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Would Further Marine Stewardship Council Sustainable Certification Improve Supply Chain Profitability in Australian Fisheries?

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Abstract

Overfishing has depleted fish stocks globally. While governments recognise that revised regulation is required to effectively manage fisheries, a lack of meaningful policy has led to the creation of private market-based sustainability regulators. The most prominent is the Marine Stewardship Council (MSC). This certification is little used in Australian fisheries however the local industry is interested to know the benefits from adopting MSC certification more widely. A meta-synthesis on the benefits of MSC certification indicates price premiums exist for some certified products in the United Kingdom and Europe but not in Asia. The transmission of this premium back to producers appears to be contingent on the supply chain structure and the existence of certified intermediaries. The cost of implementing MSC must be considered on a case-by-case basis however Australia's current fishery management regime and government support positions producers to implement this at a relatively moderate cost. This alignment between government and the MSC may also reduce ongoing compliance costs. Further research on Australian consumer's willingness to pay for MSC certification is required, however it is expected that as MSC becomes more established Australians will develop brand equity. There are also significant social benefits resulting from increased stakeholder engagement during certification. It therefore appears that further adoption of the MSC sustainable certification is likely to increase supply chain profitability in Australia.

Key words: Marine Stewardship Council, Australia, fisheries, sustainability, supply chain

Introduction and Background

The Marine Stewardship Council's (MSC) sustainable seafood certification has become increasing prevalent over the past 20 years since the non-profit organisation was founded (Jacquet and Pauly, 2007) on the belief that an independent body was required to oversee fishing practices globally to ensure their sustainability (Ward and Phillips, 2008, p. 38). Consumer education on food production has resulted in a heightened awareness of the need for sustainability, contributing to the rising profile of the MSC's 'certified sustainable' eco-label (Goyert, Sagarin and Annala, 2010). The MSC looks to improve the sustainability of fishing practices by ensuring fish stocks are only fished down to a sustainable level, minimising the environmental impact of fishing and promoting effective fisheries management (Cummins, 2004).

The MSC exhibits the characteristics of a 'chain good' created by supply chain members acting jointly to address a chain failure (Griffith et al., 2015; Fleming et al., 2018). The failure here is known as the 'tragedy of the commons' where each individual aims to maximise their benefit from a resource (Chopra and Meindl, 2013). As the demand for the resource grows it places pressure on its productive capacity, in this case the fish stock, and supply is threatened. This eventually harms all individuals as they are no longer able to benefit from the resource (Chopra and Meindl, 2013).

Early research focused on the MSC's key objective of minimising overfishing and protecting the long-term sustainability of fish stocks globally (Kalfagianni and Pattberg, 2013). A review of several fisheries was undertaken to determine whether the MSC's presence improved sustainability measures following implementation (Martin et al., 2012). The varying results from those studies globally led to further research into the governance aspects of the MSC and the effectiveness of private rules in a public system. Research to date has therefore focused on the effectiveness of the MSC in achieving its vision of sustainable fishing and the governance implications from adopting MSC (Foley, 2013).

Complying with MSC regulation often imposes significant costs on fisheries in monitoring and assessment of fish stocks and in consultation on fishing plans (Goyert, Sagarin and Annala, 2010). However, it is believed that delivering a sustainable product provides greater value to consumers and should therefore strengthen seafood brands and result in a greater sales price (Cummins, 2004). Research has indicated that there is an increasing trend in the willingness of consumers to pay for credence attributes such as animal welfare, chemical free status and country of origin (Van Loo et al., 2011). The increased volume of data and monitoring required to meet the MSC's criteria may also give the local fisheries department's confidence to increase allowable catch where fish stocks are healthy (Bettencourt and Kaur, 2011).

Maximising chain surplus will require collaboration between the supply chain actors (Chopra and Meindl, 2013). Retailers promoting MSC without alignment from producers will not be effective without volume to support their campaign. Conversely, if producers adopt MSC and retailers do not promote the sustainability characteristics, no premium can be sought, and supply chain costs will increase for no financial benefit. The industry´s competitive strategy must align with the supply chain strategy to be effective (Chopra and Meindl, 2013). More importantly this strategy must be underpinned by the supply chain capabilities that will be required to deliver on that strategy.

MSC uptake has been highest in the United Kingdom and Europe where it was formed however the MSC's efforts to influence global seafood sustainability has resulted in an increased focus in other regions, including Australia. While a number of Australian fisheries are certified, the volume of certified produce is considered low. The Western Australian lobster fishery was the first fishery certified by MSC internationally in 2000 and it has received subsequent re-certification (Bellchambers, Phillips and Pérez-Ramírez, 2016). The Australian Northern Prawn Fishery (NPF) sought certification more recently. The NPF has a strong history of working with the national government and NGO's to reduce bycatch with a focus on endangered and protected species and as a result had no objections filed to its application in 2011/12 (Hadjimichael and Hegland, 2016). As well, there are other third party certification schemes, such as in the Southern Rocklobster fishery.

The MSC is beginning to penetrate further into the Australian market with major supermarkets making commitments to source MSC-certified product over the long term. As this trend continues, Australian producers are questioning whether MSC certification will be beneficial or just a new production cost.

For suppliers of the domestic market, retailer heterogeneity must be considered when evaluating the likelihood of price premiums as studies show discount retailers are more likely to offer a premium on MSC-certified product than high end retailers (Asche et al., 2015). The Australian retail market is

dominated by Coles and Woolworths and considered an oligopoly (Gans and King, 2004). These retailers fiercely compete on price, particularly in the fresh meat and seafood categories. Producers selling into these retailers should therefore be more likely to observe a price premium or preferential supply in relation to the certification they hold.

Previous supply chain research has indicated that the key interventions to maximising chain surplus in Australian fisheries relates the use of independent science to maximise total catch (Bettencourt and Kaur, 2011) and to increase price through branding (Ward and Phillips, 2008, p. 9). Australian fisheries are managed by the States and Commonwealth which have demonstrated a good alignment to current management practices and monitoring. Australia's major fisheries operate under a catch sharing[1] arrangement which has been recognised as an effective management tool for improving fishery performance (Costello et al., 2016).

MSC certification may assist Australian producers in achieving market premiums. However, while some studies have evaluated the broad economic impacts from adopting MSC certification, there has been little comparative research on the financial implications for the supply chain.

