Journal of Business Ethics (2023) 182:1003–1024
https://doi.org/10.1007/s10551-022-05290-z

ORIGINAL PAPER

Accounting Standard-Setting for an Emission Trading Scheme: The Korean Case

Tae Hee Kim[1] · Sun Hye Lee[2] · Petros Vourvachis[3]

Received: 1 December 2020 / Accepted: 7 November 2022 / Published online: 22 November 2022

Abstract
This study examines the participation and interaction of relevant individuals in the process of developing an accounting standard for South Korea's emission trading scheme (ETS). Despite the enormous accounting implications of such schemes, there is a paucity of research on the development and application of ETS accounting. Ulrich Beck's and Anthony Giddens's risk society framework is utilised to scrutinise the process of setting accounting standards—from the agenda-setting stage all the way to the final publication of the standard. In this case study, we take an interpretive approach in analysing the rich data collected through face-to-face interviews with prominent standard-setters, accounting experts and representatives of industry and government. Participant observation and relevant documents were also considered. The findings highlight the political nature of accounting standard-setting and identify the risks and responsibilities of the key agents in the process along with the means of sub-political action taken to influence decisions. We reveal that the agents involved in standard-setting attempted to balance their anthropocentric priorities with ecocentric responsibilities and prioritised the production of a standard with minimal impact on economic, reputational, and operational risk. Having authority as a standard-setter, referring frequently to precedents and, perhaps most importantly, engaging actively with the stakeholders throughout the process seem to have contributed to a widely accepted standard, which can serve as a benchmark for future attempts to factor in ETSs.

Keywords Accounting standard-setting · Emissions trading scheme · Carbon accounting · Korea · Risk society

Introduction

As part of the international community's effort to mitigate climate change, the 194 parties to the United Nations Framework Convention on Climate Change signed the Paris Agreement in December 2015. The agreement reaffirmed and expanded on the Kyoto Protocol's 1997 provisions, committing signatories to achieving their own nationally determined contributions and setting internationally binding reduction targets for greenhouse gas (GHG) emissions (ADB, 2018). To pursue these objectives, momentum is growing for carbon pricing instruments worldwide (ICAP 2020), particularly in the form of an emission trading scheme (ETS). Globally, 19 ETSs are operating at national and subnational levels.

The prevalence of ETSs and the distinctive attributes of their features have huge implications for the field of accounting as they call for the creation of new types of assets, liabilities, revenues and expenses. An urgent need emerged for some authoritative guidance to practitioners in the form of an accounting standard (Bebbington et al., 2008; Cook, 2009). In response, in December 2004, the International Accounting Standards Board (IASB), through its International Financial Reporting Interpretations Committee (IFRIC), issued IFRIC 3 *Emission Rights*. However, this document was withdrawn in 2005 primarily because of the accounting mismatches it engendered, both in recognition and measurement bases (Cook, 2009; IASB, 2014a, b, c, d). To date, the IASB has yet to produce new guidance. Hence, several national approaches have developed to explain the financial effects of ETSs, with considerable diversity in accounting treatments and (as a consequence, also in) financial impacts (Lovell et al., 2013; IASB, 2014a, b, c, d).

✉ Petros Vourvachis
p.vourvachis@lboro.ac.uk

[1] FTA Trade Rules Division, Ministry of Trade, Industry and Energy, Seoul, Republic of Korea

[2] Surrey Business School, University of Surrey, Guildford GU2 7XH, UK

[3] School of Business and Economics, Loughborough University, Loughborough LE11 3TU, UK

Despite the enormous financial implications of these diverse treatments, there is a paucity of research on the accounting standard-setting process for ETS with a focus on the role of the agents involved in this process. There is a need for research, however, to examine this role more explicitly, as agents may "affect both the outcome of the regulatory process and the legitimacy of the rules and practices produced" (Cooper & Robson, 2006, p. 415).

This study aims to understand the participation and interaction of relevant individuals in the process of developing an accounting standard for an ETS. Previous research takes a financial accounting and particularly lobbying focus and typically examines the role of individuals indirectly, by analysing comment letters (e.g. Georgiou, 2004, Jorissen et al., 2012; Sutton, 1984). Our paper contributes to the literature by providing a rare attempt to present a standard that considers the organisational impacts on the environment and by examining the role of agents directly involved in "the various processes that actually take place" (Lowe et al., 1983, p. 19). Specifically, it adds new threads to the literature on carbon financial accounting, a branch of accounting scholarship at the intersection of the financial accounting and the social and environmental accounting (SEA) literatures. In his review of the SEA literature on carbon accounting, Ascui (2014) points out the general lack of studies focusing on financial accounting and the reporting implications of ETS (but see Bebbington & Larrinaga-Gonzalez, 2008; Lovell et al., 2010, 2013; Giner, 2014) and suggests that, "there is a role for SEA researchers to help understand and theorise the standard-setting process, the role of different agents within this [process], and the implications for other areas of SEA" (Ascui, 2014, p. 21).

To this end, the study draws on the work of Beck (1993, 1997) and Giddens (1999) on risk society. Although often debated, the framework remains empirically underexamined (Hanlon et al. 2006) with few exceptions (e.g. Antonini et al., 2020; Georgakopoulos & Thomson, 2005). SEA practices "have largely been developed and evaluated without an explicit recognition of the emerging literature on the governance of risk" (Bebbington & Thomson, 2007, p. 39). Limited previous accounting research on risk society focuses on identifying different types of risks but without making links to the actors' responsibilities. There seems to also be an altogether lack of studies utilising the frame in accounting standard-setting research despite its potential to help expand our understanding of the political nature of the process.

Our research contributes particularly to this stream of literature by identifying specific risks and responsibilities of various agents within the standard-setting process in relation to ETS, the means of sub-political action taken, and their impact on relevant decisions. We reveal that the agents involved in standard-setting attempted to balance their anthropocentric priorities with ecocentric responsibilities and prioritised the production of a standard with minimal impact on economic, reputational, and operational risk. Breaking down the issue into questions such as technology, policy, compliance with the framework, and competitiveness seems to have assisted the agents in resolving conflicts and achieving an acceptable outcome. Our findings further highlight the changing role of experts in risk society. We empirically demonstrate how expert solutions based on scientific facts are cast aside and alternatives with wider acceptance are selected, as politics ultimately take priority over expert reasoning.

By focusing on the development of an accounting standard on carbon financial accounting, this research also contributes to the regulation debates in the extant SEA literature. Notable failures to improve SEA practice, following the introduction of regulations, have been attributed to a lack of "normativity", i.e. the degree to which rules and practices become accepted and standardised (Bebbington et al., 2012). In line with this literature (see particularly Bebbington et al., 2012; Chauvey et al., 2015) we find that referring to precedents, including the main stakeholders in the process, and having an adequate level of authority as rule-setting organisation, all contribute towards producing a standard for ETS that could achieve normativity. Combining the risk society and normativity frameworks could potentially help explain why some SEA regulatory initiatives have greater success than others.

