Appendix B2: Paper 2

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Stakeholder participation and satisfaction in the process of developing management plans: The case of Scottish Inshore Fisheries Groups

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ABSTRACT

There is a growing interest in engaging stakeholders in the management of fisheries. In Scotland, the form of stakeholder involvement ranges from consultation, with an advisory function, to involvement in planning and decision-making processes. Using two Inshore Fisheries Groups (IFGs) as case studies, the present paper assesses the association between participation and satisfaction of stakeholders in the decision-making process for the development and implementation of their management plans. A survey was conducted through face-to-face interviews with the stakeholders. Spearman's correlation analysis, multiple linear regression and ordered logistic regression models were used to assess and explore the associations between stakeholders' participation and satisfaction perceptions towards the process of developing and implementing fisheries plans. The results suggest a statistically significant positive relationship between stakeholders' participation and satisfaction levels. The relationship can be affected by demographic and business characteristics, and the study revealed differences in the level of satisfaction between the two IFGs investigated. Results indicate that increasing stakeholders' satisfaction in the management process plays a key role in the success of increasing stakeholders' participation in decision-making process for the management of the Scottish IFGs and EU fisheries as a whole. Such an assessment provides a better understanding of the motives that may increase the chance of successful stakeholder' participation in fisheries management.

1. Introduction

There is a growing interest in engaging stakeholders in the management of fisheries (Aanesen et al., 2014; Cochrane, 1999; Jentoft, 1989; Pita et al., 2010). Stakeholder participation in decision-making, from the management plan to its implementation, has been recognised in Europe's recently reformed Common Fisheries Policy (CFP), as a key ingredient of good governance (Coffey, 2005; Nielsen et al., 2015; European Union, 2002). Stakeholder involvement in fisheries management facilitates the infiltration of local ecological knowledge (local interests or opinions), which can complement scientific information and thus help to improve the knowledge base for decision-making (Berkes et al., 2000; Davis and Wagner, 2003; Gasalla and Diegues, 2011; Haapasaari et al., 2013; Linke et al., 2011; Röckmann et al., 2012; Wiber et al., 2004) and revelation of new information to the regulators (Aanesen et al., 2014). It also increases the legitimacy and acceptance of management policies and decisions by creating understanding and support amongst the stakeholders for the management measures and thus contributes to a more effective enforcement of rules and regulations. Likelihood of compliance may be increased as well (De Vos and Van Tatenhove, 2011; Degnbol et al., 2006; Haapasaari et al., 2013; Pita et al., 2010). Again, it enhances the inclusion of diverse stakeholder interests about the managed resources and hence stakeholder participation in decision-making processes, which is a precondition for maximizing social welfare and thereby strengthening the public support from different stakeholders (Aanesen et al., 2014; Pita et al., 2010). Stakeholders in this paper included people with an economic, social and ecological interest in fisheries activities and their management (Aanesen et al., 2014).

Engaging stakeholders in the fisheries management processes is not a new strategy within the European Union (EU) (Pita et al., 2010). Apparently, EU common fisheries policy (CFP) suggest a paradigm shift in fisheries governance that entails a turnaround in management responsibilities between the authorities and the resource users i.e. often associated with the term “co-management”

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and more recently "results-based management" (RBM), where "an acceptable impact [is defined], and then leaving it to those concerned to identify the means to meet the requirements and to document the effectiveness of the means" (Nielsen et al., 2015). This shift has been emphasised in various policy and academic circles as a promising way forward (Aanesen et al., 2014; Nielsen et al., 2015; Pita et al., 2010). With RBM-based fisheries management, the local stakeholders are left with considerable discretion about how they conduct the fishing, as long as they achieve the targets specified for the fishery in question (Nielsen et al., 2015). The government, however, has to complement by providing enabling legislation, enforcement and conflict resolution mechanisms, and other assistance required. In spite of that, little is understood about how to best increase stakeholder participation in decision-making processes.

As indicated in the last two reforms of the CFP (in 2002 and 2013), lack of stakeholder participation in EU fisheries governance has contributed to undermining the legitimacy of the CFP (Azeiteiro et al., 2012). To amend this, Regional Management Councils (RACs) based on the five large EU sea areas were established (European Union, 2004). But, due to the most recent reform of the CFP (STECF, 2013), put into force in January 2014, RACs are now called Advisory Councils (ACs). With the ACs forum, the fisheries management system in Europe involves a wider Stakeholder participation beyond just scientists and policy-makers. In line with this, Scotland, amongst other countries, has put in place several measures, aiming to enable a wider stakeholder participation in the decision-making process of its fishery (Table 1). Under the Inshore Fishing (Scotland) Act, which was adopted in 1984, Scotland introduced a number of local and national measures for the purpose of allowing more stakeholder participation that allows meaningful decisions for the management of its fishery (Jentoft and McCay, 1995). Nevertheless, an interesting question here is: are the stakeholders in Scotland satisfied with their role in participation?

According to Pita et al. (2010), fisheries stakeholders in Scotland expressed a significantly positive attitude towards the implementation of the new management measures, i.e., the Inshore Fisheries Groups (IFGs)[1] in the local areas (Pita et al., 2010). However, the attitude (satisfaction) was assessed before the Inshore Fisheries Groups management plans (IFGMPs) were developed and approved by the government authorities. This implies that the assessed stakeholders' satisfaction did not relate to their actual participation in the development of the plan, but rather based onto the agreed and intended process involving the IFGs in the planning. Stakeholders' satisfaction with their involvement depends on the extent to which they are consulted and informed about new management measures and on the extent to which they are involved in the whole process of decision-making and implementation (Pita et al., 2010). Further, stakeholders' perceptions of participation processes are influenced by their experience with government interactions, for instance with regard to how the government has supported them and have considered their local interests (Jentoft and McCay, 1995). Finally, the leadership of the stakeholder organisation and the extent to which the proposed management measures are regarded useful, can influence stakeholders' perceptions of the quality of their participation (Hoggarth et al., 1999; Ostrom, 1990; Pita et al., 2010; Yandle, 2003).

