Combining internal and external motivations in multi-actor governance arrangements for biodiversity and ecosystem services

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ARTICLE INFO

ABSTRACT

This paper analyses the possibility of building a mutually supportive dynamics between internally and externally motivated behaviour for biodiversity conservation and ecosystem services provision. To this purpose a face to face survey amongst 169 key actors of 34 highly successful and prominent biodiversity arrangements in seven EU countries was conducted. The main finding of the paper is the feasibility of combining inherently intrinsically motivated behaviours (providing enjoyment, pleasure from experimentation and learning, aesthetic satisfaction) and internalized extrinsic motivations (related to the identification with the collective goals of conservation policy) through a common set of governance features. Successful initiatives that combine internal and external motivations share the following features: inclusive decision making processes, a broad monitoring by "peers" beyond the core staff of the initiatives, and a context that is supportive for the building of autonomous actor competences. These findings are in line with the psycho-sociological theory of motivation, which shows the importance of a psycho-social context leading to a subjective perception of autonomy and a sense of competence of the actors.

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1. Introduction

Research on collective action for environmental issues has increasingly recognized the role of internal motivations in successful long-term action for providing environmental goods and services (Ostrom, 1998; Muradian and Rival, 2012; Mauerhofer et al., 2013; Vallino, 2014). In general, support for internal motivations for nature has been linked to improved performance both in environmental policy compliance and environmental responsibility (De Young, 2000; Pelletier, 2002; DeCaro and Stokes, 2013). Scholars have documented these effects for a broad variety of actors both from market, civil society, and government backgrounds (Lemieux et al., 2012; Bolderdijk et al., 2013).

However, for using these insights in the design of effective governance instruments for biodiversity and ecosystem services, a better understanding of the supportive governance context of internally motivated behaviour is needed. Such improved understanding should allow evaluating when and how governance mechanisms that support internally motivated behaviour lead to improved environmental policy compliance and increased environmental responsibility. A systematic analysis of existing cases of successful biodiversity governance that rely on internally motivated behaviour can lead to broadening the menu of governance options. Even though such knowledge still needs to be adapted for setting up governance arrangements for other specific biodiversity issues areas and countries.

In particular, the insights on the role of internal motivations can contribute to designing mixed governance schemes. Such mixed schemes are combining tools based on external motivations, such as economic incentives, market development or regulatory tools, with tools that support internally motivated behaviour. Indeed, in practice there is often a need to use a mix of tools that support both internally motivated and externally motivated behaviours (García-Amado et al., 2013). Policy tools based on external motivations might act faster and on a broader scale. In contrast, policy tools supportive of internal motivations – such as participatory policies for generating long-term commitment – often entail more time and risk. However, their effects on raising environmental awareness and building of social capital around long-term societal change are more evident.

This paper aims to contribute to a better understanding of the psycho-social conditions that are supportive for such a combination of internally and externally motivated behaviour. To this purpose, this paper analyses a large-scale survey of motivations and governance amongst 169 key actors that are part of 34 successful prominent multi-actor biodiversity arrangements in 7 EU countries. The paper is organized as follows. The second section introduces the role of multi-actor governance arrangements, which are the specific focus of the survey. The third section presents the theory of internally and externally motivated behaviour, specifically in relation to the analysis of the psycho-social context that is supportive of internally motivated behaviour. Section four presents the data collection and the research methodology. Section five and six present and discuss the results.

2. Multi-actor arrangements in biodiversity governance

Research over the last two decades has shown that human influences on global life-support systems have reached a magnitude that might soon have severe impacts on human livelihoods and well-being (Rockström et al., 2009). In particular, by depleting the world's stock of natural wealth on a global scale – often irreversibly – the prevailing socio-economic development models have undesirable side effects for present generations, leading to a broadening ecological crisis and ever-widening social disparities (Dedeurwaerdere, 2014). Concomitantly, these models present tremendous risks and challenges for future generations.

In response to these challenges, policy makers, civil society organisations and entrepreneurs in various countries have developed new types of governance arrangements, building upon, but going beyond the conventional policies based on direct regulation and market based incentives (Young, 1994; Héritier, 2002; Jordan et al., 2003). Indeed, actors who participate in environmental policy initiatives are not only motivated by monetary compensations and the need to comply with the regulations, but also by the satisfaction of social norms and personal values (De Young 1985; Measham and Barnett, 2008; Cooke et al., 2012; Bolderdijk et al., 2013). Therefore, new types of environmental instruments are needed that do not only rely on

state led command and control, but also improve the processes of horizontal societal self-coordination (Wurzel et al., 2013).

The need to look beyond conventional state-led regulation is particularly relevant in the case of biodiversity and ecosystem services. Indeed the production of these services often do not result directly from purely bio-physical or ecological phenomena, but are the outcome of complex and dynamic relationships between ecosystems and humans in landscapes over long time spans (Raymond et al., 2009; Plieninger et al., 2013). In such situations, social-cultural and ecological value dimensions tend to play an important role, in addition to the economic value dimensions which are more directly measurable (Morris and Potter, 1995; De Groot, 2002; Kosoy et al., 2008; Greiner and Gregg, 2011; Primmer et al., 2014).