Research on the existence of promotion at the retail level and the transmission of any price increase will provide critical signals on whether effective collaboration is occurring between supply chain actors and whether adopting MSC certification at the producer level will deliver the capabilities required to meet a retailer's strategy of sustainably-sourced seafood. The seafood supply chain has traditionally been efficiency focused so its structure and capabilities have historically been aligned to a low-cost strategy. Adopting MSC will represent a change in strategy for the industry and should therefore be investigated before adoption.

In summary, the existence and magnitude of a sale price premium and the ability to increase volume to offset MSC compliance costs is not clear. Research with a focus on supply chain analysis will therefore be valuable in articulating the MSC's role in maximising chain surplus. This analysis is designed to provide insights on the long-term horizon for a supply chain to review its strategy and design in influencing resource allocation. These design decisions will ultimately determine whether the supply chain is constrained or supported in operating at its optimal level. It is key for producers in Australia to understand the costs and benefits to the supply chain before widespread adoption of MSC certification as effective supply chain management of sustainability will ensure long term supply chain profitability.

Such an understanding will be achieved by undertaking an initial literature review, which will outline and discuss the existing research that has been published, followed by a structured meta-synthesis of particular items from the literature, which focuses on the benefits and costs arising from adopting MSC certification.

Literature Review

Introduction

A decline in marine ecosystems despite commitments by governments to manage national fisheries has resulted in the creation of various private market-based governance schemes attempting to manage depleting marine resources by certifying sustainable fisheries (Kalfagianni and Pattberg,

[1] Catch share is a fishery management tool allocating privileges to fish and designated area or portion of total catch to fishers. These include individual quota systems, territorial use rights and limited access privileges (Fujita and Bonzon, 2005).

2013). The MSC is the most prominent organisation in international fisheries governance and it has been adopted by a number of fisheries around the world (Kalfagianni and Pattberg, 2013).

The MSC's mission is "to use ecolabel and fishery certification to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practices, influencing choices when buying seafood and working to transform the seafood market to a sustainable basis" (MSC, 2018a). It's aim is to become the leading global certifier. Australia's MSC adoption is considered low but in the MSC, efforts to raise awareness of certification has been increasing (MSC, 2017). Before other Australian fisheries adopt the prevalent certification, it is worth understanding the demand of consumers for sustainable produce and the economic impacts. This will enable Australian producers to make an informed decision or perform cost benefit analysis before undertaking and incurring the costs of certification.

The purpose of this initial review is to evaluate current research on the impact of adopting MSC's sustainability certification to determine whether further analysis may be useful in informing producers with a supply chain focus on whether adopting the MSC certification will increase supply chain surplus.

Analysis

The beginning of eco-labelling

As consumers became aware of the depletion of fish stocks globally and the broader requirement for sustainability in food production to protect the environment, they have increasingly looked to scrutinise current practices and influence production by allocating their spending away from what they perceived to be unsustainable products (Paddock, 2017).

While local governments have looked to manage their fish stocks sustainably, they commonly adopted a 'precautionary approach' whereby the stock status for a specific species was evaluated, harvesting rules set, a stock reference point set and a monitoring plan implemented to ensure the target stocks did not decline to an undesirable level (Kirby, Visser and Hanich, 2014). The market identified that this system was not perceived as effective due to its narrow focus, and third parties such as the MSC were proactive in introducing an 'eco-system' approach that includes the impact on non-target species and the broader environment (Kirby, Visser and Hanich, 2014). This mix of free-market, science-based, environmentalism is being used by the MSC to solve market failure.

Furthermore, it is believed that consumers place more trust in third party certifiers as the government has a real or perceived incentive to promote the effectiveness of the systems they created, undermining the legitimacy of their own certification (Kirby, Visser and Hanich, 2014). A transparent third-party independent scheme is therefore favoured by consumers and industry. It must be noted however that this perception varies significantly between countries and markets (Kirby, Visser and Hanich, 2014).

A similar phenomenon was noted across a multitude of primary production supply chains for products including palm oil, coffee, cocoa and timber where the benefits of an independent sustainability certifier, permitting the use of an eco-label to communicate sustainability credentials to the consumer, was identified and implemented (Lambin and Thorlakson, 2018). Eco-labels aim to share otherwise unobservable information on the environmental attributes of a product (Stemle, Uchida and Roheim, 2016). In the seafood industry, a number of certifiers identified this trend and entered the market to inform consumers of producer's efforts to correct the negative externalities of fishing. The key certifiers are listed in Table 1.

Table 1: Key seafood sustainability certifiers

Certifier	Country of origin	Fishing sector	Focus	Market penetration
Dolphin Safe	United States	Wild tuna	Dolphins	High but limited to one sector.
Ocean Wise	Canada	Wild fish	Local marine environment	Low as only recognised in Canada and focused at restaurant level.
Friends of the Sea	Italy	Wild fish and aquaculture	Global marine environment	High in number of fisheries but low in volume.
MSC	United Kingdom	Wild fish	Global marine environment	High in number of fisheries and high in volume.

'Dolphin Safe' was created to protect dolphins in United States waters in the tuna industry whose 'purse-seine' catch method resulted in the netting of dolphins. Observers from this scheme award certification where dolphins have the opportunity to escape the purse-seine net or where fishermen have changed fishing methods. 'Dolphin-Safe' however is narrow in its focus as it applies to one species in one region and does not discriminate between well and poorly managed fisheries where no dolphin population exists (Kirby, Visser and Hanich, 2014).

'Ocean Wise' has over 650 partners in various fisheries meeting their criteria. While 'Ocean Wise' has a broader focus that the 'Dolphin Safe' it is still limited in geography and only well recognised in Canada.

'Friends of the Sea' has focused on smaller fisheries in developing countries and also covers aquaculture with approximately 50 per cent split between wild catch and aquaculture. 'Friends of the Sea' is broader again than 'Ocean Wise' in its evaluation of fishing impacts including energy efficiency and social accountability but given its focus on small fisheries, as a percentage of international production, the volume certified is relatively low.