In the present paper, the main objective is to explore the association between stakeholder levels of participation and satisfaction in the decision-making process for the development and implementation of the fisheries MP, using two IFGs in Scotland as case studies. Various conditions and experiences of participation in the decision-making process may impact the satisfaction of stakeholder participation in development and implementation of the IFGMP. Hence, the current paper deals specifically with the relationship between stakeholder participation and satisfaction perceptions towards the decision-making process. In addition, possible factors that may further explain the hypothesised relationship were assessed.

2. Methodology

2.1. The study site

This paper is a case study, based on the two out of six Scottish IFGs, called North West Inshore Fishery Group (NWIFG) and Outer Hebrides Inshore Fisheries Group (OHIFG) in the North West Coast of Scotland (Fig. 1). The fishery in this area is executed entirely by UK (Scottish) vessels (Röckmann et al., 2012). About 68% of the Scottish fishing fleet is ≤10 m in length, operating in inshore waters (Pita et al., 2010). The Sottish inshore waters almost entirely depend on shellfish fisheries, with *Nephrops norvegicus* (Norway lobsters) as a key species, caught mostly by trawlers and creels. However, *Cancer pagurus* (brown crabs, also known as edible crabs), *Pecten maximus* (scallops) and *Homarus gammarus* (lobsters) are also important in the area. Based on the 2013 data from Marine Scotland (MS), the total estimated landing value from NWIFG and OHIFG, where the interviews of this study took place, accounted for over £31 million (about 7.2% of the Scottish total landing value, £430 million).

The Scottish IFGs, i.e., NWIFG and OHIFG, were chosen as case studies because they are amongst the few existing examples in Europe with the newly suggested fisheries management approach, where stakeholder participation in managing the fisheries is reported to have already been implemented (Scientific Technical and Economic Committee for Fisheries, 2012). Besides, it is the IFG stakeholders who have developed the recently approved MP for the key fished stocks relevant to the area, which are currently in the implementation phase. The study area location in the Scottish West Coast inshore fisheries is comprised of single country fisheries, where ample data for many possible indicators useful for the management of the fishery is available (NWIFG Executive Committee, 2011; Scientific Technical and Economic Committee for Fisheries, 2012; The Scottish Government, 2010; Ungfors et al., 2013). The ease of access by the researcher in terms of communication and language, including all the above reasons, make the NWIFG and OHIFG case studies (Fig. 1) represent an important opportunity to assess stakeholder participation in the development and implementation of a fisheries MP in EU waters, under the suggested RBM.

2.2. Survey design and data collection

A survey was conducted to assess the stakeholders' participation and satisfaction perceptions towards their involvement in the decision-making process for the development and implementations of their approved MP. A sample of 50 stakeholders from NWIFG ($n = 27$) and OHIFG ($n = 23$) were randomly selected from a complete list of the IFG members that were pre-identified based on the purposive sampling method (selecting a simple random sample from each IFG's sampling frame pre-identified) (Agresti and Finlay, 2014; Marshall, 1996; Small, 2009), to respond to a set of eight statements regarding the topics under investigation using a 5-point

[1] IFG membership is voluntary with no financial incentives, but the IFG chair and secretariat are compensated for their work. See details of the IFGs on e.g. Scottish Inshore Fisheries Groups Website: http://ifgs.org.uk/ and from *A Strategic Framework for Inshore Fisheries in Scotland* by Scottish Executive, 2005: http://www.gov.scot/Resource/Doc/149129/0039637.pdf.

Table 1
History of actions taken to increase stakeholders' participation in the decision-making process for the management of the Scottish inshore fisheries.

Action taken	Objective	Stakeholder engaged	Date since operation	Responsibility	Level of coverage
Scottish Inshore Fisheries Advisory Group (SIFAG)	To provide advice to government authorities regarding development and implementation of plans as part of the process of determining and applying policies and legislation linked to sea fisheries in the inshore waters.	Representatives of the governmental bodies, fishing industry, local authorities, conservation groups, fisheries and environmental scientists.	September 1999	Advisory	National level
Scottish shellfish Regulation Orders (ROs)	To give the responsibility of regulating and managing the nominated shellfish fisheries sustainably to local stakeholders.	All interested local stakeholders, e.g. fishers, conservationists, scientists and local authority representatives.	January 2000	Regulatory and management	Local level
Scottish Fisheries Council (SFC),	To provide the mechanism by which the authority can develop and implement policies in partnerships with stakeholders interested in commercial sea fishing	Different stakeholders, like processors, retailers, community representatives, fisheries scientists and policy makers, environmental groups, enforcement and industry bodies	January 2008	Communication mechanism	National level
Inshore Fisheries Groups (IFGs)	To improve the management of the distinct inshore fisheries of Scotland, and give the local stakeholders in the different inshore areas a strong voice in the management developments of their fisheries.	The local fishing industry and representatives from the interested commercial fishers operating in the area, environmentalists, community members, scientists, and other marine users.	September 2008 (initial 12 pilot IFGs launched)	Management[a]	Local level
Marine Scotland (MS)	To manage Scottish seawaters and support policy integration in the wider marine planning.	Government authorities and civil or public servants, including the functions of Fisheries Research Services, the Scottish Fisheries Protection Agency and the Scottish Government's Marine Directorate	April 2009	Management	National level

Note: Table 1 is adapted from Pita et al. (2010), p. 1094.
[a] According to D. MacInness and D. McNeal personal communication April 2014: the role of IFG is up to now to act as an "advisory" body to the managing authorities (government officials) and not "management" body as initially stated, since the IFGs are not legislative schemes. The government still have legislative power.

Likert scale ranging from "strongly agree" to "strongly disagree" (Likert, 1932). According to Pita et al. (2010 p. 1096), "Likert-type scales are frequently used in the behavioural sciences [20, 21] and have been increasingly used to measure fishers' attitudes and perception towards their fishery, conservation, policy and management measures [8, 22–30]".