For instance, in a study of 123 households that participate in a payment for ecosystem services in various communities in Nicaragua, Van Hecken and Bastiaensen (2010) found that in communities with strong local organization and high degrees of co-operation, the payment scheme is more effective and the internalisation of pro-environmental goals is reinforced (p. 44). In another setting, the Rio Platano Biosphere Reserve in Honduras, the building of local community organisations has shown to play an important role in the mutual productive relations between new market activities and internally motivated behaviour for conservation (Weaver, 2011). In this reserve, communities have successfully overcome the poverty-driven degradation of shared ecosystems. This success was achieved by reorienting the local economy towards non-timber forest products (such as cocoa, ornamental plants, medicines and oil), in the context of a community-based governance model. The results of these and other in depth studies on collaborative multi-actor networks have been corroborated both by framed field experiments (Rode et al., 2015) and more systematic comparative analysis of (Pahl-Wostl, 2009).

The key message from this literature is that a more diversified governance system, which has recourse to government, market and collaborative multi-actor networks, leads to higher environmental policy compliance and a higher adaptive capacity for tackling complex socio-ecological problems. In particular, multi-actor governance networks are especially effective in generating long-term change in actors' environmental behaviour (Rydin, 2006; Bodin and Prell, 2011; Dedeurwaerdere et al., 2015). These governance networks achieve long-term change through contributing to involving internally motivated participants in collective action and by fostering the internalization of common normative orientations through social learning processes (Dedeurwaerdere, 2005, 2009; Innes and Booher, 2010; Muradian and Rival, 2012).

Nevertheless, the adoption and the effective implementation of so-called "new" environmental policy instruments based on voluntary agreements and governance networks widely varies across national and cultural contexts (Jordan et al., 2013). Therefore, in order to promote successful biodiversity governance through collaborative multi-actor networks, a better understanding of the governance mechanisms that foster the involvement of internally motivated participants in these various contexts is needed. This paper will therefore focus on a broad set of multi-actor governance arrangements and assess the feasibility of combining support for externally motivated behaviour and internally motivated behaviour in these arrangements.

3. External and internal motivations for sustaining long-term behavioural change

To increase our understanding of the role of intermediary governance solutions that support both external and internal motivations, this paper turns to the scholarship in social

psychology, which has developed an extensive literature on the various forms of internally motivated behaviour. This section presents some of the key concepts of this theory of motivations and discusses the features of the socio-psychological contexts that are supportive of internally motivated behaviour.

3.1. The psycho-social context supportive of expressing of intrinsic motivations

In their theory of self-determination, Deci and Ryan (1985) distinguish between different types of motivation based on the different reasons or goals that give rise to an action. The most basic distinction is between intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to an outcome separable from the behaviour, even though the outcome is actually wanted for and can be valued by the individual. Appreciation for nature and enjoying nature are typical examples of intrinsic motivation, as they might have a strong inherent appeal in terms of novelty, challenge or aesthetic value. On the other hand, following the rules of a government regulation for protected species is an example of an externally motivated behaviour, even though the rule can in fact be followed either to avoid a fine or because the actor considers the goals pursued by the rules as legitimate.

In humans, intrinsic motivation is a critical element in improving learning and fostering creativity in a broad variety of tasks. The inclination to take inherent interest in novelty, active assimilation, and creative application of our skills positively affects task performance, task persistence, and the well-being of the person. However, despite the observable evidence that humans are endowed with these intrinsic motivational tendencies, this propensity appears to be expressed only under specifiable conditions. Scholars of intrinsic motivations have shown that two conditions in the social context are essential for enhancing the expression of intrinsic motivation, which are a sense of autonomy and a feeling of competence (Ryan and Deci, 2000). Feeling of competency refers to a social context of interactions (e.g. rewards, communication, discussion, feedback) that conduce toward feeling efficacious in relation to the task at hand, such as through a more adequate understanding of the goals or a better personal mastery of the appropriate skills for an externally imposed task at hand. The

sense of autonomy refers to a social context where the actor feels free from unwanted pressure to make important choices and direct one's action. These two conditions have been confirmed in both laboratory experiments and applied field studies, many of which have been done in classrooms and educational contexts (Ryan and Deci, 2000).

Governance research confirms the importance of these features in environmental governance. In particular, when individuals feel that they have been adequately included in relevant decision making procedures, both their perception of the legitimacy of institutional rues and their intrinsic motivation increase (Brehm and Brehm, 1981; Gibson, 1989; Moller et al., 2006). The primary psychological mechanism responsible for these positive outcomes seems to be that adequate inclusion in human governance satisfies people's fundamental need for self-determination and procedural justice (Deci and Ryan, 1985, 2000, 2002; Greenberg, 1990; Tyler, 1990, 1998).

3.2. The psycho-social context supportive of internalizing extrinsic motivations

In many biodiversity and ecosystem services' policies the activities themselves are not intrinsically motivating, but the activities are instrumental for the achievement of other goals, such as collective values or social demands. This means that these behaviours are extrinsically motivated. Nevertheless, as will be argued throughout this paper, under some conditions, the social contexts that favours the expression of intrinsically motivate behaviour also might be favourable to the gradual internalisation of these extrinsically motivated behaviours.

Indeed, research in social psychology shows that extrinsic motivations considerably vary in their relative autonomy and can thus either reflect mere compliance with an external control or can entail personal endorsement and a feeling of choice (Ryan and Deci, 2000). This is the case, for instance when a collective value that was initially external to the agent becomes internalized as a legitimate collective goal to pursue. Therefore, given an appropriate social context for self-determination, external motivations can progressively become more internal through a process of reflective approval and/or integration with other values held by the actors.