The MSC was formed by Unilever and the World Wide Fund for Nature (WWF) in 1997 with learnings applied from Unilever's Forestry Stewardship Council (FSC) founded in 1993 also in collaboration with WWF. Unilever was the largest frozen fish buyer globally and was looking to meet their consumer's desire for sustainably-sourced seafood (Kirby, Visser and Hanich, 2014). The MSC recognised the movement from a focus on targeted fish or iconic species such as dolphins to a more holistic view of marine health and sustainability. The MSC therefore reviews the target stocks status, the ecological impacts of the fishing method and effectiveness of compliance monitoring during the certification process (Kirby, Visser and Hanich, 2014). The MSC structure is less inclusive than the earlier FSC in the interest of being more efficient (Ponte, 2006). One criticism of the MSC from this structure however is that it has resulted in the certifier overlooking small-scale fisheries (Ponte, 2006).

The MSC's success has been partly attributed to its "political spread" and the partnership with WWF in creating the label, adding significant credibility to its scheme (Constance and Bonanno, 2000).

MSC principles

The MSC principles underpinning certification are threefold:

1. Sustainability of stock – "Fisheries must operate in a way that allows fishing to continue indefinitely".

2. Ecosystem impacts – "Fishing operations need to be managed to maintain the structure, productivity, function and diversity of the ecosystem, including other species and habitats."
3. Effective management – "All fisheries need to meet all local, national and international laws and have an effective management system in place." (MSC, 2018b).

The process of certification is: pre-assessment, full assessment planning, confirming assessment tree, information assessment, peer review and stakeholder comment, reporting, objection period, review if denied, chain of custody certification for label display (Kirby, Visser and Hanich, 2014).

A score out of 100 is determined using a weighted average score for each principle. A score above 60 is the minimum requirement for consideration, however a fishery must score at least 80 for unconditional certification. Conditions to certification will require specific actions to be implemented in a defined time period that demonstrates an improvement in the fisheries sustainability metrics (Kalfagianni and Pattberg, 2013). MSC believes certifying those who score below the best practice score of 80 is beneficial as movement of a fishery over time to 80 represents an improvement in global sustainability, in line with the MSC's vision (Kalfagianni and Pattberg, 2013).

Certification lasts up to five years with an annual fee and royalties payable to use the certification label (Kirby, Visser and Hanich, 2014). Annual audits are performed to examine whether any management or environmental factors have changed (MSC, 2018b).

Ability to improve environmental conditions

Measurement of the performance of fisheries before and after certification indicates the MSC does have an ability to improve the sustainability of fishing practices (Sarah et al., 2012). Many fisheries have undertaken pre-certification assessments where MSC suggested substantial improvements should be made prior to obtaining a full assessment. Where these improvements were suggested, a 22 per cent increase in the best practice indicator scoring was observed (Sarah et al., 2012). Further improvements were noted after certification with performance indicators increasing 16 per cent in the five years following certification (Sarah et al., 2012). These improvements were shown to correlate to an improvement in environmental health with increased overall biomass and fish stock health in protected areas (Sarah et al., 2012). The certification process also significantly improved the level of information available for tracking fishery performance (Sarah et al., 2012).

However, the ongoing management of the fisheries has been criticised by some who believe pre-assessment is the only period when significant changes occur (Christian et al., 2013). During this stage fisheries implement changes to meet the minimum standard for certification. Once met, it is argued there is no incentive for further improvement as the objective of gaining use of the eco-label is met (Christian et al., 2013).

This does not appear to be the case for the Western Australian lobster fishery, which was the first fishery certified by MSC internationally or for Mexico's Baja California lobster fishery, the first developing country fishery certified. Both fisheries have been re-certified multiple times with conditions set by the MSC and met by the producers (Bellchambers, Phillips and Pérez-Ramírez, 2016). This process of certification and continuous improvement with the MSC has resulted in a better understanding of the target species status, better research competencies, better monitoring and reporting of bycatch and protected species and a better understanding of how fishing may influence local eco systems (Bellchambers, Phillips and Pérez-Ramírez, 2016). The South African hake fishery is also a long-term supporter of the MSC and has undergone re-certification multiple times. Improvements have been noted such as a 90 per cent reduction in seabird mortality and a significant contribution to research on benthic fauna (Butterworth, 2016; Field et al., 2013).

The MSC's position may enable them to leverage their increasing reputation to pressure governments not acting on sustainability to create or adopt their standard for fishery management (Kalfagianni and Pattberg, 2013). However, while MSC uptake is rising rapidly, research suggests that generally the types of fisheries attracted to the MSC program do not hold the characteristics of a vulnerable fishery (Kalfagianni and Pattberg, 2013). This lack of participation by the most fragile fisheries, ordinarily located in developing countries, limits the MSC's ability to impact and improve global sustainability.

Reducing the barriers for developing fisheries, particularly those that are small scale, where there may not be the economies of scale or scope required for the certification to be cost effective, is therefore key to improving the MSC's effectiveness globally (Jacquet and Pauly, 2008). Lowering certification costs through discounts or other schemes will increase participation by smaller fisheries (Kalfagianni and Pattberg, 2013). An analysis of suitable data-limited assessment methods for these smaller fisheries would also provide a realistic target for developing fisheries that often do not have enough data to meet the MSC's assessment requirements (Stratoudakis et al., 2016). Finally, support in capacity building to give regional leaders the competencies to promote and implement the requirements of certification will also improve the MSC's global impact (Stratoudakis et al., 2016).

Economic implications

Eco-labelling programs aim to provide a market-based incentive for better environmental management. If consumers value the environmental characteristics of the product, they will allocate their purchasing to these items over un-labelled products. This may result in a price premium for the labelled products creating an incentive to obtain certification (Roheim, Asche and Santos, 2011). Studies however present mixed evidence on the presence of the price premium across different species and countries.

A survey of participants in the South African hake fishery note there has been no price premium obtained since certification (Japp, 2008). Respondents partially attribute this to the concurrent certification of their major white fish competitors in New Zealand hoki and Alaskan pollock (Japp, 2008). Western Australian and Mexico's Baja California lobster fisheries also lack evidence of a price premium relating to MSC certification (Bellchambers, Phillips and Pérez-Ramírez, 2016). This may be explained by the fact that the products do not display the certification label due to the additional royalty costs with its use. This decision also relates to the final market as almost all of this lobster is sold to Asia where it is believed few consumers discriminate between products based on environmental issues and no cognitive effects of MSC have been demonstrated (Jacquet and Pauly, 2007). MSC has recognised this and opened offices in China and Singapore. This may lead to the eventual adoption of the MSC logo by producers at which point further studies should be performed to evaluate whether a price premium can be associated with its use.