Herein, the agreement level of stakeholders' participation perceptions was assessed under the following four investigation topics: 1) informed, 2) consulted, 3) involved and 4) supported by the government. Whereas the stakeholders' level of satisfaction regarding the process of developing their own IFGMP were also assessed under the following four topics: 1) happy, 2) local interests (opinions) are met, 3) the developed MP will make a difference, and 4) satisfied with their leadership in their IFG. Using a 5-point Likert-type scale, the respondents' participation and satisfaction levels in decision-making process were assessed by asking them to classify their agreement to the statements covering these eight topics. See the statements used for questioning as they were presented to the survey respondents in Appendix B. These agreement levels were investigated because issues of participation in fisheries can be traced in a continuum, corresponding to a hierarchical degree of stakeholder engagement (Arnstein, 1969; Hoggarth et al., 1999; Jentoft and Mccay, 1995; Pita et al., 2010; Pretty, 1995; Sen and Nielsen, 1996). Specifically, this paper used Pretty's typology of participation, where he adapts and reduces Arnstein (1969) "ladder of citizen participation", ranging from "manipulative participation" (where participation is simply a pretence, with stakeholders' representatives having no power) to "self-mobilization" (where stakeholders take initiatives independently of external institutions or influence, and the government provide enabling support). For a detailed description of the levels of participation used, see Pretty (1995).

The first level of participation under investigation, 'informed', corresponds to the level 'passive participation' in Pretty's typology of participation. The next level 'consulted' corresponds to "participation by consultation" in Pretty's typology of participation. The next level analysed, 'involved", falls between Level 5 (functional participation) and Level 6 (interactive participation) of Pretty's typology of participation. Then lastly, the level of participation under investigation was 'Government support'. This level falls under Level 7 of Pretty's Self-mobilisation participation level.

In this study, participation in the context of stakeholder satisfaction, under the topics, happy, local opinions met, MP will make a difference, and leadership satisfaction, falls also under Levels 5 and 6 of Pretty's characteristics (Pretty, 1995).

Research suggests that stakeholder' perceptions of participation and satisfaction with the decision-making process in fisheries management can be influenced by, the stakeholders' work experiences, use of different gear types, membership of associations (e.g. membership of Fisheries Producer Organisations (POs)), education and even age (Blyth et al., 2002; Gelcich et al., 2005, 2009; Noble, 2003; Pita et al., 2010; Richardson et al., 2005; Salas and Gaertner, 2004). Data on these variables and other demographic

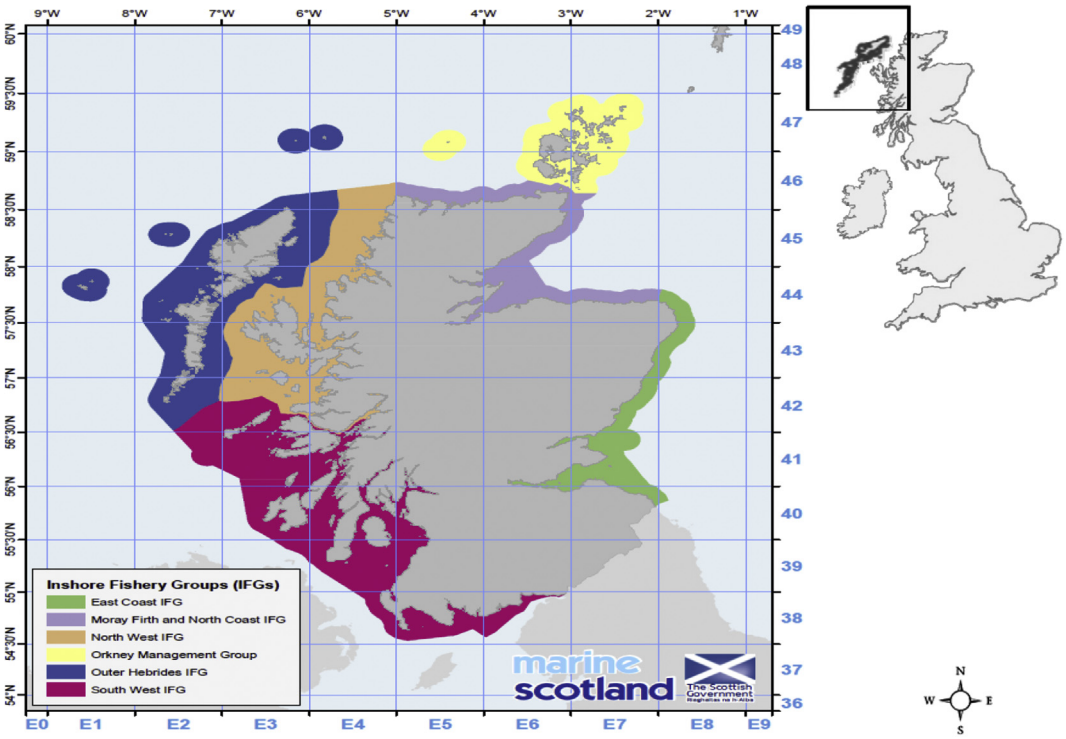

Fig. 1. Map showing the study site, i.e. the coverage for NWIFG and OHIFG area (Copyright 2014 MS).

and business characteristics (Appendix B) were also collected and included in the analysis for adjustment.

Qualitative data was also collected from the same 50 respondents through the follow-up comment on each 'question statement' as expressed in Appendix B to supplement the quantitative information gathered. All interviewees' responses were audio recorded and transcribed. In addition, the interviews were documented through writing field notes, and some pictures were taken. For triangulation purposes, literature archives or records, reports and published IFGMPs were also utilised to collect the data. To obtain such documents, experts within the academic and technical field of the study were contacted through emails and phone calls. Some of such informative documents were also acquired through searching available online documents.

Prior to the implementation of the interviews/survey in NWIFG and OHIFG, contact was established with SIFAG, MS, including harbor authorities, fisheries associations and IFG chairs within the included IFGs. Then, the questionnaire was pre-tested and adjusted. Informed consent was obtained from the respondents verbally and in writing before conducting interviews. Respondents were also given time to both consider their participation and to ask questions about the research and the researcher (interviewer). In addition, the presence of the audio recording equipment was acknowledged, to assure respondents of confidentiality and give them the opportunity to withdraw if they were uncomfortable with being taped. The respondents involved approve the use of direct quotations in the present paper.