Fig. 1 illustrates the various processes of internalising extrinsic motivations. The first type of process (reading the figure from left

	Extrinsic motivations remaining external to a large degree	Internalized extrinsic motivations			Inherently intrinsic motivations
ASSOCIATED PROCESSES	External regulation (external rewards / punishments)	Reputation/ esteem: approval of behaviour by others	Self-endorsement of the goals	Hierarchical synthesis with one's other goals	Interest/ Enjoyment Inherent satisfaction
PERCEIVED LOCUS OF CAUSALITY	External	Somewhat external	Internal	Somewhat internal	Internal
SUPPORTING CONTEXT		Feeling of competence, sense of social relatedness	Feeling of competence, sense of autonomy		Feeling of competence, sense of autnomy

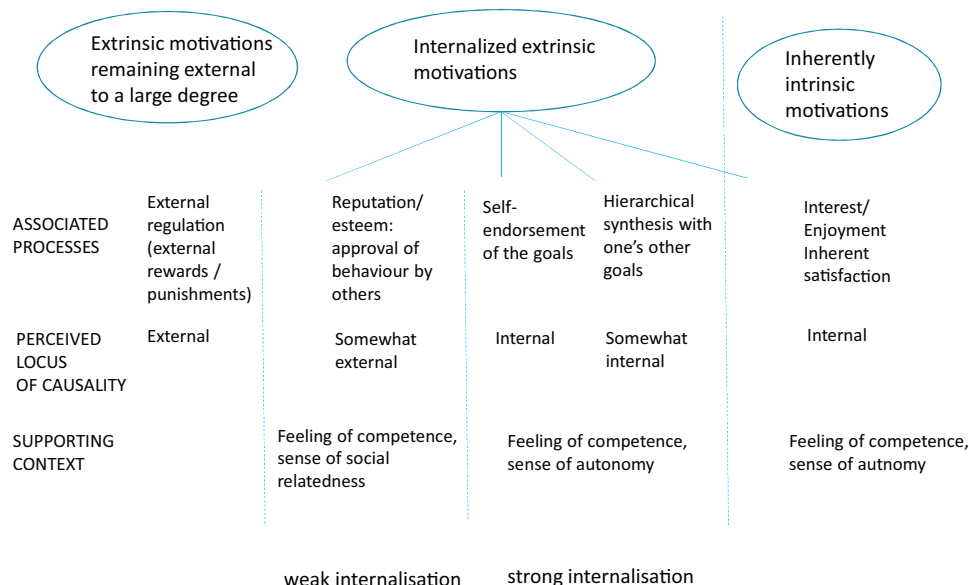weak internalisation   strong internalisation

Fig. 1. A taxonomy of human motivation (adapted from Ryan and Deci (2000); p. 61).

to right) refers to extrinsic motivations that remain external to a large degree. In this case, the motivating power nearly exclusively comes from external influences, such as monetary rewards or punishments. The second type, social approval/esteem, refers to a weak form of internalization. For this type, the extrinsically motivated behaviour is prompted by the search for social recognition by significant others to whom an actor feels connected and who value his/her behaviour, be it a group or society. However, such behaviour remains partially external, as the group/society is controlling the appropriate interpretation and implementation of the value-related goals. The third and fourth types of process refer to the strong forms of internalization. The third type, the self-endorsement of the goals, refers to processes where an actor self-identifies with the personal importance of a behaviour and endorses the behaviour as his/her own. The fourth type is related to the third type and refers to processes where the actor brings the collective goals and social demands with which he/she previously has identified into congruence with his/her other values and needs. In practice, these various types are often mixed which each other and are not related in a linear way. For example, there is no need to pass through the social approbation ("social recognition") stage to reach the stage of strong internalization of externally motivated behaviour (Ryan and Deci, 2000).

Scholars in social psychology have shown that strong internalization yields manifold adaptive advantages, including more effectiveness and greater experienced well-being (Ryan et al., 1997). In addition strong internalisation leads to decreased dependence from the need to rely on external incentives for generating behavioural change for collective purposes. Interestingly, the social contextual conditions for favouring internalization of extrinsically motivated behaviours are very similar to the conditions supporting the expression of inherently intrinsic motivated behaviours. As shown through experiments and field studies, internalization is favoured by a combination of three factors: feelings of competency, a sense of autonomy and a sense of relatedness (Ryan and Connell, 1989). Competency and autonomy are also the conditions that favour the expression of strong internally motivated behaviours, as discussed above. Relatedness, on the other hand, is specific to the weak internalisation process and refers to a sense of belonging to the group or society that values and disseminates the collective goals and social needs (Ryan et al., 1994)

4. Data collection and methodology

To analyse the appropriate governance context for supporting internally motivated behaviour in biodiversity governance, a sample of 34 multi-actor governance arrangements has been selected in seven EU countries within the context of an EU-funded consortium on biodiversity motivation (www.biomot.eu), based on a transdiciplinary research methodology (Popa et al., 2015). Academic experts from social psychology, environmental policy, bio-engineering and ecology were directly involved through the entire project. In addition, a stakeholder panel was set up in each participating country and local social actors were involved in screening the most prominent biodiversity arrangements in each country. The research results and policy implications were again discussed with the social actors at a two days international conference in Brussels, the 10th and 11th of June 2015.

