood programs. The recommendations provided here are not intended to prescribe a blueprint for CSFs, as this would be impossible for such community-specific businesses. Instead, it is hoped that the three key features suggested in this paper are considered by prospective programs, as well as currently operating CSFs aspiring to improve their financial performance and overall program viability.

Acknowledgements

We are extremely grateful to the 24 CSFs that responded to our survey and provided us with the data for this study. We thank J. Stoll for his insight during the development of this work. During this research, authors were funded by Simon Fraser University (to S. Godwin, F. Francis, B. Howard, L. Malpica-Cruz), and the University of British Columbia (to A. Witter).

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.marpol.2017.04.009.

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Glossary

1. *Financial performance* is the financial success of a business at a given point in time.
2. *Financial viability* is the ability of a business to financially sustain itself over time.
3. *Economic viability* is the ability of a business to sustain all components of its business system over time; in the context of small scale fisheries, such components include their financial performance, as well as social and ecological factors like product sustainability and social outreach (see [32]).