2.3. Statistical analysis

Spearman's correlation analysis was conducted to assess if there is a relationship between stakeholders' participation and satisfaction perceptions. P values were Bonferroni adjusted.

Descriptive statistics were used to describe and summarize data in a meaningful way such that, for example, patterns might emerge from the data. For internal consistency of Likert scale items, Cronbach's α coefficient was determined (Cronbach, 1951). Factor analysis was conducted to determine whether the sample size data used was adequate to find relationships between the included variables before finally utilising the regression models as explained below. Due to small sample size, for the purpose of analysis, the 5-point Likert-scale were collapsed to 3-points (agree, neutral and disagree). Since purposive sampling for randomly selecting the interview-respondents within the targeted IFGs was applied, and such samples do not always exactly reflect the populations from which they are drawn, a Z-test for the rank sum for two independent samples was conducted using the Wilcoxon's rank sum Z-test. The Z-test was conducted to determine the probability of drawing samples that are as different in their index scores as that which we observe from populations that are not different.

Ordered logistic regression models set up applied to identify whether belonging to NWIFG compared to OHIFG has different impact on the agreement levels to the investigation statements of stakeholders' participation and satisfaction perceptions. The unadjusted model was then adjusted for age, education, dependency on fisheries, fishing gear, belonging to POs, and work experience. Selected demographic and business characteristics were used for adjustment in the analysis to measure their influence on the stakeholders ranked responses with regard to their respective IFG area. Selection was based on the most important demographic and business characteristic variables that are reported to have the potential of determining the stakeholders' participation and satisfaction perceptions towards new fisheries management measures (Blyth et al., 2002; Gelcich et al., 2005, 2009; Noble, 2003; Pita et al., 2010; Richardson et al., 2005; Salas and Gaertner, 2004).

Composite measures, "stakeholders' participation index" and "satisfaction perception index" were generated from the responses on the four item investigation statements of stakeholders'

Table 2
Spearman's rho for the eight items on stakeholders' levels of participation and satisfaction perception in decision-making process (N = 50). Bonferroni adjusted significant correlation coefficient in bold.

	Government supports stakeholders	Stakeholders are informed	Stakeholders are consulted	Stakeholders are involved	Local opinions accounted for	Stakeholders are happy	IFGMP will improve fishery	Good leadership
Government supports Stakeholders	1							
Stakeholders are informed	**0.630**	1						
Stakeholders are consulted	**0.630**	**0.899**	1					
Stakeholders are involved	**0.600**	**0.454**	**0.454**	1				
Local opinions accounted for	**0.550**	**0.511**	**0.511**	**0.760**	1			
Stakeholders are happy	0.355	**0.590**	**0.590**	**0.660**	**0.674**	1		
IFGMP will improve fishery	0.324	**0.541**	0.415	0.414	**0.526**	**0.670**	1	
Good leadership	0.292	**0.508**	**0.462**	**0.463**	**0.540**	**0.794**	**0.618**	1

participation and satisfaction perceptions, respectively, by summing up respective scores. A multiple linear regression analysis, with stakeholders' participation index as an outcome variable, was conducted after the correlation analysis. A backward approach was adopted, which included satisfaction perception index, age, education, dependency on fisheries, belonging to PO, fishing gear and work experience.

Analyses were conducted with IBM SPSS statistics, version 22.0.

3. Results

3.1. Sample characteristics

The mean age for respondents in the NWIFG and OHIFG is 51 and 49 years, with average lengths of fisheries work experience of 28 and 22 years, respectively. However, 65% of the stakeholders in OHIFG compared to 59% of stakeholders in NWIIFG indicate that they have more than standard level of formal education. Almost all of the fishers included in this study are full-time fishers and highly dependent on the fisheries industry. The majority of the fishers interviewed are local to the NWIFG and OHIFG, where 55% and 56% work with static gear, respectively. In both IFGs, some stakeholders are part of the fisheries producers' organisations (POs) and some are not, with 44% in the NWIFG and 43% in the OHIFG belong to the POs. All the results on demographic and business information from the included respondents can be seen in Appendix A: Table A1.

3.2. Participation and satisfaction in the decision-making process

The results indicate a positive relationship between stakeholders' participation and satisfaction item variables included. Certain item variables of stakeholders' perception of participation and satisfaction are strongly correlated (Table 2).

The results in Table 3 portray a pattern that the stakeholders between the two fishing community-groups have different perceptions towards the decision-making process in the development of the MP, except for the first item, '*The government values and supports our views*' ($Z = -1.64$, $p = 0.102$ two tail). The stakeholder group (OHIFG) that appears to have good leadership (74%) also verbally indicates (57%) that they are involved in the decision-making process for the development of the MP (Table 3). It also follows that stakeholders in the OHIFG compared to those in the NWIFG hold the belief that they are being informed (87% and 44% respectively), consulted (83% and 48% respectively), happy with the

Table 3
Descriptive statistics, reliability analysis (Cronbach's alpha) and factor analysis (KMO and significance value) to Likert-type statements designed to quantify stakeholders' perceptions and satisfaction regarding their participation in the decision-making process during the development of the MP, i.e. for NWIFG and OHIFG.