Multi-actor governance arrangement were defined as collaborations amongst public and private actors that gather around specific biodiversity goals. As can be seen from the detailed list in Annex 2B, each arrangement is therefore characterized by an ambition (the specific biodiversity goals) and a group of actors that collaborate to realize that ambition (the multi-actor collaboration). Therefore one arrangement is not necessarily limited to one specific initiative or one specific policy instrument. Each arrangement includes a set of initiatives and tools that are developed by the managers and the participants in relation to the specific biodiversity goals.

4.1. Details of the data collection

Two common criteria for the selection of these arrangements were applied. First, the multi-actor governance arrangements needed to be part of the most successful biodiversity multi-actor arrangements in the country and this success needed to be documented and recognized as such by a broad variety of actors in the country, including stakeholders, policy makers and beneficiaries. Success in this context was defined as improved performance both in environmental compliance and environmental responsibility (cf. references supra, in the first paragraph of the introduction). Second, each arrangement had to include both initiatives that favoured tools supporting internally motivated behaviour and projects that favoured tools supporting external economic rewards to the participants.

An overview of the selected arrangements is given in the Annexes 2A and B. As can be seen, the actor groups behind the 34 cases studied are various networks of organizations, whose participants include entrepreneurs, volunteers, farmers, nature NGOs, researchers and policy makers. The specific biodiversity goals encompass conservation and protection of biodiversity and sustainable use. The cases cover protected species (wolf, corncrake, golden eagle, wild hamster, wild cat, bats and red kites), the protection of specific landscape elements (river banks, trees, peatlands, grass lands and ecological corridors), protected areas (Natural Parks, Natura 2000 areas and Biosphere reserves), agro-biodiversity (traditional crops/breeds and agricultural landscapes) and sustainable use of natural resources (water resources and sustainable fishing). The number of cases based on internally motivated behaviour tends to be slightly higher for cases related to the protection of landscape elements and protected areas as compared to agro-biodiversity and sustainable use. However, some cases under agro-biodiversity and sustainable use are explicitly based on internally motivated behaviour (such as the Walloon Network of Fruit Diversity). In contrast, some cases related to the

Table 1

Overview of the multi-actor governance arrangements in the research sample (number of valid interviews of initiatives = 169 in 34 arrangements) (full list of arrangements in Annex 2A and B).

Categories of multi-actor governance arrangements in the sample	# Interviews
Initiatives managed by public authorities, with multi-stakeholder consultations, and some level of involvement of stakeholders in the implementation process	83
Examples: preservation of grassland orchards in Kozjansko, Slovenia; Wolf management in Mecklenburg-Vorpommern, Germany	
Public contracting between state and private sector/non-profit or research organisation	35
Examples: Sustainable Catchment Management Programme of United Utilities Water Company, United Kingdom; Walloon Network of Fruit Diversity, Belgium	
Multistakeholder initiatives led by civil society (for profit and non-profit), with the participation of public authorities as one of the stakeholders	50
Examples: protection of old crop varieties, Dreschflegel, Germany; Trees for Life, United Kingdom.	

Table 2
Outcome variables of the two probit models.

	Non-economically motivated participants	Economically motivate participants
Question 30: participants join because of existence of economic benefits to them	= 1 (yes) if answered "not at all" or "to a small degree": $n = 56$	= 1 (yes) if answered "to a large degree" or "very much": $n = 86$
	= 0 (no) if answered "to a moderate degree", "to a large degree" or "very much": $n = 113$	= 0 (no) if answered "to a moderate degree", "not at all" or "to a small degree": $n = 83$

Legend: n = number of answers.

protection of landscape elements and protected areas are based on external economic rewards to a large extent (such as the Moorfutures case, which includes a mechanism for selling carbon credits for protecting the peatlands).

The degree of success (along the two dimensions of environmental compliance and responsibility) was cross-checked through an extensive reporting and documentation on each of the arrangements by the co-authors of the paper. A common reporting template included questions on outcomes of the initiatives in terms of change in actor behaviour within the biodiversity policy domain of the arrangement. In addition questions on outcomes and implementation were also included in the questions of the structured questionnaire (cf. below). On the basis of the triangulation of these sources of data on success, one governance arrangement was excluded from the sample (which initially was composed of 35 arrangements), as the cross-checking lead to qualify it as only moderately successful.

Between June 2013 and May 2014, a structured questionnaire with close-ended questions was administered (through face-to-face interviews) to 178 managers of/key participants to initiatives within these governance arrangements (cf. Table 1). The interviews were conducted by the team of researchers of the BIOMOT project (cf. details in the acknowledgements section). In each initiative at least five separate "on the field" interviews were conducted individually with the following persons: the initiator of the initiative, a key contributor to the arrangement, a stakeholder who was closely involved, a core beneficiary and the policy maker who has been most closely involved in the creation of the initiative. Each person answered the survey in relation to the main initiative within the governance arrangements with which he/she was most acquainted and which he/she described in detail before starting the proper interview (cf. detailed survey in Annex 3). Nine of the conducted interviews were excluded: four because of the incompleteness of the answers on the internal motivations and five others that were part of the case that was excluded.

4.2. Empirical model

To analyse the results of the survey two probit models were developed (cf. Table 2):

- Strong non-economic motivation to join: a first model analysing the common design features of the initiatives characterized by participants who joined for reasons other than economic benefits to them.
- Strong economic motivation to join: a second model analysing the common design features of the initiatives characterized by participants who joined mainly for reasons of economic benefits to them.