As part of our examination, the study looks closely into the accounting issues emerging during the standard-setting process vis-à-vis the development of the ETS in South Korea. The Korean ETS was launched on 1 January 2015, becoming East Asia's first mandatory, nation-wide ETS and the second-largest carbon market after the EU ETS. We identify two major accounting issues with an ETS: presentation and the treatment of free allowance. The policy experiences and challenges from the Korean ETS particularly in relation to these two issues can provide valuable lessons for policymakers in other countries who are designing similar schemes as part of their own emission policies (ADB, 2018).

The study investigates the accounting standards-setting process for ETS—from the agenda-setting stage all the way to the final publication of the standard. An interpretive approach is adopted analysing data collected primarily via semi-structured, face-to-face interviews. The research also benefits from participant observation and relevant documents in the form of staff papers, agenda papers and meeting minutes. Interviewees include members of the IASB, the Korean Accounting Standards Board (KASB), and the French Accounting Standards Board (Autorité des Normes Comptables – ANC), as well as accounting experts and industry and government representatives. In addition to responding to calls for greater researcher engagement with practice (Adams & Larrinaga-González, 2007; Parker,

2005), the study offers unique insights into decisions taken at the highest accounting level in relation to the controversial issues surrounding ETS.

The remainder of the paper flows as follows. After an introductory background to Korea's ETS, there is a discussion of the theoretical framework and a review of the accounting issues associated with ETS. Then the methods and findings sections are presented, whilst the concluding section summarises the key findings and discusses the study's limitations, its implications for research and practice, and suggestions for further research.

Background

In 2008, Myung-bak Lee, the president of South Korea, proclaimed 'Low Carbon, Green Growth' as the vision to lead the nation's development for the next 50 years (PCGG, 2010a). In 2009, building on this proclamation, the Korean government pledged its voluntary mid-term reduction target, which was 30% GHG reduction below the Business-As-Usual (BAU) level by 2020 (PCGG, 2010a, 2010b). To attain its mitigation target, the Korean government decided to adopt not only a regulatory policy measure but also a market-based policy measure (PCGG, 2010a). It faced, therefore, a choice of either a carbon tax or an ETS measure.

To decide on a suitable measure, the Korean government weighted the benefits and limitations of the two approaches. Both a carbon tax and an ETS reflect a 'market-based approach' and are subject to 'perfect markets' and 'complete information' (Braun, 2009; Pope & Owen, 2009). In theory, from the perspectives of transparency, simplicity, and administration cost, a carbon tax could be more efficient and less disruptive than carbon trading, as there is no need for an entire new market system and firms are given a specific tax rate (Andrew et al., 2010; Roberta 2009 as cited in Pasfield & Paeffgen, 2013, p. 390). However, compared to a carbon tax, the ETS appears to be a more attractive policy tool. Given its market-based mechanism, the scheme is considered the most cost-effective way to tackle GHG emissions by inducing business entities to adopt carbon reduction strategies, such as research and development in abatement technology (Egenhofer, 2007; Kruger et al., 2007; Schmalensee & Stavins, 2013). Providing a great volume of free allowances also appears to minimise potential conflicts among stakeholders (Baldwin, 2008; Hepburn & Stern, 2008). Importantly, in the long term, setting unambiguous emission reduction targets through an ETS may facilitate the achievement of these targets irrespective of the level of energy prices (Baldwin, 2008; Hood, 2010). Conversely, under a carbon tax regime, it is uncertain how optimal levels of pollution would be presented and achieved at the national economy level (Hood, 2010; Pope & Owen, 2009).

Thus, the Korean government decided to introduce an ETS instead of a carbon tax as it considered it a more reliable strategy for helping the nation meet its reduction targets (Park et al., 2012). The scheme was deemed to be the most effective measure to transform energy/carbon-intensive industries to energy-efficient and low-carbon industries by leading them to invest in more energy-efficient technologies (PCGG, 2012b). Having entered its third phase (2021–2025), the scheme covers 685 of the country's largest GHG emitters, comprising ~73.5% of national emissions (ICAP, 2021). The ETS was preceded by a mandatory GHG and Energy Target Management System (TMS) that was launched in 2012 (following a two-year pilot phase started in 2010). Facilitating the collection of verified emissions data, the TMS still applies to smaller entities not covered by the Korean ETS (ICAP, 2021). Figure 1 illustrates the chronological development of the Korean green growth policy and ETS.

The existing literature addresses the operating mechanism of carbon trading and features of ETSs (e.g. Baldwin, 2008; Egenhofer, 2007; Hood, 2010; MacKenzie, 2009). In terms of basic operations, a government first establishes an overall cap on emissions. This cap is converted to an equivalent

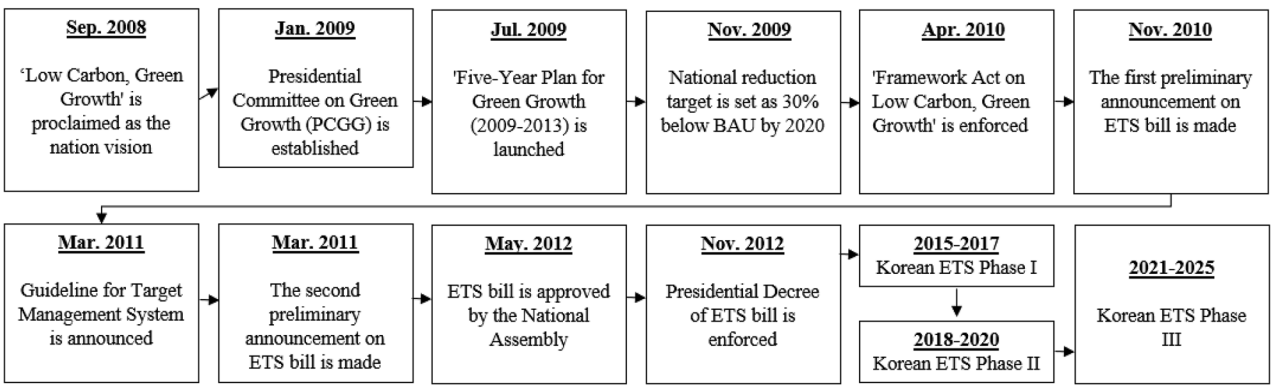

Fig. 1 Development of Korean green growth policy and ETS. Source: PCGG (2010a, 2012a); Bloomberg New Energy Finance 2013

quantity of emission rights representing the authoritative entitlement to emit (Wemaere et al., 2009). To comply with the obligation to achieve the reduction targets, participants can sell or purchase permits in the market by comparing a company's marginal cost of reducing carbon emissions to a market price of permits. Nevertheless, several crucial decisions are required at the design stage.