Likert-scale items	IFG area	% Responses[a]			Wilcoxon's rank sum Z test	
		Disagree	Neutral	Agree	Mean Rank	Z score
Stakeholders' participation index (Items = 4, Cronbach's $\alpha = 0.87$; KMO = 0.742 and significant at <0.001) in decision-making process of MP development						
The government values and supports our views	**NWIFG**	44	19	37	22.65	$Z = -1.64$, $p = 0.102$
	OHIFG	26	13	61	28.85	
I am well informed regarding the decision-making process	**NWIFG**	37	19	44	20.06	$Z = -3.36$, $p = 0.001$
	OHIFG	0	13	87	31.89	
I am consulted before the IFGMP was made	**NWIFG**	33	19	48	21.13	$Z = -2.70$, $p = 0.007$
	OHIFG	4	13	83	30.63	
I am involved in decision-making process of MP development	**NWIFG**	59	22	19	20.61	$Z = -2.77$, $p = 0.006$
	OHIFG	26	17	57	31.24	
Stakeholders' satisfaction index (Items = 4, Cronbach's $\alpha = 0.88$; KMO = 0.795 and significant at <0.001) in decision-making process of MP development						
Local fishing interest/opinions are taken into account in the IFGMP	**NWIFG**	45	33	22	20.89	$Z = -2.55$, $p = 0.01$
	OHIFG	17	26	57	30.91	
Happy with the decision-making process in making IFGMP	**NWIFG**	52	37	11	18.13	$Z = -4.03$, $p < 0.001$
	OHIFG	13	17	70	33.96	
The IFGMP will make a difference to the fishery	**NWIFG**	30	55	15	17.81	$Z = -4.39$, $p < 0.001$
	OHIFG	0	30	70	34.52	
The IFG leadership is good	**NWIFG**	52	22	26	18.80	$Z = -3.82$, $p < 0.001$
	OHIFG	4	22	74	33.37	

Table 4
Results of backward linear regression analysis of stakeholder participation perception.

Variable	Estimate	SE (estimate)	p
Constant	6.961	1.633	0.000
Satisfaction index	0.590	0.106	0.000
Fishing gear[a]	1.451	0.611	0.022
Fisheries dependence[b]	−2.685	0.712	0.001

Adjusted R squared = 0.607.
[a] Static gear = 1, Mobile gear = 0.
[b] High dependence = 1, if not = 0.

process (70% and 11% respectively) and are optimistic that the IFGMP will make a difference (70% and 15% respectively).

The reliability analysis for the items included in the stakeholders' participation and satisfaction index variables shows an acceptable Cronbach's α of 0.87 and 0.88 respectively. The factor analysis outcome indicates that the data herein is adequate, since the KMO value is above the considered acceptable limit of 0.6, and with sample significance below 0.05 (p-value < 0.001). Factor analysis results also shows that 72% and 73% of the total variance may be explained by the stakeholders' perceptions of participation and satisfaction item variables included, respectively.

According to Table 4, stakeholder satisfaction perception, gear type and fisheries dependence significantly predicts the degree of the stakeholder participation perception. Fisheries dependence have negative influence on participation perception (Table 4).

Results from logistic regression models indicate a significant difference in item variable levels of stakeholders' perception of participation and satisfaction between the NWIFG and OHIFG, except for "*Government support*", where the scores are not significantly different (Table 5). Significant OR mean that, compared to NWIFG, OHIFG stakeholders tend to be more agreeing to all investigation statements for satisfaction and participation perceptions. The OHIFG are more likely than NWIFG stakeholders to fall towards the high end agreement scale-level of the stakeholder perceptions of participation and satisfaction.

Except for the seventh model item, "The IFGMP will make a difference", i.e., with OR = 0.053, the results suggest that adjusting the model for age decreases the difference in level of agreement between the NWIFG and OHIFG to the response-statements of satisfaction and participation perceptions towards the decision-making process for the development of the MP. This is also the pattern in multiple adjusted models, (Table 5), where the difference becomes even smaller than just adjusting for age.

Despite the fact that most stakeholders in the NWIFG, compared to OHIFG, show a significantly lower level of satisfaction and participation perceptions towards the decision-making process for the development and implementation of the MP, most NWIFG stakeholders (55%) are not sure (neutral) of the perception that the IFGMP will help make improvement to the fishery (Table 3).

4. Discussion

This study examines aspects of the association between participation and satisfaction of stakeholders in fisheries management. The reliability coefficients and KMO value (Table 3) of the items used to express stakeholders' participation and satisfaction scales suggest that the set of items used herein reliably and adequately measure the association between the two variables in a valid manner. Relationship between levels of participation and satisfaction, including the differences in levels of participation and satisfaction achieved between the two IFGs, gives a better understanding of how increased stakeholders' responsibility in the decision-making process can best arise in a mature regulatory setting, or about the motives to increase the chance of successful stakeholders' participation in fisheries management.

The results suggest that levels of participation in the decision-making process are related to the expressed satisfaction regarding participation in the development and implementation of the MP. The positive correlations between the variables (Table 2) support those from previous studies reporting consistent relationships between level of participation and satisfaction with participation in the activities and roles (Coffey, 2005; Gray, 2005; Salas and Gaertner, 2004). In line with this, the results from the multiple regression model (Table 4) suggest that when stakeholders are satisfied with the management process, they are more likely to participate. It is revealed that stakeholder satisfaction in fisheries management exerts a significant positive effect on stakeholder participation, even after controlling for demographic and business characteristic (Table 4).

The other suggested important determinants of stakeholder participation in fisheries management herein include "type of fishing gear" and "the degree of fisheries dependence" (Table 4). Fishers who use creel-boats are more likely to participate in fisheries management, compared to those using trawlers. This may be due to the fact that the West coast area have a series of fisheries restriction zones where only creel-boats are allowed to fish in order to avoid gear conflict. In addition, the trawl-boat users do not favour the seasonal and total closures to mobile gear imposed

Table 5
Odds ratios (OR) calculated from ordered logistic regression models' estimates for stakeholders' perceptions in the NWIFG compared to those in OHIFG of being supported by the government, informed, consulted, involved, if happy, if their local opinions are taken into consideration, if the IFGMP developed makes a difference and if satisfied with their leadership during the decision-making process for the development of the IFGMP.