As discussed in section two and three, governance contexts that support a sense of autonomy and a feeling of competency amongst participants are conducive to involving internally motivated actors. To account for these psycho-social contextual features, a set of governance variables were included in the empirical model that address issues of monitoring, knowledge management, decision making, and strengthening of the actor competences. In additional,

the empirical model tested what kind of non-economic and economic benefits were important for the participants. Finally, a control variable related to the economic benefits for society were also included in the model. Fig. 2 schematically represents these independent variables that have been used to understand the contrasting features of the two models. A detailed definition of these variables is given in Annex 1.

4.3. Data analysis method

Most responses to the survey are given on a Likert scale of 5 items, or, alternatively, by answering to a pre-coded set of options. To diminish bias in interpretation in the Likert scale, answers were coded as binary response variables by considering the two lower level answers ("not at all" and "to a small degree") or the two higher level answers ("to a large degree" and "very much") as one category, depending on the question. All dependent and independent variables of the two models were derived from the close-ended questions of the structured questionnaire (cf. table in Annex 1 and the list of close-ended survey questions in Annex 3). The few missing data on some variables were coded as "0" and included in the regression analysis, in order to be able to use the information of all the 169 respondents (missing data varies between 0% and 7% of the respondents for some questions, cf. details provided in Annex 1).

The dependent variables of the two models can reasonably be represented by two binary response variables based on the close-ended question 30a of the questionnaire. We therefore estimated the correlations with the outcome variables through a binary regression model (Probit regression). The statistical software package Stata 13.1 was used to perform the analysis. To account for the finite nature of the population of multi-actor arrangements for biodiversity in the 7 countries, we used the svy ("survey") set command in stata, with the following parameters: pw = 10000 ("pweight" = number of observations in the population); fpc = 169
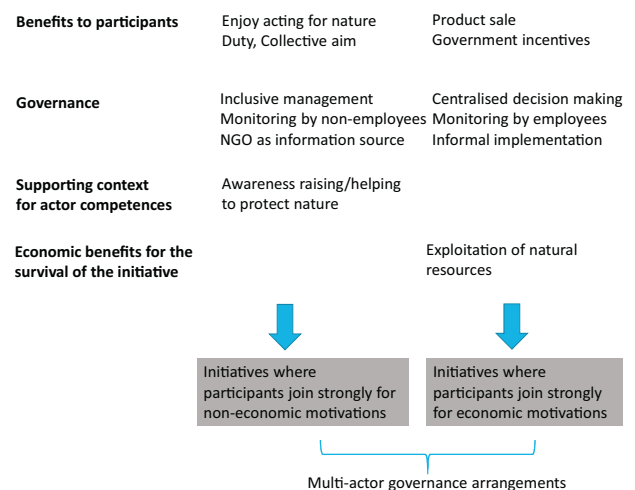

Benefits to participants	Enjoy acting for nature Duty, Collective aim	Product sale Government incentives
Governance	Inclusive management Monitoring by non-employees NGO as information source	Centralised decision making Monitoring by employees Informal implementation
Supporting context for actor competences	Awareness raising/helping to protect nature	
Economic benefits for the survival of the initiative		Exploitation of natural resources

Initiatives where participants join strongly for non-economic motivations

Initiatives where participants join strongly for economic motivations

Multi-actor governance arrangements

Fig. 2. Combination of internally and externally motivated behaviour in multi-actor governance arrangements.

Table 3
Categories of actors' involved in the initiative at the operational and general decision making level (answers to question 19).

Stakeholders involved in the initiative		Entire sample (n = 167, missing answers excluded)	Initiatives with strongly non economically motivated participants (n = 56)	Initiatives with strongly economically motivated participants (n = 86)
Local authorities	At operational level	36%	37%	32%
	At general decision making level	45%	51%	36%
Central authorities	At operational level	38%	43%	36%
	At general decision making level	62%	59%	63%
EU level authorities	At operational level	8%	12%	10%
	At general decision making level	35%	27%	38%
Private sector enterprises	At operational level	41%	27%	49%
	At general decision making level	24%	20%	29%
Social enterprises and cooperatives	At operational level	19%	20%	19%
	At general decision making level	14%	20%	13%
Non-profit organisations	At operational level	48%	49%	45%
	At general decision making level	39%	45%	41%

("finite population correction" = number of sampling units). We observe Prob > F = 0.0000 for both models, indicating a highly significant regression.

All original survey data will be released in open access upon publication through the EU open access infrastructure for research data Zenodo (www.zenodo.org), with a creative commons attribution only international license (CC BY 4.0).

5. Combining internal and external motivations in multi-actor governance arrangements

5.1. Common features of the multi-actor arrangements

The preliminary descriptive analysis of the overall sample confirms the hybrid multi-actor nature of the governance arrangements. As can be seen from Table 3, the hybrid nature is present in the two sub-groups of initiatives (strongly non-economically motivated participants and strongly economically motivated participants), without significant systematic differences. The connection to the private sector enterprises is a bit stronger in the sub-sample of economically motivated participants, but companies (both private sector and social profit sector) are not absent from the non econ motivated sub-sample.

Table 4 highlights the importance of economic benefits to the society. The results in the table show that both sub-groups cover initiatives that provide direct economic benefits to society and initiatives without clearly providing such direct benefits. Voluntary labour is important in both sub-groups. Legend: Percentage of responses calculated over the entire sample, missing answers to q33 and q34 excluded The preliminary descriptive analysis of the

sample also confirms the mixed nature of the actors' motivations in our sample (cf. Tables 5 and 6). The analysis of these descriptive data shows that in both sub-groups both economic and non-economic motivations play an important role, even if the economic motivations are stronger in the second group. Payment from the government or fiscal incentives is in both cases the most important economic benefit to the participants. Overall these results underline again the importance of designing appropriate governance mechanisms that can combine external and internal motivation of the participants to the initiatives.