Table 1 summarises the essential features of the Korean ETS and contrasts them with those of its EU predecessor which was used as a main reference point (PCGG, 2012a, b). Clearly, there are many similarities across the schemes. The Korean ETS also became mandatory (to companies emitting over 125,000 tons, or facilities emitting over 25,000 tons of carbon equivalents per year) and adopted a cap-and-trade approach. As with the EU ETS, annual reporting provisions were also made and maximum penalties for non-compliance were introduced. Evident differences concerned the allocation of allowances and the flexibility of compliance. Regarding the allocation of allowances, the Korean government decided to predominantly adopt the grandfathering approach, due to the initial lack of emission data. As regards flexibility measures, it was decided that international offsetting credits could be used only from Phase III onwards and for up to 50% of the total offset limit, to give a greater

Table 1 Summary of ETS features and accounting implications

EU ETS	Korean ETS	Implications
General frame		
1. Mandatory 2. Cap-and-trade[a]	1. Mandatory 2. Cap-and-trade	Under cap-and-trade, to ensure tradability of emission rights at the greatest extent
Time frame		
1. Phase III: 2013-2020 2. 1 year compliance year (1/1–31/12)	1. Phase I: 2015–2017 Phase II: 2018–2020 Phase III: 2021–2025 2. 1 year compliance year (1/1–31/12)	Inconsistency between business year and compliance year
Cap/Reduction target		
21% below 2005 verified levels by 2020	30% reduction below BAU level by 2020	Estimate the quantity of emission rights which should be held at the end
Allocation of allowances		
1. Greater use of auctioning in Phase III leading to 100% auctioning in 2027 2. Benchmarking[b] is a default method	100% free allocation in Phase I Grandfathering in most sectors (Benchmarking in some sectors)	Recognition of emission rights and the related liability in the financial statements
Flexibility of compliance		
1. Restrictions on use of credits of Kyoto mechanisms 2. Unlimited banking 3. Unlimited borrowing[c]	1. Limited use of offsetting credits 2. Unlimited banking 3. Limited borrowing	Recognition of emission rights in the case of offsetting, banking, or borrowing
Competitiveness of 'at-risk' industries		
1. Criteria of carbon leakage lists[d] 2. 100% free allocation to industries included in carbon leakage lists	1. Criteria of carbon leakage lists same as the EU ETS 2. % free allocation to the sectors included in carbon leakage lists	Same accounting issues as with the allocation of allowances
Market oversight and rules		
1. Annual reporting by 31/03 of following compliance year 2. €100/tCO_2eq penalty for non-compliance	1. Annual reporting by 31/03 of following compliance year 2. Maximum penalty of KRW 100,000/tCO_2eq for non-compliance	1. Recognition and de-recognition of asset and liability 2. Accounting treatment for penalties

[a]Cap-and-trade scheme: the cap is implemented by issuing allowances to emit up to the cap. Once allowances are allocated to participants, allowances are tradable in the market. Baseline-and-credit scheme: the cap is implemented by assigning an individual baseline of regulated emissions to the cap. Credits are issued to participants only when emissions are produced below the baseline and are tradable after a compliance period

[b]Grandfathering: the amount of allowance received is determined on historical emissions. Benchmarking: the amount of allowance received is determined on emission targets

[c]Offsetting: allows emission reductions achieved in projects not covered by the scheme to be offset against compliance targets or sold in the market. Banking: the right to use surplus allowances in the next period. Borrowing: the right to use allowances from the next period in case of shortage

[d]Carbon leakage: providing a high level of free allowances, particularly for emission-intensive industries

incentive to companies to invest in green technologies. To tackle potential over-supply of allowances, a 10% borrowing limit was set.

At first, the Korean ETS was strongly opposed by the industrial world. Major associations, including the Federation of Korean Industries, the Korea Chamber of Commerce and Industry Associations and the Korea International Trade Association, expressed concerns regarding the detrimental impact of the scheme on competitiveness. In response, several provisions were made, such as 100% free allowances for energy-intensive and trade-intensive industries, coupled with financial support in the form of loans, subsidies, or tax benefits for installing GHG reduction facilities or investing in green R&D. Importantly, as Table 1 further indicates, the complex nature of and variations in the ETS features can substantially influence accounting decisions.

Theoretical Framework

The theoretical framework of this study draws on Beck's (1993, 1997) and Giddens's (1999) work on risk society. Giddens (1999) defines a risk society as "a society where we increasingly live on a high technological frontier which absolutely no one completely understands and which generates a diversity of possible futures" (p. 3). In this world, class plays a lesser role than before in shaping our outlook, whilst the role of risk is paramount (Hanlon et al. 2006). In a risk society, a transition is noted from external risk (i.e. risk of events that may strike individuals unexpectedly) to manufactured risk. Manufactured risk stems from the progression of human development, especially in science and technology. Giddens stresses that in these "new risk environments… history provides us with very little previous experience. We often don't really know what the risks are, let alone how to calculate them accurately" (1999, p. 4). Consequently, despite the reliance on science and expert knowledge, there is a growing uncertainty and distrust of professional expertise. Experts can only supply factual information but cannot assess which solutions are culturally acceptable. Hence, politics and morality are gaining priority over expert reasoning (Beck, 1997; Hanlon et al., 2006).

In a risk society, politics have a new role, "one marked by a push-and-pull between accusations of scaremongering on the one hand and of cover-ups on the other" (Giddens, 1999, p.5). Considerable political action takes place outside the officially classified political sphere (i.e. in business and private life). As Beck (1997) states, such activity can take the form of "arguing, bargaining, deception, separating, uniting, loving, and betrayal" (p. 52) and can be referred to as sub-political; sub-politics can spread in all the other fields of society "in a form that remains to be comprehended and developed" (p. 52).

Ecology is emphasised by Beck (1997) as a particular case where technocracy ends and opportunities for alternative, sub-political action emerge in the wake of reflexive modernisation. Characteristic of a risk society, reflexive modernisation is a process of modernisation that implies coming to terms with the limits and contradictions of the modern order (Giddens, 1999), by "reinvent[ing] our political institutions and invent[ing] new ways of conducting politics at social 'sites' that we previously considered unpolitical" (Beck, 1997, p. 53). Therefore, reflexivity brings with it unpredictability, uncertainty and diversity as individuals reveal and provoke responses which are unknowable at the outset (Hanlon et al., 2006).