Outcome variable[a]	Unadjusted analysis		Age adjusted analysis		Multiple factor adjusted analysis[b]	
	OR	95% Confidence interval	OR	95% Confidence interval	OR	95% Confidence interval
Government support	0.402	(0.136, 1.188)	0.350	(0.114, 1.079)	0.213	(0.063, 1.004)
Informed	0.102	(0.024, 0.431)**	0.088	(0.020, 0.399)**	0.033	(0.005, 0.227)***
Consulted	0.177	(0.048, 0.655)*	0.160	(0.041, 0.619)**	0.113	(0.025, 0.525)**
Involved	0.208	(0.068, 0.632)**	0.199	(0.064, 0.616)*	0.156	(0.041, 0.586)**
Happy	0.081	(0.023, 0.282)***	0.076	(0.021, 0.272)***	0.044	(0.010, 0.199)***
Local interest taken into consideration	0.237	(0.079, 0.708)*	0.233	(0.077, 0.704)*	0.175	(0.046, 0.668)*
IFGMP will make a difference	0.053	(0.013, 0.213)***	0.053	(0.013, 0.216)***	0.037	(0.007, 0.186)***
Good leadership	0.097	(0.028, 0.336)***	0.095	(0.027, 0.335)***	0.038	(0.008, 0.191)***

Dummy variable for x is 1 for OHIFG and 0 for NWIFG.
*p < 0.05; **p < 0.01; ***p < 0.001.
[a] Agree vs. Neutral vs Disagree.
[b] Adjusted for age, education, dependency on fisheries, experience, fishing gear and if the stakeholder belongs to POs.

under the Inshore Fishing (Scotland) Act 1984 as a good management measure (Pita et al., 2010). Such measures may, therefore, influence the static gear users to feel that they are more listened to, and hence the increased satisfaction with their participation in management processes, which results into being more likely to participate compared to the mobile gear users. This might also be related to the fact that the stakeholders tends to be less likely to participate if their families depend mostly on fisheries (Table 4), since most of the trawl-boat (mobile gear) compared to creel-boat (static gear) users had 90–100% of the their household income coming from fishing. On average, NWIFG with lower levels of participation compared to OHIFG earn higher household income from fisheries per year (Table A1). In addition, most of the trawl-user respondents verbally indicated that IFGs are for creel-boat users. Hence, all this may support the findings that fisheries dependence exhibits a net negative effect on stakeholder participation, even after adjusting for other predictors.

Logistic regression analyses also suggest that the level of participation, in the decision-making process for the development of the IFGMP, is only partly related to expressed satisfaction regarding participation. These findings are in line with those from previous studies reporting that various conditions or factors in the decision-making process for the management of the fisheries can influence the stakeholders' satisfaction in participation, and so may also affect the association between participation and satisfaction (Hoggarth et al., 1999; Ostrom, 1990; Pita et al., 2010; Yandle, 2003). It is interesting to note that adjusted estimates showed that demographic and business characteristics affect the association between satisfaction and participation level. Generally, association size was inflated in unadjusted models (Table 5). This means that demographic and business characteristics can influence stakeholders' participation in the decision making process, independent of their satisfaction perceptions towards the process.

In comparison to NWIFG stakeholders, the higher score level of OHIFG stakeholders' overall perception concerning satisfaction and participation in the decision-making process may most likely contribute to the fact that by April 2014, the OHIFG stakeholders already had started implementing their MP objectives that can be enacted within the existing legislation. Amongst others, the OHIFG has conducted the common cockle (*Cerastoderma edule*) fishery survey as planned in their MP and are now talking with Marine Scotland (MS) to determine the way forward for the other measures that require additional legislation to be introduced. Thus, as of April 2014, the IFGs are at a 'forward consultation stage' with the government in order to get all of the laws that need to be changed, modified, or call for the introduction of a new legislation. Yet to change or introduce a new legislation for implementation of the MP measures requires long administrative time (D. MacInness, personal communication, 15 April 2014). Consequently, the IFGs would like to become a legislative body so that they also can have the power to manage the fishery and not just be an advisory body to the government authority, although the Scottish government does not seem to be willing to give such power to the IFGs (D. MacInness and D. McNeal, personal communication, 15 April 2014). This may contribute to the equality in the stakeholders' score on their opinion about "government values and support", especially since it is the same government supporting them. Lack of stakeholders' legislative power may therefore contribute to the uncertainty of successfully increasing stakeholder participation in EU fisheries management as a whole (Berghöfer et al., 2008).

However, the current results suggest that the nature of participation measures themselves can influence satisfaction towards stakeholders' engagement in the decision-making process. A broader array of stakeholder participation and good leadership as expressed by the OHIFG may influence the stakeholders' satisfaction with their participation in fisheries management. For example, the OHIFG leader have arranged with the local authority to have what they call "community quota scheme" where the new fishers are able to lease the quota, and this is a measure to ensure new entry into fisheries. But, according to De Vivero et al. (2008) a broad array of stakeholders' representatives may result in a participation paradox, implying that the higher the number of involved stakeholders, the smaller the role each plays. This may result in individual stakeholders losing their prominence and importance in the wider spectrum of interests (de Vivero et al., 2008; Gray and Hatchard, 2003).

Overall, this study supports the arguments of Mikalsen and Jentoft (2008) who point out that a process open to a wider range of stakeholders facilitates information exchange and transparency in the management process. And just as Gray (2005) also highlights, the results herein suggest that satisfaction in participation measures of a wider coverage of stakeholders coupled with good leadership will make a major contribution to the success of increasing stakeholder participation in the decision-making process for MP development and implementation in the fisheries, despite stakeholders' lack of legislative power for management. The IFGs in Scotland are now at the initial stage of implementing their MP, i.e., at the stage called hereafter: *moving forward on measures that existing legislations can introduce*.