5.2. Governance features for opting in of non-economically motivated behaviour

5.2.1. Presentation of the results

Table 7 shows the results of the regression analysis on the two contrasting models: (1) initiatives characterized by a group of more strongly non-economically motivated participants and (2) initiatives characterized by a group of participants that join to a large degree because of the existence of economic benefits to them. The variables refer to the features listed in Fig. 2 above (for the detailed definitions of the variables, and the descriptive statistics, cf. annex 1).

5.2.2. Discussion of the regression results

We first discuss the various kinds of non-economic motivations that characterize that participants in the selected successful biodiversity arrangements. Then we discuss the governance variables that are significantly correlated with the biodiversity initiatives where participants join strongly for non-economic

Table 4
General economic characteristics (economic benefits to society and voluntary labour).

	Entire sample	Initiatives with strongly non economically motivated participants (n = 56)	Initiatives with strongly economically motivated participants (n = 86)
Economic benefits to society: how important are the economic benefits derived from this initiative at the level of society: answered moderately important, quite important or very important (as compared to rather unimportant or not important) (question 34)	64% (n = 175)	56%	67%
Voluntary labour: salary for the participants is not important, rather unimportant or moderately important (question 33)	57% (n = 168)	60%	40%

Legend: percentage of responses calculated over the entire sample, missing answers to q33 and q34 excluded.

Table 5
Categories of economic benefits to the participants of the initiatives (question 33a,b,c).

The following economic benefits for the participants are indicated "quite important" or "very important"	Entire sample (n = 167, missing answers excluded)	Initiatives with strongly non economically motivated participants (n = 56)	Initiatives with strongly economically motivated participants (n = 86)
(a) Payment from the Government or fiscal incentives	54%	37%	66%
(b) Direct exploitation of natural resources	38%	23%	46%
(c) Selling of products or services	38%	19%	49%
One of the above (a)–(b)–(c) indicated as "quite important" or "very important"	76%	52%	91%

Legend: percentage of responses calculated over the entire sample, missing answers to question 33 excluded.

reasons. Finally we discuss the control variables pertaining to the kinds of economics benefits to participants and society.

Amongst the set of non-economic motivations that were proposed in the survey to characterize the participants, the variable most significantly correlated with the presence of participants that join for non-economic motivations is the variable "Collective aim" of the initiative. This variable is related to internalized external motivations. A second variable related to internalized external motivations, "Duty", is also significantly correlated. In addition, one key inherently intrinsic motivation, "Enjoy acting for nature" is significantly correlated.

In contrast, another important inherently intrinsic motivation that was part of the survey, which is "to maintain social relationships", does not show any significant correlation. This variable is only moderately important when considering the entire sample: 46% of the respondents say that "to maintain social relationships" is not at all or very weakly important for the participants to join, 28% considers it is moderately important, while 26% say that it is important to a large degree or very much. Moreover, this proportion is more or less similar in the two sub-groups of economically motivated participants and non-economically motivated participants, indicating that it has no higher prevalence in the group of non-economically motivated participants. This is consistent with the fact that social relationships are generic inherently intrinsic motivations and there is no a priori reason why these should be stronger in non-economically motivated as compared to the economically motivated multi-actor governance arrangements.

The general outcome of the survey confirms the hypothesis that a specific set of governance variables are correlated with the presence of participants that join for non-economic motivations. Indeed the dependent variable "Strong non-economic motivation to join" is highly correlated with governance variables that are conducive to a sense of autonomous self-determination by the participants ("Inclusive management" and "Monitoring by non-employees"). This variable is also highly correlated to a supporting context for a feeling of competency, through the proxy on capacity building through awareness raising and providing help for nature protection (variable "Awareness raising for nature protection"). The governance variables that are conducive to a sense of being controlled in a formal way ("Centralised decision making" and

"Monitoring by employees") are negatively correlated (in contrast to the variable "Inclusive management").

In line with the result on the monitoring by non-employees, highlighted under section (a), the importance of non-profit organisations in knowledge management is also significantly correlated with the presence of non-economically motivated participants ("NGO as information source"). Interestingly the "Inclusive management" variable is slightly less significant when the variables "Collective aim" and "Duty" are withdrawn from the regression equation, which indicates that the variable "Inclusive management" has the strongest impact in combination with these two internalized extrinsic motivations.

Finally, purely informal contacts and communication ("Informal implementation") shows a negative correlation to the presence of participants that join for non-economic motivations. Therefore, although these informal contacts are overall important in the sample (on average 70% of respondents indicate that it plays a very important role), it is comparatively less important in the sub-sample of initiatives with participants that join for non-economic motivations.

As for the control on the kinds of economic motivations that are important to the participants, two of the four options that were proposed to the interviewees are negatively correlated with the presence of participants that join for non-economic motivations: the governmental/fiscal incentives ("Government incentives") and direct market activities ("Product sale"). This is in contrast to the other economic motivations for participants that were proposed in the questionnaire, which are the direct exploitation of natural resources and the salary for their contribution to the initiative, where no significant difference between the two-sub groups is observed.