In relation to ecology, organisations may adopt what could be called 'ecological modernisation'. This form of modernisation is particularly associated with the invasion of ecology into the economy, which opens it to politics. Organisational action becomes dependent on publicity and industry on discourse, whilst opportunities grow for external groups to exert influence. A transition is noted from ecological morality to ecological politics as "industry loses its ecological innocence, other business sectors build up their "greening livelihood…[and] [e]cology becomes a hit, a self-seller—at least as cosmetics or packaging" which in turn "opens up a political game involving sectors of industry, companies, taxes, and monitoring" (Beck, 1997, pp. 59–60). Business is free either to take on the role of the villain and poisoner or to slip into the role of the hero and helper and celebrate this role publicly. Two alternatives then emerge. The first is confrontation, that is, industrial polluters face off against affected groups. The second calls for cooperation. This alternative involves breaking down the environmental issue into other questions: "technology, development, production arrangements, product policy, type of nutrition, lifestyles, legal norms, organisational and administrative forms, and so on", which Beck argues is the only way "not to conduct cosmetic ecology on a grand scale but to actually assure viability in the future" (1997, p. 61).

However, when risks, such as those associated with the environment, materialise, it is common to ask who is responsible for the risk being taken. As Giddens (1999) notes:

> Risk… is always connected to responsibility…. Risks only exist when there are decisions to be taken….The idea of responsibility also presumes decisions....It isn't surprising therefore that as we move towards a world dominated by manufactured rather than external uncertainty, there is a renewed discussion of the nature of responsibility (p. 7-8).

Responsibility is "an interestingly ambiguous or multi-layered term" in daily discourse (Giddens, 1999, p. 9).

Building on the work of Hart (1968) and Van de Poel (2011), Van de Poel and Fahlquist (2012) distinguish among forward-looking and backward-looking responsibilities. Forward-looking responsibility would include responsibility-as-virtue (i.e. he is a responsible person) and responsibility-as-obligation (i.e. he is responsible for the safety of the passengers), which are prospective in nature. Backward-looking responsibility would include responsibility-as-accountability (i.e. the moral obligation to account for what you did or what happened and your role in it happening); responsibility-as-blameworthiness (i.e. he is responsible for the car accident); and responsibility-as-liability (i.e. he is liable to pay damages), which are retrospective as they usually apply to something that has occurred.

In relation to risks, both the forward-looking and the backward-looking normative conception of responsibility are relevant. Backward-looking responsibility is mainly at stake when a risk has materialised. Forward-looking responsibility is relevant with respect to the prevention and management of risks. The more specific analyses of moral responsibility in techno-scientific contexts often focus on forward-looking responsibility (e.g. when discussing the forward-looking responsibility of engineers for preventing or reducing risks). One explanation for this focus may be that in these contexts the overriding objective is to prevent and manage risks rather than to attribute blame and liability. Backward-looking forms of responsibility could be more relevant when determining who is liable for certain damage resulting from the materialisation of technological risks and also in more general social and political discussions about how the costs of risks should be borne: by the victim, by the one creating the risks, or collectively by society.

Empirical investigations of the risk society framework remain scarce (Hanlon et al., 2006). The literature tends to identify different types of risks, such as production, market and consumption risks (Georgakopoulos & Thomson, 2005), systemic risks (Miller et al., 2008), transaction risks (Dekker et al. 2013; Ding et al. 2013), operational risks (Huber and Scheytt 2013), and reputational and financial risks (Rossing, 2013a, b). Nonetheless, there is insufficient empirical research on the links of risks to responsibility.

As for Beck's ecological morality vs ecological politics arguments, the literature debates whether an anthropocentric or ecocentric approach should be followed. On the one hand, Hillerbrand (2012) argues for "an anthropocentric ethical framework that values nature or its parts only as far as they provide some value for human (present or future) well-being" (p. 326). On the other hand, Shrivastava (1995) suggests anthropocentrism as a fundamental limitation of the traditional management paradigm. Instead, he calls for an ecocentric management approach that does not prioritise maximising profits, revenues and productivity over minimising the negative and destructive effects of organisational activities. Within SEA, Bebbington and Thomson (2007) underline the incapability of the profession to manage the risks of industrialisation, yet they simultaneously stress that SEA "can play an essential role in identifying these risks" (p. 38).

Our study adds relevant strands to the literature by identifying specific risks and responsibilities of different agents within the standard-setting process in relation to ETS, the means of sub-political action taken, and the way these factors ultimately influence the decisions on this project. The following section provides an overview of the accounting issues pertaining to ETS.

ETS Accounting Issues

Given the distinctive attributes of allowances, which represent the entitlement to emit greenhouse gases, ETS creates a new type of asset, liability, revenue and expense in the financial statements. From a practitioner standpoint, an urgent need arises for some authoritative guidance in the form of an accounting standard (Bowen & Wittneben, 2011; Cook, 2009; Lovell et al., 2010; Ratnatunga & Jones, 2012). From an academic perspective, the necessity of accounting and reporting business activities and financial consequences stemming from the scheme has also been highlighted, albeit with some diversity in the proposed ways forward. Whereas one aspect of the literature (e.g. Bebbington et al., 2008; Cook, 2009; MacKenzie, 2009) adopts an incremental approach and seeks a solution within the conventional financial accounting framework, another strand (e.g. Ratnatunga & Jones, 2012) argues for a more radical approach, by emphasising the incapability of the existing framework to accommodate the highly complex accounting issues under an ETS.

Indeed, accounting standard-setters (e.g. IASB), academics (e.g. Black, 2013; Cook, 2009), and practitioners (e.g. KPMG, 2008) have been puzzling over a number of fundamental questions with regard to the accounting treatment for emission rights and obligations within the conventional accounting paradigm. Regarding emission allowances, it is primarily questioned whether emission allowances are assets; if so, what types of assets (i.e. inventory, other current assets or intangible assets); and how should the value of allowances be initially and subsequently measured. Regarding liabilities arising from emissions, it is primarily questioned when a liability should be recognised and how should the liability be initially and subsequently measured.

The starting point of this controversy pertains to the characteristics of emission rights. If emission rights are viewed as intangible assets, they are treated under either a cost model or a fair value model. If they are considered as financial instruments, they are measured at fair value.

However, if they are regarded as inventory (commodities), then they need to be distinguished among different business models (production, compliance, or trading) that emerge. Several studies have underscored the multi-faceted nature of emission rights and the potential impact on accounting statements (see e.g. Cook, 2009; Fornaro et al., 2009; Ratnatunga & Jones, 2012; Haupt & Ismer, 2013).