In Sweden a study on frozen cod fillets found evidence for a price premium of around 10 per cent for MSC-certified seafood through an analysis of national retail prices (Blomquist, Bartolino and Waldo, 2015). This premium is consistent with studies in the United Kingdom performed on salmon (Asche et al., 2015), Alaskan pollock (Roheim, Asche and Santos, 2011) and haddock where premiums were found to be in the order of 10-15 per cent (Sogn-Grundvåg, Larsen and Young, 2014).

Recent research on products where a price premium was noted at the retail level has looked for the transmission of these premiums down the supply chain to the producer level. This is critical for the long-term adoption of MSC as the producers incur the costs of certification and compliance and therefore will likely require some return to compensate them for the increased cost of being MSC certificated (Gutierrez et al., 2016).

An analysis of Baltic cod fishery ex-vessel pricing for the period 2011-12 did not show evidence of a price premium, even when the product was sold to customers holding the MSC chain of custody certification (Blomquist, Bartolino and Waldo, 2015). A study on Japanese ex-vessel pricing for flounder did not find evidence of a price premium for certified product, however as only monthly average prices were used from three markets, the basis for this conclusion should not considered robust (Wakamatsu, 2014).

A later analysis of ex-vessel pricing in Alaska for salmon and halibut, in Japan for flounder, and comparative uncertified fisheries in British Colombia, Canada and Japan, produced mixed results. Stemle, Uchida and Roheim (2016) showed a considerable premium for certified chum salmon, pink salmon and flounder compared to uncertified sockeye salmon. There was however no premium noted for chinook salmon, coho salmon or halibut (Stemle, Uchida and Roheim, 2016).

Another potential benefit of MSC is its ability to provide access to new markets for products. These markets ordinarily serve more affluent consumers willing to pay for sustainability characteristics such as in the United Kingdom and the United States where several major supermarkets have stated that over time their intention is to stock only MSC-certified seafood (Thrane, Ziegler and Sonesson, 2009). These commitments by retailers result in preferred supplier status for producers with MSC, and have resulted in fisheries supplying non-traditional markets (Ponte, 2006).

This is particularly the case for high priced value-added products that are almost exclusively MSC certified such as South African hake and New Zealand hoki being sold into Northern Europe, North America and Australia (Lallemand et al., 2016). As a direct example, South African hake was not supplied to Northern Europe until after it achieved certification in 2004 (Lallemand et al., 2016). In the Parties to the Nauru Agreement (PNA) skipjack fishery the market access granted by MSC was noted as a tool to better their position as a producer and intermediary in the supply chain (Kirby, Visser and Hanich, 2014). Repositioning their product in international supply chains increased their ability to independently govern their fishing resource and provided opportunities to improve profitability (Kirby, Visser and Hanich, 2014).

Criticisms of MSC

As adoption of the MSC certification has increased, the effectiveness of the MSC and its certification process has been criticised. More specifically, the scoring has been viewed as subjective with those undertaking the review given an excessive amount of discretion and incentives to inflate scores (Christian et al., 2013; Jacquet and Pauly, 2007). The MSC process is also viewed as favouring large industrial fisheries over smaller, potentially more sustainable, fisheries, demonstrated by a lack of representation of developing or smaller fisheries on the MSC board of directors (Christian et al., 2013). The resulting focus on larger fisheries could unfairly penalise developing countries for their government's poor fishery management as the fisheries do not have the resources to begin managing the fishery in line with MSC principles (Gutierrez et al., 2016).

Research has suggested that MSC certification could result in trade barriers between producers with and without certification (Cummins, 2004). This effect will be intensified by endorsement from major retailers responding to an increasing consumer desire to pay for credence attributes and an increasing level of scrutiny on supermarkets sourcing responsibly (Van Loo et al., 2011). Certification trade barriers will also be worsened by governments subsidising certification in response to community pressure on sustainability (Cummins, 2004). This support may result in a new form of protectionism as economically weaker regions are marginalised by their inability to subsidise and implement MSC standards (Roheim, 2003). This phenomenon has been supported by systematic studies on coffee, timber, and other food items where it was demonstrated certification programs had marginalised smaller producer and those who could not afford the costs of certification (Ponte, 2008). Others argue

that the new eco-condition favours wealthy northern hemisphere consumers, ultimately imposing what they believe constitutes a sustainable fishery on developing countries (Constance and Bonanno, 2000).

It is also argued that the MSC could achieve the opposite of its objective as the resulting access right limitations may result in greater pressure on uncertified fisheries from price sensitive consumers, particularly in developing countries due to their low-cost environment (Kalfagianni and Pattberg, 2013). This was an effect noted after the FSC formation where deforestation increased in certain areas as pressure increased on uncertified land to meet the demand for low cost timber (Gullison, 2003; Kalfagianni and Pattberg, 2013).

The proposal to certify the pollock fishery in the Russian sea in January 2013 raised credibility concerns as the WWF, who later withdrew, and the At-sea Processors Association formally objected to the fisheries certification. Certification however proceeded, which resulted in the original MSC pollock fishing and processing sector abandoning the label and instead electing to adopt a local Alaskan certification program ASMI (Hadjimichael and Hegland, 2016). These disputes if more frequent could damage the MSC's reputation as the global certification leader in the long term.

Conclusion of the initial review

As shown in this brief review, the focus of research has largely been in relation to the environmental effectiveness of the MSC and the interaction between private and government organisations with political and socio-economic effects noted (Foley, 2013). Price premiums at the retail and producer level have produced mixed results and there is little comparison between markets to explain the different results noted. A number of criticisms of the MSC have also been raised which should be considered by Australian producers, as the legitimacy of a certification body is at the core of its value as a certifier. Few studies commented on the cost of MSC relative to the benefit achieved, although among the various papers both are discussed in detail individually.

A Systematic Meta-Synthesis

Rationale

A formal review of the findings across multiple countries and markets and the implications for Australian producers with a supply chain focus will therefore add significant value for the industry to determine whether value generated by adopting MSC is improving supply chain profitability or only imposing an additional cost on producers. The review systematically analyses current research to identify whether those fisheries complying with the MSC principles and meeting the MSC best practice indicator targets receive benefits in pricing, volume or in other areas that could more than offset the additional costs imposed by the certification (Sainsbury and Sumaila, 2003, p. 343), with reference to the supply chain concept as defined by Chopra and Meindl (2013).