Control variables were included to test for correlations with economic benefits that are key for the survival of initiatives. The direct exploitation of resources is significant (and negative) in the regression equation for non-economically motivated participants, while it is not significant in the other sub-group. This result might be related to the fact that the governance features in the sub-group of initiatives with strongly non-economically motivated participants are slightly less compatible with the direct exploitation of resources. Indeed, the significance of one of the governance variables ("Informal implementation", which is negative) is

Table 6
Categories of non-econ benefits to the participants of the initiatives (question 30).

The following reasons that make participants join the initiative are indicated "very much" or "to a large degree"	Entire sample(n = 177, missing answers excluded)	Initiatives with strongly non economically motivated participants (n = 56)	Initiatives with strongly economically motivated participants (n = 86)
Because they enjoy acting for nature	67%	73%	57%
Because they think it is their duty to do so	31%	43%	20%
To push for legal and policy change	33%	38%	30%
To better implement existing legislation and policy	29%	23%	30%
To maintain social relationships	26%	18%	28%

Legend: percentage of responses calculated over the entire sample, missing answers to q30 excluded. The motivation to push for legal and policy change is difficult to interpret with our data as "pushing for change" can correspond both to stronger or less strong policy/legal involvement.

Table 7
Results of the probit estimations of governance features supportive of "opting in" of non-economically/economically motivated behaviours.

	Biodiversity initiatives with high success where participants join strongly for non-economic reasons, variable: strong non economic motivation to join		Biodiversity initiatives with high success where participants join strongly for economic reasons, variable: strong economic motivation to join	
	Significance	Coefficient $P < |z|$	Significance	Coefficient $P < |z|$
Core independent variables				
Intrinsic nature-related motivations of the participants for joining the initiative				
Enjoy acting for nature	(+)*	0.51	(−)**	−0.59
Internalized extrinsic motivations of the participants for joining the initiative				
Collective aim	(+)***	1.98	(−)**	−0.70
Duty	(+)*	0.52	(−)**	−0.57
Governance (decision making)				
Centralised decision making	(−)	−0.40	(+)**	1.03
Inclusive management	(+)**	0.58	(−)***	-0.71
Governance (monitoring and implementation)				
Monitoring by employees	(−)**	−0.66	(+)**	0.50
Monitoring by non-employees	(+)**	0.66	(−)***	−0.66
Informal implementation	(−)**	−0.54	(+)	0.01
Governance (Knowledge management)				
NGO as information source	(+)**	0.68	(−)	−0.27
Supporting context for actor competences				
Awareness raising for nature protection/helping to protect nature	(+)***	0.99	(−)**	−0.63
Control variables				
Important economic benefits for survival of initiative				
Exploitation of natural resources	(−)**	−0.59	(+)	0.23
Econ benefits to participants				
Product sale	(−)***	−1.05	(+)***	0.74
Government incentives	(−)**	−0.69	(+)***	0.61
Prob > F		0.0000		0.0000

Legend: sample: $N = 169$. Maximum Likelihood estimates of the probit models: *** = statistically significant at the 1% level, ** = statistically significant at the 5% level. The numbers in the table are the coefficients of the regression equation.

increased with the presence of the variable "Exploitation of resources" in the regression equation. The statistical significance of the variable "Exploitation of resources" contrasts with the other economic benefits that play a role for the survival/economic sustainability of the initiative. Indeed for the following economic benefits to the initiative no significant difference is observed between the two sub-groups: the payment of fiscal incentives, the selling of products or services and the grants from private donors.

6. General discussion: options for broadening the toolbox of biodiversity governance

The analysis in this paper focuses on the psycho-social context of successful biodiversity initiatives based on multi-actor governance arrangements in various countries and across biodiversity issue areas. Through an in depth comparative analysis of 34 cases, a set of psycho-social features that are common to initiatives that support internally motivated biodiversity action have been identified, along with governance mechanisms that strengthen these features. The list of features and mechanisms analysed in this paper is of course not exhaustive, nor does it constitute a set of necessary conditions. Further, these features are present with various degrees of strength in the different cases that are analysed. Nevertheless, the features and mechanisms that are identified show what has worked in a consistent way in a significant number of multi-actor arrangements for biodiversity. Therefore, whenever feasible, these mechanisms can be mobilized and "tailor made" for setting up multi-actor governance arrangements in other issues areas and countries.

Two main findings result from the analysis. First, the descriptive analysis shows that the internal and external motivations can be combined at the level of individual participants. Results show that they might have at the same time a high level of intrinsic nature related motivations, internalized extrinsic motivations and purely external motivations. Second, the regression analysis shows that a strong "opt in" of participants with a high level of internal motivations is correlated with an autonomy and competence supportive governance context.

Although the importance of internal motivations has been highlighted in the context of pro-environmental behaviour since the work of De Young (1985), few large-scale studies have been conducted to analyse the governance consequences of this finding. Moreover, many governance studies have searched for evidence of so-called "crowding" out of the internal motivations by the external incentives, without however finding conclusive evidence that this would be a systematic phenomenon (Rode et al., 2015). The study in this article, in line with recent work on "opting out" (Primmer et al., 2014), leads to highlighting a different mechanism: non-economically motivated participants "opt in" preferably into initiatives where inclusive and autonomy promoting governance mechanisms have been implemented. In such cases, what one observes is rather the possibility of a mutual co-existence of both internally and externally motivated behaviour in the same biodiversity initiative.