To address these complex accounting issues, the IASB issued IFRIC 3, *Emission Rights*, in December 2004. This document recommends the recognition of emission rights as intangible assets; in accordance with IAS38 *Intangible Assets*, such rights should be initially measured at fair value (i.e. on the day of allocation). As a corresponding entry for granted allowances, it proposed that a government grant be recognised as deferred income. Subsequently, allowances could be valued at either cost or market value, and liabilities would be recognised as emissions are produced.

IFRIC 3 was met with harsh criticism from practitioners (especially large polluters), accounting professionals and academics, chiefly because of the evident accounting mismatches in treatments (Bebbington et al., 2008; Black, 2013; Cook, 2009). For example, emission rights could be measured at cost and liabilities at fair value. Changes in the value of emission rights would be acknowledged in the other comprehensive income (OCI) under equity, whilst changes in the value of liability would be reflected in the income statement (Lovell et al., 2010, 2013). In addition, a mismatch in terms of the timing of recognition may occur where an asset is recognised when allowances are received, whereas a liability is recognised as emissions are produced throughout the year (Warwick & Ng, 2012). The European Financial Reporting Advisory Group (EFRAG), the IASB's most prominent stakeholder, also articulated its concerns regarding the discrepancies in IFRIC 3 and warned that these may cause artificial volatility in financial statements. Other IASB constituents voiced their opposition to the gross presentation and insisted on either applying a net presentation, i.e. related items presented in a single, aggregate amount, thereby minimising the impact statements, or linked presentation, i.e. related items presented separately but adjacent to one another, a method reportedly favoured by the Financial Accounting Standards Board in the US (IFRS 2014).

In response to this criticism, the IASB withdrew IFRIC 3 in June 2005. Lovell and MacKenzie (2011), Lovell et al. (2013) and Lovell (2014) attributed this standardisation failure to the friction between the complex nature of emission allowances and a type of 'inertia' where the solution is sought within the existing accounting framework. Correspondingly, Ascui and Lovell (2011) ascribe this failure to inadequate understanding of ETS. They argue that accountants tend to incorporate carbon into existing frameworks without grasping the complexities of science, policy or regulation regarding climate change issues. These 'unresolved tensions' (Lovell et al., 2013, p.745) lead practitioners to seek their own legitimate solutions in response to the absence of any international accounting standard for emission rights, often by adopting regional accounting standards.

The lack of an international accounting standard for emission rights has resulted in a high degree of latitude in accounting for emission allowances in practice (Cook, 2009). In fact, approximately 15 approaches have been developed that the IFRS preparers apply to account for the effects of ETSs (IFRS 2014). Tables 2 and 3 illustrate the three main methods. Method 1 is based on IFRIC 3. Method 2 is essentially the same as Method 1 except for how liability is measured. Method 3 is the 'net presentation' where emission allowances are measured at nil value and the liability is recognised when actual emissions exceed the equivalent amount of allowances on hand. A numeric example is also included to indicate the significant differences.

Evidently, Method 1 gives rise to markedly different net results on the balance sheet and the income statement from the other two methods (i.e. Δ320 vs. Δ120). Ostensibly, the net effect on profit/loss under both Methods 2 and 3 is similar (i.e. Δ120). However, under Method 2, the asset and the liability are displayed as a gross amount, and under Method 3, only a net liability is shown, which may help project a favourable picture in various financial analysis measures, including the debt ratio. Unsurprisingly, in the absence of authoritative guidance, Method 3 is predominantly used in practice (IFRS 2014).

Methods, Data Collection and Analysis

Our primary purpose is to gain novel insights into the participation and interaction of relevant individuals in the accounting standard-setting process for ETS. To gain an in-depth understanding of the dynamic and complicated subject matter, this research relies on a single *information-rich* case study (Eisenhardt, 1989; Patton, 1990). We chose an array of data collection methods: interviews, document analysis and direct observation. The triangulation of methods is useful not only to validate the findings from one method using the others, but also to identify potential variance and gain a holistic understanding of the phenomenon (Jick, 1979).

Due to the highly specialised subject and the significantly specific context of our research, we found purposive sampling was the most appropriate way to secure participants (Denscombe, 1998). The interviewees were carefully selected. We were seeking those individuals who were closely involved in the standard-setting and decision-making process. Our first round of interviews began with our professional and personal networks. Preliminary interviews were conducted in March 2013 when the ETS project was initiating, with members of the KASB board and

Table 2 Methods applied in practice to account for cap & trade schemes

	Method 1	Method 2	Method 3
Initial recognition			
Allocated allowances	Recognise and measure at *market value* at date of issue; corresponding entry to government grant		Recognise and measure at *cost*; which for granted allowances is *nil*
Purchased allowances	Recognise and measure at cost		
Subsequent measurement			
of allowances	Allowances are subsequently measured at *cost* or *market value*, subject to review for impairment		Allowances are subsequently measured at cost, subject to review for impairment
of government grant	Government grant is *amortised* on a systematic and rational basis over compliance period		Not applicable
Liability			
Recognition	Recognise liability when incurred (i.e. as emissions are produced)		Recognise liability as emissions are produced. The liability is not shown on balance sheet until emissions produced exceed the allowances allocated to the participant
Measurement	At *market value* of allowances at each period end that would be required to cover actual emissions (regardless of whether allowances are on hand or were purchased)	At the *carrying amount of allowances on hand* at each period end to be used to cover actual emissions; plus the *market value* of allowances at each period end that would be required to cover any *excess emissions*	At the *carrying amount of allowances on hand* at each period end to be used to cover actual emissions (nil or cost); plus *the market value* of allowances at each period end that would be required to cover any *excess emissions.*
Presentation	*Gross/separate presentation* (where related items are displayed at their separate amounts in different financial statements or sections, or in the same financial statement and section but not adjacent to one another); or *linked presentation* (where related items are displayed at separate or disaggregated amounts but are located adjacent to one another)		*Net presentation* (where related items are displayed as a single aggregated amount)

Source: Starbatty (2010), IFRS (2014)