Through the theoretical lens of the current findings and as opposed to findings reported in Pita et al. (2010), members of the stakeholder group, which mostly perceive that they are well informed about management measures (i.e. OHIFG), also mostly feel that they are consulted and involved in the process. Thus, the results support Pretty's typology of participation that passive participation (i.e. being informed) is a key step to legitimate participation (Pretty, 1995). The fact that most NWIFG compared to OHIFG stakeholders still perceive that they are not consulted (33% vs 4% respectively), not involved (59% vs 26% respectively) and not informed (44% vs 26% respectively) indicates that there still is a lot of work to be done before reaching the OHIFG stakeholders' participation level in the decision-making process. Achieving this implies improvement in the CFP's goal of increasing stakeholder participation in order to make EU fisheries management policies and decisions more legitimate. Just as reported by Pita et al. (2010), Delaney et al. (2007), and Nielsen and Mathiesen (2003) about the lack of stakeholders' participation in the decision-making process for the management of the EU fisheries, the deficiency of stakeholder participation and satisfaction in the Scottish IFGs currently in operation is not exceptional.

There are numerous reasons contributing to lack of participation in the decision-making process. The current study portrays that the less the stakeholders are listened to, the less they are happy with the process. The less the stakeholders are happy with the decision-making process in developing and implementing the MP, the less they are of the opinion that the MP will improve the fishery, hence reducing their satisfaction of their participation in the process. In addition, the results indicate that, with good leadership, it is possible to increase the level of stakeholder satisfaction in decision-making processes and hence the participation (Table 4). Seventy-four per cent of the involved OHIFG stakeholders, who happened to have already started implementing their MP by April 2014, were of the opinion that they have a good leadership, whilst only 26% of those from the NWIFG who reported not to have started implementing their MP, believe that their leadership is good (Table 3). Therefore, apart from the three items used to express stakeholders'

satisfaction level (Table 3), the study results suggest that good leadership is essential for improving stakeholder participation in decision-making processes for fisheries management.

Stakeholders from both OHIFG and NWIFG said in the interviews that the OHIFG has good leadership due to their background and work experience, which give them the required skills as leaders. It was pointed out that a good IFG chair should be independent of the fisheries market and industry to avoid judgement favours, and that the leaders in general should have the work experience and with a political background that can enhance the skills required to strategically influence the policy-makers or government authorities to listen to their needs. This is important especially because fisheries management institutions in the EU still operate primarily top-down with regards to the CFP (Delaney et al., 2007; Pita et al., 2010; Mikalsen and Jentoft, 2008). In addition, it was pointed out that it is important that at least some of the IFG leaders should have a fisher background and be knowledgeable about the fisheries ("*know the fisheries inside and out*"), besides having longtime experience working with fisheries management worldwide in order to enable a good network nationally and internationally. All of this, therefore, gives the leadership the skills and the capacity to effectively mobilise and develop good projects that are able to attract and secure resources, e.g., funding and skilled labour like scientists, for the IFG. Consequently, this might make the fishing community respect the leaders, and more so increase stakeholder satisfaction that their fishing interest are bound to be met, and hence the assurance for increased stakeholder participation.

It was also pointed out during the interviews that just as it is with the OHIFG, a good geographical position with coverage area of manageable size is required for effective management. For instance, the OHIFG area is dominated by one FA, the Western Isles Fishermen's Association, where the manager (now for 31 years: April 2014) happens to be the OHIFG secretariat himself. Whilst in other IFGs like the NWIFG, different FAs are involved and this makes management of the fisheries complex compared to the OHIFG (since all management measures considered have to be consulted on with all FAs having members operating in the area). Thus, due to such heterogeneous management conditions, belonging to a specific stakeholder group or fishing community may explain variation in stakeholders' satisfaction of participation, and so may the level of participation (Table 5).

The current study has some limitations. For instance, since communities are not homogeneous entities, there is always the danger of assuming that those participating are representative (Pretty, 1995). Likewise, in the present study, even if the complete list of key respondents was available, there is a limitation because not all of the randomly identified respondents in the IFGs were accessible, e.g., fishers at sea (hence the slight difference in number of fishers interviewed). Nonetheless, most of the selected respondents were accessible in this study. Further, the stakeholders' participation and satisfaction levels are based on individuals' perspectives; as such, this might contribute to the highly statistically significant positive correlations between the two variables. Finally, given the small sample size, the computation of a valid adjusted estimate was limited by the fact that not all demographic and business characteristics (covariates) were included in the analysis. Therefore, additional research, based on big sample size, is needed to fully understand the relationship between the stakeholders' level of participation and satisfaction adjusted for all of the specific factors influencing these relationships. Nevertheless, findings herein increase the insights on how stakeholders within an RBM-based strategy of fisheries management can be more motivated and successfully engaged in the decision-making process for the development and implementation of the MP.

5. Conclusion

Stakeholder satisfaction with the fisheries management process can have a major influence on the extent to which stakeholder engagement in the fisheries management will be observed (Coffey, 2005; Salas and Gaertner, 2004). The study results showed that if the local opinions are accounted for, the stakeholders involved are happy with the process and so may accept the promise that the new management measure (e.g., IFGMP) will improve the fishery. Such relationships are realistic in case of good leadership. Apart from the nature of participation measures themselves, the stakeholders involved need to be satisfied that the process benefits them and that participation results in meaningful decision-making. In agreement with previous results, stakeholder satisfaction in participation, dependence on fisheries and type of fishing gear used, are important determinants of stakeholder participation in fisheries management. Independent of stakeholder satisfaction, demographic and business characteristics such as work experience, age, education, fisheries dependency and membership in POs, can influence stakeholder participation in decision-making processes for fisheries management. Stakeholders' satisfaction needs to be increased in order to increase their participation. Devolving management power to the stakeholders is a possible path to make the stakeholders' engagement viewed as true participation by everyone (Berghöfer et al., 2008; Gray, 2005). However, the results indicate that stakeholders can still participate without a clear acceptance by government regarding who has the right to formally assume the management role, as long as they are satisfied with their participation. Good leadership may help to ensure stakeholder satisfaction of their participation in fisheries management. On one hand, stakeholders who are more satisfied with the process are also more likely to participate. On the other hand, stakeholders who have participated in the process are also more likely to be satisfied. Generally, stakeholders who are satisfied with the decision-making process also view themselves to be engaged in the process. Under the umbrella of results-based fisheries management strategy, the present study's results suggest that increasing stakeholders' satisfaction in the management process plays a key role on the success of increasing stakeholders' participation in the decision-making process for the development and implementation of the MP in Scottish IFGs and EU fisheries as a whole.