The observed co-existence opens up a wealth of opportunities for designing governance mechanisms situated between strongly externally motivated—such as very strongly dependent on the external rewards/punishments and strongly internally motivated—such as voluntary behaviour done only for the sake of enjoyment and creative learning. Such mechanisms can be supported by the psycho-social contextual features that have been highlighted in this paper. For instance, policy makers can support social contexts that favour actors' competencies, the critical integration of biodiversity policy objectives within his own value system and the feeling of autonomy in the decision making over important choices.

Empirical evidence from environmental governance studies lend support to the possible contribution of these contextual

features to improving environmental outcomes. First, as shown elsewhere, broad participation in the environmental policy schemes can reduce the likelihood of unexpected resistance in implementation (Berkes et al., 2003). For instance, scholars of common pool resource shave shown that participation can lead to increased compliance and effectiveness with the common rules for sustainable use of common pool resources (Ostrom, 1990). Further, including a broader set of stakeholders gives access to different kinds of knowledge which may be vital for finding innovative solutions (Berkes and Folke, 2002). Finally, decentralised problem solving can lead to a higher degree of adaptiveness and robustness of a system (Pahl-Wostl, 2009). However, governance networks based on these features can also fail, suffer from problems of legitimacy or from high implementation costs.

In particular, as also highlighted by DeCaro and Stokes (2013), the establishment of formal mechanisms of inclusive and participatory decision making is not enough to build effective social inclusion and participation. The effectiveness of these formal mechanisms in creating long-term and self-sustained behavioural change does also depend on the way that they are implemented, the psycho-sociological features of the participants and the pre-existing context. Indeed, strongly participatory mechanisms have regularly failed (Ostrom et al., 2007) and, on the other hand, even a weakly participatory mechanism can have a very positive impact on successful biodiversity governance if the implementation process strongly favours certain psycho-social features such as the actors' subjective perceptions of self-determination.

This importance of the socio-psychological features has also been discussed in the context of the literature on so-called participatory misfit. As shown in this literature, while formal and direct public involvement may not be essential for successful participatory governance in all cases, a sense of procedural fairness and self-determination among those affected by environmental policy might be (Tyler, 1990; DeCaro and Stokes, 2008). Participation may therefore arise from institutional forms that guarantee strong formal inclusive decision making or result from weaker forms such as informational pamphlet or citizen consultation, as long as the psycho-social features are strengthened. In this context, scholars show the importance of carefully considering the socio-psychological environment when evaluating outcomes of public participation, because apparent failures of participation may arise from participatory misfit with the psycho-social context, rather than from an inherent fault of a given mechanism of participation itself (DeCaro and Stokes, 2013, p. 14)

The latter result is important for qualifying the outcomes of the study reported in this article. Indeed, in the regression equation, the number of participants who join for strongly non-economic reasons is correlated both with more inclusive decision-making and with the socio-psychological variables "Collective aim", "Duty" and "Enjoy acting for nature". This correlation is stronger as compared to a regression where only inclusive decision making is considered (without these three socio-psychological variables), as specified in the discussion of the results above. This indicates that it is not inclusive decision-making alone as such that is the most significant feature, but the inclusive decision-making, in combination with a supporting context for these socio-psychological features, that leads to an "opt in" of participants with a strong non-economic motivation into multi-actor biodiversity initiatives.

7. Conclusion

This paper analysed the possibility to build mutually supportive dynamics between internally and externally motivated behaviour for biodiversity conservation and ecosystem services provision. The specific aim was to analyse the supporting mechanisms that foster the involvement of internally motivated participants in various contexts and across various biodiversity policy areas. The main contribution of the paper is to apply insights from social psychology on the role of actors' self-determination in supporting internally motivated behaviour to a large-scale sample of multi-actor governance arrangements in Europe.

Through an in depth comparative analysis of 169 key actors involved in 34 successful governance arrangements, a set of psycho-social features that are common to initiatives that support internally motivated biodiversity behaviour have been identified, along with governance mechanisms that strengthen these features. The key governance of features for supporting internally motivated behaviour that were identified are inclusive decision making processes, a monitoring of the initiative by a broad group of voluntary and associated participants, and a psycho-sociological context that is supportive for the empowerment of the self-determination of the involved actors.

The list of features and mechanisms analysed in this paper is of course not exhaustive, nor does it constitute a set of necessary conditions. But, the features and mechanisms that are identified have contributed to successful biodiversity governance in a significant number of multi-actor arrangements. Therefore, the overall goal of the analysis is to show the relevance of including a broad set of collaborative governance mechanisms in the governance toolbox, in combination with the conventional tools of monetary payments and direct regulation.

Authors' contributions

The text was written by Tom Dedeurwaerdere, who also conducted the statistical regressions and the literature review for the theory section. Paolo Melindi-Ghidi provided crucial methodological insights for the statistical analysis and Paula Fernandez-Wulff and Janneke Hagens contributed to the overall consolidation of the case study results. The other authors selected the cases, contributed to the design of the survey protocol through a series of common workshops and conducted the interviews (number of field interviews): Jeroen Admiraal (11) (with the support of Willem van Esch (14)), Almut Beringer (5), Flavia Bonaiuto (5), Lavinia Cicero (24), Juha Hiedanpää (9), Paul Knights (24), Florin Popa (11), Urban Šilc (25), Nathalie Soethe (20), Tiina Soininen (15), Jose Luis Vivero (18). All authors endorsed the presentation and interpretation of the field work data and approved the final manuscript.

Acknowledgements

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.envsci.2015.12.003.

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