Table 3 Financial results under different accounting methods

	Method 1	Method 2	Method 3
Jan. 1	Dr) emission rights 1000 (100x@10) Cr) government grant 1000		No entry* * Allowances are measured at nil value
Dec. 31 (with the cost model)	Dr) emission expense 1320 Cr) emission liability 1320 (110x@12)	Dr) emission expense 1120 Cr) emission liability 1120 (100x@10 + 10x@12)	Dr) emission expense 120 Cr) emission liability 120 (10x@12)
	Dr) government grant 1000 Cr) emission income 1000		Not applicable
(with the revaluation model)	Dr) emission rights 200 (100x@(12-10)) Cr) OCI* 200 * Other Comprehensive Income (under equity in B/S)		Not applicable
Balance Sheet (B/S) and Income Statement (I/S) with the cost model			
B/S (Dec.31, 201X)	*Asset* Emission rights 1000 *Liability* Emission liability 1320 Net asset (320)	*Asset* Emission rights 1000 *Liability* Emission liability 1120 Net asset (120)	*Liability* Emission liability 120 Net asset (120)
I/S (Dec.31, 201X)	Emission income 1000 Emission expense 1320 Net income (320)	Emission income 1000 Emission expense 1120 Net income (120)	Emission expense 120 Net income (120)
Balance Sheet (B/S) and Income Statement (I/S) with the revaluation model			
B/S (Dec.31, 201X)	*Asset* Emission rights 1200 *Liability* Emission liability 1320 *Equity* OCI 200 Net asset (320)	*Asset* Emission rights 1200 *Liability* Emission liability 1120 *Equity* OCI 200 Net asset (120)	*Liability* Emission liability 120 Net asset (120)
I/S (Dec.31, 201X)	Emission income 1000 Emission expense 1320 Net income (320)	Emission income 1000 Emission expense 1120 Net income (120)	Emission expense 120 Net income (120)

In this example, it is assumed that 1 unit of emission rights represents 1 CO_2 ton. Company A receives 100 units of free allowance to emit 100 CO_2 tons for the compliance year 1 Jan. to 31 Dec. On the day of receipt, the market price of emission rights is 10/unit. The company emits 110 CO_2 tons over the compliance period. The market price of emission rights is 12 per unit

above, all of whom played critical roles in making decisions. These interviews were particularly useful for identifying further individuals regarded as significant stakeholders in accounting standard-setting in general and especially for the Korean ETS. This snowballing method involving the direct nomination by the interviewees is indeed one of the most reliable and efficient ways of increasing the number of interviewees (Denscombe, 1998). After having carried out interviews with practitioners and accountants, we realised the needs for views from the Korean government as well. Hence, we chose to interview the EST task force team in the Ministry of Environment and then spoke with public organisations such as Korean Exchange for they were expected to play a critical role in ETS market.

Furthermore, we understood from the initial interviews that throughout the standard-setting process, the KASB members constantly referred to the precedent cases of the IASB and ANC, and we realised the need for heightened understanding of these cases. Accordingly, we contacted these two organisations and carried out additional interviewees with their accounting standard-setters in June and July 2014.

Both semi-structured and open-ended interview questions were designed to glean professional opinions and experiences from the interviewees (Kvale & Brinkmann, 2009). Based on the answers provided, the questions underwent some adjustments along the way. Before recording any of the interviews, we obtained formal permission from each participant. The interviews typically lasted 30 min to 1.5 h. Subsequently, all interviews were translated from Korean to English. In total, we conducted 32 interviews. Detailed information about the individual interviewees is presented in Table 4.

The interviews contained abundant narratives and nuanced details of the accounting standard-setting process, both the specific context of Korea and in general. Nevertheless, we also needed unbiased and objective data to validate and complement the responses from the interviews. Several documents were collected from the IASB, ANC, KASB and directly from the interviewees. Although we managed

Table 4 List of interviewees

No.	Role	Organisation	Industry	Interview date
1	Senior technical manager	KASB		05/03/2014
2	Senior technical manager	KASB		05/03/2014
3	Vice chairman (KASB) Vice president (KAI)	KASB		04/04/2014
4	Board member	IASB		05/06/2014
5	Technical director	IASB		06/06/2014
6	Accounting standard-setter	IASB		06/06/2014
7	Accounting standard-setter	ANC		01/07/2014
8	Accounting standard-setter	ANC		01/07/2014
9	Accountant	Siemens	Conglomerate	03/07/2014
10	Managing director	KPMG Korea	Accounting organisation	07/03/2014
11	Director	KPMG Korea	Accounting organisation	07/03/2014
12	Director	PwC	Accounting organisation	03/03/2014
13	Manager	POSCO	Steel	05/03/2014
14	Manager of Environment Affairs Team	GS Caltex	Oil Refiner	11/03/2014
15	Assistant Manager of Environment Affairs Team	GS Caltex	Oil Refiner	11/03/2014
16	Manager in Accounting Department	GS Caltex	Oil Refiner	07/05/2014
17	Manager	Samsung electronics	Conglomerate	12/03/2014
18	Manager	Samsung electronics	Conglomerate	12/03/2014
19	Researcher/Analyst	Samsung SDS	Information Technology	12/03/2014
20	Manager	Samsung SDS	Information Technology	12/03/2014
21	Manager	South-East Power Co.	Electrical Industry	07/03/2014
22	Assistant manager	South-East Power Co.	Electrical Industry	07/03/2014
23	Lawyer	South-East Power Co.	Electrical Industry	07/03/2014
24	Team leader in Strategic Industries Team	Federation of Korean Industries		10/03/2014
25	Deputy director	Ministry of Environment	Korean Government	14/03/2014
26	Government official	Ministry of Environment	Korean Government	14/03/2014
27	Deputy director	Ministry of Strategy and Finance	Korean Government	18/03/2014
28	Team leader	Korean Exchange	Public Organisation	14/03/2014
29	President	Greenhouse Gas Inventory and Research Centre of Korea	Public Organisation	21/03/2014
30	Director in Climate Response Division	Korean Energy Management Corp	Public Organisation	21/03/2014
31	Team leader	Korean Energy Management Corp	Public Organisation	21/03/2014
32	Chief researcher	Korea Institute of Industrial Technology	Public Organisation	20/03/2014

to acquire an extensive number of documents that could be potentially relevant, we concluded that it would be reasonable to take an extremely exclusive approach and concentrate on only the most pertinent and reliable documents. Specifically, we adopted the four criteria suggested by Scott (1990, cited in Flick, 2006, p. 248): authenticity, credibility, representativeness, and meaning. The documents had to be specifically related to the accounting issues and accounting standards for emission rights. Table 5 shows the documents selected for use in the analysis.

In addition to the interviews and archival documents, the data from direct observations of the KASB meetings were examined. We attended two major meetings held by the KASB on 24 March 2014 and 11 April 2014. Due to the sensitivity and strict confidentiality of the subject matter, the meetings were not recorded. However, we were allowed to take copious notes, which were included in our data analysis.