Method selected

Meta-synthesis is hermeneutic or interpretive in nature unlike quantitative meta-analysis which aims to test cause and effect relationships utilising quantitative data (Walsh and Downe, 2005). While subjective interpretations are required when undertaking meta-synthesis, its value lies in its ability to identify similarities between studies and draw conclusions based on findings in different environments.

Conceptually, meta-synthesis has been referred to as the collation and analysis of findings on a topic providing results that are "greater than the sum of the parts" (Finlayson and Dixon, 2008). While some difficulty exists in identifying the varying objectives of existing research, the additional level of interpretation on existing literature presents new perspectives and advances both knowledge and theory on the topic (Nye, Melendez-Torres and Bonell, 2016).

Selection criteria

For a meta-synthesis to be valuable and transferable its methods must be transparent and the results replicable. A clear outline of the search method used to collect relevant research should therefore be provided and contradictions on the topic noted. This is the foundation for a rigorous meta-synthesis as any biased or poorly defined searches will likely produce inadequate case studies and therefore inadequate results (Aytug et al., 2012). To add further rigour, the case studies selected were critically assessed to ensure there was a reasonable basis for their comparison, avoiding ill-founded conclusions based on differing research scopes. In completing this critical assessment, discussion on the broad implications of MSC certification was a minimum requirement for inclusion.

A search of bibliographic databases was undertaken to identify all relevant research and case studies evaluating the impacts MSC. The databases searched include Elsevier, Scopus, ProQuest, Lexis Nexis, Web of Science, Wiley Online Library, Swetswise, the University of Melbourne Library search tool 'Discovery', Google Scholar, and Science Direct. This search was completed using key words relating to the research question. The phrases 'Marine Stewardship Council', 'MSC', 'sustainability', 'eco-label', 'supply chain', 'value chain' and 'certification' were used to identify literature related to the topic. Both United Kingdom and United States spellings, synonyms to key words and alternative terms for these and other key words were identified and included (for example: eco-label, eco label and ecolabel). A review of the bibliographic citations of the relevant studies returned in the initial search was then preformed to identify further research on the topic. A review of the literature published in the journal issues identified was also performed to add further relevant research to the review. An initial sample of 21 case studies resulted from this search methodology (Appendix 1).

Inclusion and exclusion criteria

This initial sample was then categorised against further inclusion and exclusion criteria (Appendix 1). Studies were classified as quantitative or qualitative to determine whether conclusions under each method could be related to the research method. Meta-synthesis often excludes quantitative studies, however they are included in this study given the ability to objectively measure benefits such as price premiums and the significant contributions made by these quantitative studies that are considered highly influential and extensively cited in this literature.

The studies were then screened to confirm they were undertaken after certification and therefore based on actual results rather than estimates. Following this assessment, the initial sample of 21 studies was reduced to 17 (Appendix 2). These studies include published and peer-reviewed journal articles and articles published by non-government organisations. The studies analysed producing regions across the world however the majority of the studies related to products that were sold into European markets. This is attributable to the maturity of this market and the fact that the MSC was formed in London with an initial focus on local fisheries (Roheim, Asche and Santos, 2011).

Data analysis

A grounded theory approach was used to analyse the studies selected. This approach begins with open coding, which is a review of the studies selected to identify common concepts and gain an in-depth

understanding of the data (Nye, Melendez-Torres and Bonell, 2016). Codes were assigned to any costs or benefits to the supply chain resulting from certification in each study. In an attempt to minimise the impact of meta-synthesis' weakness in identifying casual relationships, codes were only applied where costs or benefits directly resulted from certification. As the review is conducted on cases where certification exists, a level of selection bias exists. The research is limited in its ability to evaluate whether the identified costs or benefits exist in circumstances where certification does not exist. This is discussed below.

Nvivo software was used to identify themes across the studies with 28 coded themes identified as recurring across the research. These included price premium, market access, retail, consumer, cost, benefit, fishing rights, environmental impact, label recognition, barrier, regulation and social licence. These codes were then categorised into the broader sub categories of price, markets, management and social as shown on the first row of Appendix 2. The trends evident from these code classifications were adopted as a preliminary explanatory framework for the general benefits resulting from the MSC label. The framework and findings were then 'grounded' in reality with a detailed analysis confirming the themes coded in each case study (Corbin and Strauss, 1990).

Results

Appendix 2 summarises the results of the meta-synthesis. The results indicate that there may be substantial benefits for producers that could offset the costs of certification. A discussion of whether the benefits noted are universal or contextual follows with consideration of the fishery characteristics, size and markets supplied.

Price

In theory, the demand for sustainable eco-labelled produce will provide an economic incentive for certification. Of the 17 studies reviewed, eight found evidence for a price premium for MSC certified products. Five of these studies related to seafood that is sold to the United Kingdom and Western Europe markets with premiums in the order of 10-15 per cent noted for pollock, salmon, and haddock at the retail level (Asche et al., 2015; Roheim, 2008, p. 38; Roheim, Asche and Santos, 2011; Sogn-Grundvåg, Larsen and Young, 2014). Studies reviewing wild lobster production were not able to make an assessment of a price premium as the MSC eco-label was not used by producers despite approximately 20 per cent of global supply being certified (Bellchambers, Phillips and Pérez-Ramírez, 2016).

In North America, a study using survey data indicated a significant willingness by consumers to pay a premium for ecologically sustainable seafood in restaurants (McClenachan, Dissanayake and Chen, 2016). The study undertaken in Maine recorded a premium of approximately 50 per cent of the restaurant dish value (McClenachan, Dissanayake and Chen, 2016). These results may however subject to "socially desirable responding" where respondents overstate their willingness to prioritise the environment or social items (Van de Mortel, 2008).

To incentivise the producers who incur the cost of certification, these price premiums must be transmitted down the supply chain. After the discovery of a price premium in some retail markets, research has focused on whether this premium is noted at the producer level.