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Appendix A

Table A1
Demographic and business characteristics, including attitude and participation perceptions for the respondents in the study. Descriptive statistics is shown as means (±standard deviation) and percentages (n = 50)

Variable	Description of variable	Mean (±SD)		Frequency of occurrence (%)			
		NWIFG	OHIFG	NWIFG		OHIFG	
				1	0	1	0
Demographic characteristics							
Age	=Respondent age (years)	50.48 (6.9)	48.48 (9.3)	–	–	–	–
Experience	=Number of years working in the fishing industry	28 (10)	22 (12)	–	–	–	–
Marital status	=1, if respondent is married, 0 otherwise	0.89 (0.3)	0.96 (0.2)	89	11	96	4
>std. grade education level[a]	=1, if respondent have more than std. level of education, 0 otherwise	0.59 (0.5)	0.65 (0.5)	59	41	65	35
Local fisher	=1, if living and fishing within the IFG area interviewed, 0 otherwise	0.67 (0.5)	0.70 (0.5)	67	33	70	30
Household income[b]	=Total household income in £ per year from fisheries depended family	28,638.65 (15,203.70)	24,625.00 (9457.80)	–	–	–	–
Dependent children	=Number of dependent children in the household dependent on fisheries (≤16 years old)	0.67 (1)	1.0 (1.4)	–	–	–	–
Business characteristics							
Skipper	=1, if respondent employed as skipper, 0 otherwise	0.59 (0.5)	0.61 (0.5)	59	41	61	39
Owner of boat	=1, if respondent owns the vessel, 0 otherwise	0.52 (0.5)	0.52 (0.5)	52	48	52	48
Full-time fisher	=1, if respondent employed as a full-time fisher, 0 otherwise	0.70 (0.5)	0.70 (0.5)	70	30	70	30
Fisher	=1, if respondent is employed as fisherman in the vessel, 0 otherwise	0.70 (0.5)	0.70 (0.5)	70	30	70	30
Belongs to POs	=1, if respondent belongs to Fisheries Producer Organisations, 0 otherwise	0.44 (0.5)	0.43 (0.5)	44	56	43	57
Static fishing gear	=1, if respondent works/fishes with creel (ports), 0 otherwise	0.37 (0.5)	0.30 (0.5)	37	63	30	70
Mobile fishing gear	=1, if respondent works/fishes with Trawl, 0 otherwise	0.41 (0.5)	0.39 (0.5)	41	59	39	61
High dependence on fisheries[c]	=1, if respondent belonging to household highly dependent on fisheries (household income 90–100%)	0.74 (0.5)	0.70 (0.5)	74	26	70	30

[a] More than standard level education corresponds to SCQF level ≥6 (Scottish Credit and Qualification Framework), SQA ≥ higher (Scottish Qualification Authority), or SVQ ≥ 3 (Scottish Vocational Qualifications).
[b] Household income filtered for only those respondents who are highly dependent on fisheries.
[c] Highly dependent on fisheries implies that 90–100% of the respondent's household income comes from fishing (adapted from the levels of dependence on fisheries (Tzanatos et al., 2006).

Appendix B

Survey questions as presented to the survey respondents (see below).

Perceptions of participation in the decision making process

Answer in terms of your agreement. Tick what suits you best: 1= strongly disagree, 2 = disagree, 3 = neutral (or don't know), 4 = agree, and 5 = strongly agree.

Informed (lacks input of stakeholders, i.e. stakeholders are informed after the decision is already made)

A. Stakeholders/fishers were well informed about the decision-making process

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

Consulted (this is more than just informed. At least it seeks stakeholder's opinions, but management bodies are under no obligations to account for stakeholder's views).

B. Stakeholders/fishers were usually consulted regarding the decision-making process.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

Involved (this allows the involvement of stakeholders in the decision making process: interactive participation, e.g. as is the aim of the IFG measure, where local resources are supposed to be used).

C. Stakehoders/fishers take part in the decision-making process.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

D. The government provide an enabling framework of supports for the development of the MP

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

The stakeholders' satisfaction perceptions toward a new management measure, i.e. the process of developing and implementing the Inshore Fisheries Group Management Plans (IFGMP)

What is the level of your agreement to the following statements, i.e. ranging from 1= strongly disagree, 2 = disagree, 3 = neutral (or don't know), 4 = agree, and 5= strongly agree?

E. I am happy with the decision-making process in making the IFGMP.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

F. IFGs improve fisheries management in the area.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

G. IFGs take more into account the opinions of the fishers/stakeholders.

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

H. The leadership in our IFG is good

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Give your comment:

Demographic characteristics

1. How old are you (in years)?
2. Do you have more than standard level of education? Yes or No
3. How long have you been working in the fishery industry?
4. Are you married? Yes or No
5. Are you a local fisher, i.e. if you leave within the West Coast of Scotland? Yes or No
6. Are you living within the Western isles (Outer Hebrides IFG), North West IFG or South West IFG?
7. How much is your total family household income per year or per month?
8. How many children under the age of 16 years do you have (dependent children)?

Business characteristics

1. Are you employed as a skipper? Yes or No
2. Are you the owner of the boat? Yes or No
3. Are you a full-time employed fisher? Yes or No
4. Are you part of the Fishers Producer Organisation? Yes or No
5. Are you working with static or mobile fishing gear? Yes or No
6. Are you from a household highly dependent on fisheries (households with 90 – 100% of income from fishing)? Yes or No
7. Do you have a role in the IFG? Yes or No
8. What is your role?

Attitude and perception

1. Do you think the government values and supports the fishing industry? Yes or No
2. Does the current management regime meet the local fishers' interests? Yes or No
3. Do you perceive yourself to be informed regarding the decision-making process? Yes or No
4. Would you perceive that the fishers or representatives of fishers are consulted with regard the decision-making process? Yes or No
5. Do you think the fishers/stakeholders are involved in the decision-making process? Yes or No

Any comments?

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