To analyse the data, we then proceeded with thematic analysis, always mindful of the purpose of the study, our exploration of the standard-setting process, and the qualitative nature of the data (Bryman & Bell, 2015). Guided by the Gioia method (Corley & Gioia, 2011; Gioia et al., 2012), we grouped the coded data into different keywords. In the process of categorising them, we concentrated on identifying patterns and similarities among the frequently recurring concepts. As we considered our theoretical framework, multiple reiterations between reading transcripts and revising concepts and categories were carried out in an abductive manner

Table 5 List of documents

Document title	Type of document	Reference number	Source	Date
Emission Trading Schemes	Research paper	Agenda paper 10A	IASB	May 2010
Recognition of assets in a cap-and-trade scheme	Staff paper	IASB Agenda paper 10A/FASB Agenda 6A	IASB	Sept 2010
Existence and recognition of liabilities for the allocation in a cap-and-trade scheme	Staff paper	IASB Agenda paper 10B/FASB Agenda 6B	IASB	Sept 2010
Issues to be discussed at future board meetings	Staff paper	IASB Agenda 10C/FASB Agenda 6C	IASB	Sept 2010
Recognition of a liability for emissions in excess of initial allocation, and measurement of liabilities in an emission trading scheme	Staff paper	IASB Agenda 7A/FASB Agenda 8A	IASB	Nov 2010
Initial and subsequent measurement of purchased allowances (assets) (cap-and-trade scheme)	Staff paper	IASB Agenda 7B/FASB Agenda 8B	IASB	Nov 2010
Balance sheet presentation of the assets and liabilities in an emission trading scheme	Staff paper	IASB Agenda 7C/FASB Agenda 8C	IASB	Nov 2010
The Research Programme	Agenda paper	Agenda paper 13A	IASB	Apr 2014
Background scheme information	Staff paper	IASB Agenda 6A/ASAF Agenda 4B	IASB	Nov 2014
Summary of accounting issues	Staff paper	IASB Agenda 6B/ASAF Agenda 4C	IASB	Nov 2014
Proposals for accounting of GHG emission rights	Agenda paper	Agenda 12	IASB/ANC	Oct 2012
Review of the law relating to the ETS	Agenda paper	Agenda 1	KASB	Mar 2014
Exposure draft, accounting standards for non-public entities 'Emission rights and Liability to deliver allowances'	Agenda paper	Agenda 2	KASB	Jun 2014
SKAS No. 33 'Greenhouse gas emission permits and emission liability'	Agenda paper	Agenda 2	KASB	Sep 2014
SKAS No. 33 'Greenhouse gas emission permits and emission liability'	Agenda paper	Agenda 1	KASB	Oct 2014
Minutes of the technical committee for the ETS	Meeting minutes	NA	KASB	Mar 2014

(as in Brennan & Merkl-Davies, 2014). The categories that emerged originally included the respective objectives of the ETS and the accounting standards-setting, communication processes and directions of ETS and accounting standards-setting, alternatives of accounting standards, and finally the prospects of ETS and accounting standards. The categories were again subsumed under three main themes: ecocentrism and cooperation, anthropocentrism and cooperation, and anthropocentrism and conflicts (see "Appendix" section).

Findings

With the firm intention to publish accounting standards for its ETS before its nation-wide implementation in 2015, the KASB officially initiated the accounting standard-setting process in 2013. In Korea, the Financial Services Commission (FSC) has an obligation to establish and amend accounting standards on the basis of the Act on External Audit of Stock Companies: the fundamental law governing accounting for companies. Since 2000, under Article 13 of the Act on External Audit of Stock Companies, the FSC has delegated this duty to the Korea Accounting Institute (KAI). Founded as an independent private organisation on 1 September 1999, KAI sets accounting standards that ensure consistency and objectivity for external audits of corporations. Then, the KASB was established under KAI for the purpose of deliberation and decision-making regarding accounting standards and related matters.

As such, the process of accounting standards-setting for the Korean ETS has involved multiple stakeholders. They include the KASB as the responsible party for accounting standard-setting and both large and small emitters as information providers, and investors as information users (see Fig. 2). Some of these stakeholders, along with accounting experts, were invited to be part of the technical committee as an advisory group that provides the KASB with professional and technical advice on accounting issues. From our data, we have pinpointed distinct responsibilities taken by different parties according to their perceived risks around ETS. The parties who were engaged more closely in the initial stage of the scheme's adoption perceived environmental risks. Hence, they assumed ecocentric responsibilities. At the same time, the market participants, including companies, revealed a tendency to worry relatively more about financial and reputational risks rather than environmental risks. This perspective led them to take a more anthropocentric approach (Table 6). Such an idiosyncrasy in terms of perceived risks leads to different approaches to the scheme. Accordingly, the standard-setting process

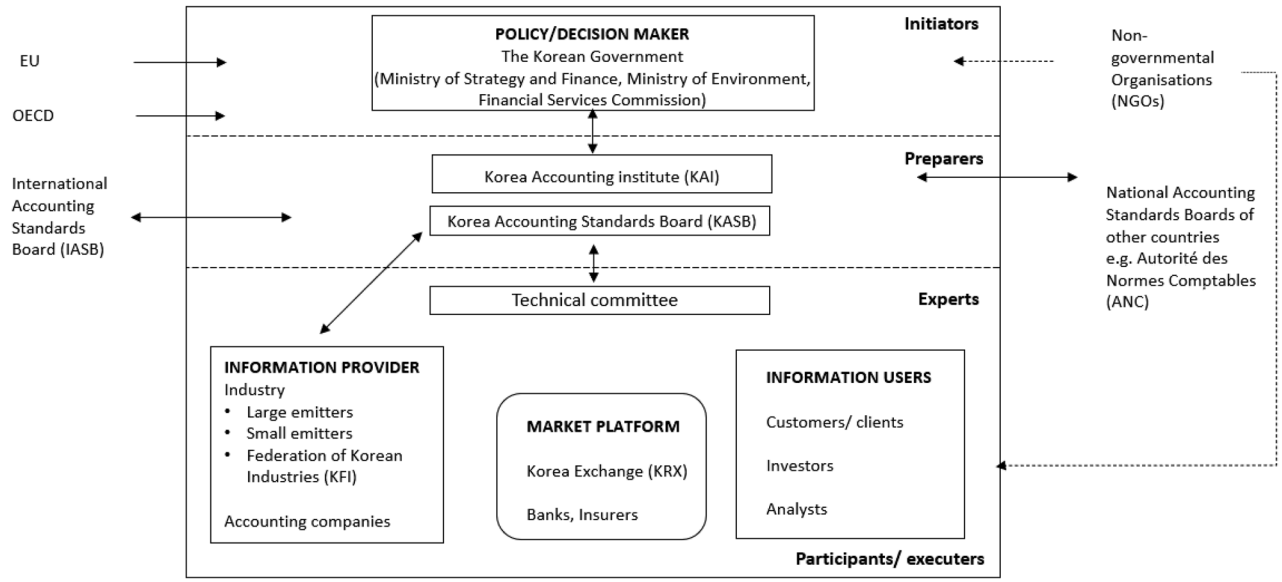

Fig. 2 Political and sub-political actors and their dynamics

Table 6 Risks and responsibilities

	Risks	Responsibilities
Supranational institutions	Environmental risks	Ecocentric responsibilities Forward-looking responsibilities
National institutions	Environmental risks, reputational risks	Ecocentric, Anthropocentric responsibilities Backward-looking, forward-looking
KAI (KASB)	Reputational risks, operational risks	Anthropocentric responsibilities, Forward-looking
Large emitters	Environmental risks, reputational risks, financial risks	Ecocentric --> Anthropocentric responsibilities Backward-looking, Forward-looking
Small emitters	Environmental risks, reputational risks, financial risks	Ecocentric --> Anthropocentric responsibilities Backward-looking, Forward-looking
Investors	Environmental risks, reputational risks, financial risks	Ecocentric, Anthropocentric responsibilities Forward-looking