In Sweden it was found that premiums existed at the retail level, however no evidence was found that the premium was passed back to producers (Blomquist, Bartolino and Waldo, 2015). A study on Japan and Alaskan vessel pricing to determine whether an MSC price premium exists for producers provided mixed results. In Japan one study found no producer price premium for MSC-certified producers

however limitations in the method of obtaining prices, being monthly, raised questions over the robustness of the results (Wakamatsu, 2014). A later study analysing the Japanese and Alaskan salmon fishery found premiums for approximately half the species caught but a lower or no premium was noted for other species (Stemle, Uchida and Roheim, 2016).

The evidence for price premiums is therefore varied at both the retail and producer level. There does appear to be a correlation between existing premiums and the market in which the product is sold, with United Kingdom and European markets attracting a premium, while no premium is noted in the Asian markets. This discussed further below.

Markets

Twelve of the 17 studies found evidence that MSC certification improved market access particularly to the United Kingdom and Western Europe which are traditionally considered higher value markets. For the majority of studies noting improved market access as a benefit, producers were proactively seeking certification to maintain market access in response to a shift in consumer and retailer preferences. In the South African hake fishery, increased access to export markets was noted as the key to maintaining economic returns despite the crisis in its traditional southern European markets in 2007 (Lallemand et al., 2016). The market access resulting from MSC is therefore considered critical to maintaining the value of the fishery and providing resilience to market shocks (Gutierrez et al., 2016).

Two studies found certification provided access to new markets, allowing these suppliers greater trading options. In the PNA skipjack fishery, market access granted by certification was noted as a tool to improve their trading position enabling them to reposition their product in international supply chains to increase profitability (Kirby, Visser and Hanich, 2014).

For the Western Australian lobster fishery, certification increased access to European markets and contributed to a reduction of the EU tariff on seafood by 50 per cent (Bellchambers, Phillips and Pérez-Ramírez, 2016). Although almost all of the Western rock lobster catch is currently sold into Asia, the ability to export into Europe if market conditions change is of great value to the industry (Chance, 2003).

Management

Nine of the 17 studies indicated improved fishery management following MSC certification. These studies provided evidence of government support for the MSC process and as a result improved management efficiency was noted. These improvements are a result of increased monitoring, data collection and cooperation between local government departments and the MSC. This led to the implementation of new management techniques that provide clear directions for fisheries and in some cases lower overall regulation as inefficient fishery compliance measures were replaced by the MSC principles (Pérez-Ramírez, Ponce-Díaz and Lluch-Cota, 2012).

In some fisheries new measures included the implementation of resource access rights, such as quotas or legal recognition of traditional entitlements for producers, increasing certainty over their rights to fish in the long term. These structural changes to policy and management provided stakeholders in Argentinian fisheries with an increased ability undertake long term planning with greater certainty over fishery management following certification (Pérez-Ramírez, Ponce-Díaz and Lluch-Cota, 2012). Structural changes were also considered an instrumental tool for fishing companies to secure quota allocations in the South African hake fishery and gain certainty over their rights to fish (Ponte, 2006, 2008). Similarly, the certification of the PNA tuna fishery, a cooperative of Pacific countries, led to

significant management changes that were internationally discussed and negotiated resulting in a more effective management plan and security of fishing rights for local producers (Kirby, Visser and Hanich, 2014). In Mexico's red rock lobster fishery, certification has significantly increased the likelihood of renewing the current fishing operations 20-year government concession (Pérez-Ramírez, Ponce-Díaz and Lluch-Cota, 2012).

More effective environmental management has also been noted following certification. In the South African hake fishery certification resulted in a heightened awareness by government and industry to scientific recommendations as practices shifted towards data collection and analysis to assist decision making (Butterworth, 2016). In particular the prioritisation of bycatch, discards and the ecosystem impact from bottom trawling has encouraged cooperation between researchers, fishing companies and non-government organisations (Butterworth, 2016).

The MSC certification process has also facilitated cooperation between historically competing fishing nations who share a fishing resource and therefore require a joint fishery management plan to obtain certification. This bilateral cooperation was noted with Norway and Russia in obtaining joint certification in the Barents Sea for a number of species (Pristupa, Lamers and Amelung, 2016). This improved collaborative environmental management provides more stability in the resource and benefits for all stakeholders.

In addition to these global structural changes, in Australia the recognition of the benefits of certification has prompted the Western Australian government to invest A$14 million to fund the implementation of a MSC program to assist producers in becoming certified (Department of Fisheries, 2018). The Mexican rock lobster fishery also noted an increase in government support through the investment in infrastructure following certification as well as the access to basic amenities in traditionally rural fishing communities (Bellchambers, Phillips and Pérez-Ramírez, 2016). This is partly attributable to the raised profile of the fishery, assisting their committee to gain national representation and the capacity to influence policy and management (Bellchambers, Phillips and Pérez-Ramírez, 2016).

Social

Seven of the 17 studies recorded a social benefit from MSC certification such as an improved reputation or renewed social licence. This is a result of the increased producer awareness of the environmental issues resulting from their fishing operations following certification and the engagement that is required with the community during the public comment phase of obtaining certification.

In Argentina, certification was found to encourage producers' understanding of environmental issues and stock health (Pérez-Ramírez, Ponce-Díaz and Lluch-Cota, 2012). Certification made users more careful with their resources to ensure long-term sustainability and therefore long-term economic feasibility (Pérez-Ramírez, Ponce-Díaz and Lluch-Cota, 2012).

Greater stakeholder participation is also noted as a social benefit from certification as it results in an improved social position for the fishery as the process facilitates engagement from the broader community who have the opportunity to share knowledge and objections with the aim of resolving conflicts between members in the certification process (Ponte, 2006, 2008).

These social benefits are considered valuable by industry as the public image of the seafood industry has historically been focused on environmental impacts and the threat of over fishing (Toonen et al., 2013). This image has resulted in heighted political attention leading to government interventions

such as the proposed expansion of marine parks in Australia to reduce fishing grounds. MSC certification will assist in removing information asymmetry in relation to fishing practices and build community support, ensuring the industry is consulted on policy that could negatively impact the industry.

Discussion

When Australian producers consider adopting MSC certification it is critical that any incentives provided are transmitted down the chain (Asche et al., 2015). The stages for transmission are:

1. Consumer willing to pay for attributes,
2. Certified product price premium noted,
3. Transmission of some premium to producer, and
4. Producer receives price signal and modifies behaviour.

The results of international studies noted in the review provide some guidance on what Australian producers may experience after certification. It is however important to consider the cost and the Australian regulatory, economic and consumer landscape when interpreting how the evidence observed overseas may apply to Australia.

Cost of certification

The MSC provides an estimated cost of certification of US$15,000 to US$120,000, however it can be as much as US$500,000 for large complex fisheries such as the US pollock fishery (Roheim, Asche and Santos, 2011). An annual fee ranging from US$200 to US$2,000 and royalties ranging from 0.3-0.5 per cent, both based on the total value of sales, is also payable (Christian et al., 2013). Furthermore, the cost of addressing conditions, requiring additional research or data collection, whilst not explicit, is often significant (Bellchambers, Phillips and Pérez-Ramírez, 2016). More research is required to quantify these indirect costs, however they will likely vary significantly across fisheries and must be considered on a case-by-case basis.

Australian regulatory landscape

When seeking certification, a key consideration should be the extent to which the fishery will need to implement changes, and therefore incur costs, in getting up to the MSC standard. As noted earlier, most Australian fisheries are managed by a catch-share arrangement. A study on MSC assessment scores of various fisheries showed that those operating under a catch-share arrangement had a higher probability of achieving unconditional pass scores for several performance indicators (Parkes et al., 2016; Parkes et al., 2010). The MSC's highest scoring fisheries were also noted as being two times as likely to be under a catch-share arrangement (Parkes et al., 2016; Parkes et al., 2010). Thus Australian fishery regulations are supportive of MSC certification delivering benefits to the industry.

The Western Australian state government has further supported the MSC initiative by contributing funding for producers to obtain certification. The government also committed a portion of these funds to assist with fishery improvement programs required by the MSC (Department of Fisheries, 2018). This demonstrates their support of the MSC and its management practices and a willingness to align to these methods. This opportunity to harmonise regulation with effective management policies could ultimately increase in catch allowances where the health of fish stocks can be proven.

Australian seafood supply chain

It was noted earlier that the major supermarkets have made commitments to source MSC-certified

product over the long term. Food service companies have also taken an interest in sustainability certification with Sodexo sourcing only MSC-certified product in the United Kingdom from 2010 (Kalfagianni and Pattberg, 2013). Fast food chain McDonald's also pledged in 2013 to source MSC-certified seafood for its 14,000 United States stores (Asche et al., 2015). These corporate sustainability strategies are aimed at securing supply chains for the long term and could emerge in Australia (Dauvergne and Lister, 2012).

The results of the studies show that MSC certification has increased market access for the majority of producers. The ability to access international markets is a quasi-price premium as when domestic pricing is unfavourable producers can stream product to better priced markets where they would previously have been a price taker at the prevailing domestic price.

It is also critical that producers ensure their supply chain is structured for the successful transmission of the MSC status. If certified product is blended with uncertified product, it loses its value. Where intermediaries such as packers or processors do not hold chain of custody certification, the MSC label will not be available and the consumer will not be aware of the product characteristics for which the producer is seeking a premium. This leakage is believed to be largely responsible for a lack of price premiums in many fisheries (Stemle, Uchida and Roheim, 2016). It is important to note however the chain of custody certification also comes at a cost and intermediaries will also require a fair return as profitability along the chain is key to long term adoption. As the existence of a retail-level premium does not guarantee a premium at the producer level (Blomquist, Bartolino and Waldo, 2015), vertically-integrated seafood producers selling direct to customers may be best placed to control the labelling of their product and to achieve the greatest benefits as product is certified under their control.

MSC as a certification leader

While the MSC is currently seen as the leader in seafood sustainability certification, its continued dominance is less clear. The integrity of MSC as a global authority on sustainability in fishing is critical given the high costs of implementation. There is also the potential for new or existing certifiers to present better alternatives providing consumers with greater comfort and value, resulting in a significant sunk cost for producers needing to switch certifiers (Hadjimichael and Hegland, 2016).

The MSC is most well known in the United Kingdom due to its initial formation in London and the large amount of marketing undertaken locally since the program was launched (Roheim, Asche and Santos, 2011). Over time however the MSC has grown to be the largest global certifier and since arriving in Australia has been vetted by support from government and major retailers (Hadjimichael and Hegland, 2016).

Producers must however be cognisant of early shifts away from the MSC noted in the north which could be a predictor of what may happen over time in the Asian-Pacific region. Alternatives such as the ASMI and the Sustainable Seafood Coalition have seen a rise in adoption, and the maturity of the Thorupstrand Kystfiskerlaug certification in Denmark should also be noted. This cooperative was created to further differentiate producer's sustainability characteristics by advertising the artisanal aspects of the fishery, utilising short trips with energy efficient equipment to reduce environmental impact (Hadjimichael and Hegland, 2016).

Producers should also be aware of concerns over the potential for consumer 'label fatigue' when adopting a certification and alignment to one national certifier will likely provide greater benefits from consumer recognition (McClenachan, Dissanayake and Chen, 2016). Furthermore, any changes to the

MSC must occur with consumer engagement to ensure they understand the meanings of new initiatives and retain brand equity (McClenachan, Dissanayake and Chen, 2016).

Further research

There is limited research within the Australian retail market on MSC product. The industry would benefit from detailed studies comparing the price of MSC and uncertified seafood domestically across retail channels to provide greater evidence on the potential for a price premium in Australia. A similar dock side pricing analysis should be performed to determine whether any premium is being transferred back to the primary producer.

The majority of research undertaken on the MSC relates to large-scale industrial fisheries in the Northern hemisphere. Further research should therefore be undertaken to determine whether the phenomena noted in these large-scale fisheries holds for smaller fisheries in Australia.

The regulatory standards of the home country and its correlation to the benefits noted from MSC would also provide useful information for fisheries internationally, as developed and more trusted regulatory environments, such as Australia, may obtain fewer benefits from adopting MSC certification if the existing management standards are considered robust. This will alter the benefits flowing to producers and ultimately affect the cost benefit decision.

The cost of implementing MSC is only noted in broad terms. Certainty over the total cost of certification is required for a fair assessment. A survey of producers globally obtaining detailed data on implementation, regulatory and ongoing additional costs derived from certification would be valuable.

Finally, investigation into the transmission of any premium down the supply chain in light of the structure noted in the Australian supply chain will also provide greater certainty that the benefits of MSC certification will flow to producers if implemented.

Conclusion

Whether MSC certification can increase supply chain profitability in the Australian seafood supply chain will be product or species specific. The idiosyncrasies of each seafood supply chain will need to be considered when making this assessment.

Current fisheries regulation will impact the cost required to meet the MSC's certification however Australia's current regime positions producers well to implement this at a relatively low cost. The supply chain structure and the ability of intermediaries to hold chain of custody certification will be critical to minimise leakage as product is transferred to consumers and for the transfer of any price premium to producers. Vertically integrated seafood operators may therefore be best placed to control product flows and capture an increase in supply chain surplus.

Harmonisation of fishery management policy and the MSC principles will likely reduce compliance costs for producers and result in a more data-rich, science-based policy that could lead to greater catch allowances in healthy fisheries or reduce the likelihood of reductions based on ineffective analysis.

It is critically important however that producers adopt certification based on consumer demand and while further research is required, it appears that Australian consumers are willing to pay for sustainability. Producers should work together and avoid being influenced by segmented labelling

types adopted by supermarkets competing with each other. Building brand awareness by supporting one certifier will deliver greater benefits than a fragmented certifying market. Exporting seafood producers should evaluate the demand in their end market, particularly those exporting to Asia, before adding the costs of MSC to their supply chain.

Further quantitative research into the benefits of certification, where practicable, will provide further context on which decisions about whether to adopt certification can be made.

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Appendix 1. Case study sample and inclusion and exclusion criteria

Author and date	Relevance of scope	Study type	Certification type	Post certification	Country/Region	Publication type	Include?
Ankamah-Yeboah and Bronnmann 2018	Not relevant	Quantitative					
Asche et al. 2015		Quantitative	MSC and Organic	Yes	United Kingdom	Journal	Yes
Bellchambers, Phillips and Pérez-Ramírez 2016		Qualitative	MSC	Yes	Australia and Mexico	Journal	Yes
Blomquist, Bartolino and Waldo 2015		Quantitative	MSC	Yes	Sweden	Journal	Yes
Christian et al. 2013		Qualitative	MSC	Yes	Various	Journal	Yes
Constance and Bonanno 2000	Not relevant						No
Hadjimichael and Hegland 2016		Qualitative	MSC	Yes	Alaska, Australia and Faroe Islands	Journal	Yes
Japp 2008		Qualitative	MSC	Yes	South Africa	Journal	Yes
Kalfagianni and Pattberg 2013		Qualitative	MSC	Yes	Various	Journal	Yes
Kirby, Visser and Hanich 2014		Qualitative	MSC	Yes	PNA Skipjack	Journal	Yes
Lallemand et al. 2016		Quantitative	MSC	Yes	South Africa	Journal	Yes
McClenachan, Dissanayake and Chen 2016		Quantitative	MSC, fair trade, local	Yes	Maine, USA	Journal	Yes
Miller and Bush 2015		Qualitative	MSC and Dolphin safe	Yes	West and Central Pacific	Journal	Yes
Morales-Yokobori, Prenski and Blanco 2011	Not relevant	Semi-quantitative					No
Pérez-Ramírez, Ponce-Díaz and Lluch-Cota 2012		Qualitative	MSC	Yes	Australia and Mexico	Journal	Yes
Ponte 2006, Ponte 2008		Qualitative	MSC	Yes	South Africa	Journal	Yes
Roheim, Asche and Santos 2011		Quantitative	MSC	Yes	UK	Journal	Yes
Stemle, Uchida and Roheim 2016		Quantitative	MSC	Yes	Japan and Alaska	Journal	Yes
Stratoudakis et al. 2016		Qualitative	MSC	Yes	Various	Journal	Yes
Thrane, Ziegler and Sonesson 2009	Not relevant	Qualitative					No
Wakamatsu 2014		Quantitative	MSC	Yes	Japan	Journal	Yes

Appendix 2. Case study analysis

				Price	Markets	Management		Social
Author	**Certification**	**Country**	**Size**	**Price premium**	**Market access**	**Improved fishery management**	**Lower regulation after certification**	**Social licence and reputation**
Asche et al. 2015	MSC	UK	Large	Yes	Yes	n/a	n/a	Yes
Bellchambers, Phillips and Pérez-Ramírez 2016	MSC	Australia and Mexico	Large	n/a – logo not used	Yes	Yes	No	Yes
Blomquist, Bartolino and Waldo 2015	MSC and KRAV	Sweden	Large	Yes	n/a	n/a	n/a	n/a
Christian et al. 2013	Various	Various	Various	n/a		Yes	n/a	n/a
Hadjimichael and Hegland 2016	MSC	Alaska, Australia and Faroe Islands	Large	Yes	Yes	n/a	n/a	Yes
Japp 2008	MSC	South Africa	Large	No	Yes	Yes	n/a	Yes
Kalfagianni and Pattberg 2013	MSC	Various	Large	n/a	Yes	Yes	Yes	n/a
Kirby, Visser and Hanich 2014	MSC and Dolphin Safe	Parties to Nauru Agreement	Large	n/a	Yes	Yes	n/a	Yes
Lallemand et al. 2016	MSC	South Africa	Large	Yes	Yes	Yes	n/a	Yes
McClenachan, Dissanayake and Chen 2016	MSC, fair trade, local	USA	Large	Yes	n/a	n/a	n/a	n/a
Miller and Bush 2015	MSC and Dolphin Safe	West and Central Pacific	Large	n/a	Yes	n/a	n/a	n/a
Pérez-Ramírez, Ponce-Díaz and Lluch-Cota 2012	MSC	Australia and Mexico	Large	No	n/a	Yes	Yes	n/a
Ponte 2006, Ponte 2008	MSC	South Africa	Large	No	Yes	Yes	n/a	Yes
Roheim, Asche and Santos 2011	MSC	UK	Large	Yes	n/a	n/a	n/a	n/a
Stemle, Uchida and Roheim 2016	MSC	Japan, Alaska and Canada	Large	Yes	Yes	n/a	n/a	n/a
Stratoudakis et al. 2016	MSC	Various	Small	Yes	Yes	Yes	n/a	n/a
Wakamatsu 2014	MSC	Japan	Large	No	Yes	n/a	n/a	n/a