naturally entails both cooperation and confliction among the parties.

We present our findings according to the themes identified through our analysis process. At the initiation stage of ETS, ecocentrism among actors accompanied by cooperative interaction was found. As the process of accounting standard-setting began the actors presented both cooperative and conflicting views and interactions mainly for anthropocentric reasons.

Ecocentrism and Cooperation

Supranational institutions, including OECD and EU and national institutions, have agreed upon the urgency of environmental concerns, and put heads together to come up with a solution. Among other strategies, the ETS was devised as an effective market tool to tackle the risks caused by GHG emissions.

The fundamentals of the scheme were well acknowledged and appreciated in Korea as can be found in the interviews. For instance, Interviewee 30 remarked, "ETS is one of the policy measures from which we can choose. ETS is part of the big plan of reducing GHG emissions". Also, according to Interviewee 3, "the objective of ETS is continuous and long-term reduction of GHG emissions, and in order to make the reduction efficient, ETS uses the market and induces the most efficient and optimal reduction". Interestingly, though, at least in our sample, the environmental concerns were mainly discussed by the interviewees from KAI and public organisations, yet such issues were seldom mentioned by the other interviewees who were more focused on the technicality of the subject matter.

Anthropocentrism and Cooperation

The Korean government decided to collaborate with the other OECD countries by participating in global efforts to reduce GHG emissions. Whilst the Korean government indicated an ecocentric drive to adopt ETS with the foremost aim of reducing GHG emissions, the government also had a more anthropocentric motive primarily for mitigating related *reputational risks*. Resisting or simply not joining the global trend of lowering GHG emissions would have caused societal pressure and even damage to the national brand and have potentially disadvantaged international relations.

Whilst still pondering a few options, domestic companies raised their voices and opposed a carbon tax; instead, considering the existing domestic situations, i.e. high tax burden, they supported the ETS (Kim, 2016; Park & Hong, 2014). The concerns were accommodated, and the Korean government embraced the scheme on a relatively large scale with the target of 30% GHG gas reduction by 2020 (Park & Hong, 2014). One of our interviewees confirmed these possible consequences in an indirect way by stating that even joining ETS on a such large scale may not be sufficient: "We have been receiving suggestions from OECD that as the current ETS covers 70% of the emissions in Korea, we should introduce a carbon tax for the remaining 30%" (Interviewee 27).

We also inferred from some of the participants that the concern for *reputational risks* applies to industries and multinational corporations (MNCs) since they have investors abroad who would want to consider the performance in terms of carbon reduction as a criterion for investment. ETS, however, for its market-based mechanism, has financial and accounting implications that the Korean government failed to consider initially. By contrast, the KASB realised the need to mitigate *operational risks* that may cause early market failure, and they informed the government. Hence, the KASB joined the process with a deeper understanding of the standards. As Interviewee 3 noted:

> I think the Ministry of Environment did not know clearly…There is KAI, and we set up standards for such cases.…So we got to know that this policy was adopted and then we initiated the whole process [of accounting standards setting].

Interviewee 3 admitted that the main objective of the KASB is to enable timely provision of accounting information to optimise the flow of capital. This point is also corroborated by Interviewee 5 who commented, "I think the overall objective is to try and give useful information to users". At least for the KASB, especially for those who prepare the accounting standards, the reduction of GHG emissions itself was not the top priority.

The core principles in accounting standard-setting for ETS were threefold: to minimise influence on the efficacy of ETS in the market, to be compatible with the existing accounting framework, and to accommodate the interests of key stakeholders. Our interviewees stressed that accounting standards should not hamper the functionality of the scheme. As Interviewee 26 from the Korean government put it, "The government called for the accounting standards for ETS in such a way as, first, not to cause additional burdens on the industry, and second, not to impede tradability in the market". This statement was confirmed by Interviewee 1, one of the accounting standard-setters, who commented, "The accounting standards for ETS were intentionally constructed in order not to affect the market mechanism of the scheme".

Interestingly, mainly due to the market-based characteristics of ETS, the attention of the practitioners tends to get diverted from the fundamental risks, i.e. *environmental risks*, to the secondary effects, i.e. *financial risks* where they are more concerned about prospective gains and losses from market trading than any detrimental impacts on the environment. Interviewee 32 even stressed that he "see[s] the scheme [ETS] and the market separately". Additionally, Interviewee 18 pointed to a shift that occurred after the introduction of the scheme: "Before ETS, industries occasionally had projects to reduce CO2 level and so on.… but after ETS, we just spend all the time on talking and thinking about how to get more allowance and how we can report the emissions correctly", Interviewee 31 offered a further perspective: "When you ask…, [the government] says that both GHG reduction and market invigoration are the objectives, but I think we need to choose one clear objective… The market should exist simply as a system to support trades and should not be the essence".Having acknowledged the practical concerns, the interests of stakeholders were factored in from the beginning of the standard-setting process for the Korean ETS, in a similar manner to the process of scheme selection. The process officially began with the KAI forum where the scheme and accompanied accounting issues were introduced to and discussed by external parties, including companies and investors (see Fig. 2). As a next step, a technical committee for emission rights was formed in August 2013. This committee included representatives of various stakeholders: large emitters, the biggest four accounting firms, the ETS task force team (in the Ministry of Environment), the Financial Supervisory Service (FSS), and academics. The technical committee worked as an advisory group to provide technical and professional advice on accounting issues throughout the process. Their expertise and opinions were respected and although not directly considered in the accounting standard-setting process, they significantly influenced the perspectives of KASB staff.

The interviews revealed the two major stakeholders whose interests were deemed to be most significantly

affected by accounting standards for ETS: large emitters as information providers and investors as information users. The identified large emitters are the companies operating in energy-intensive industries, including steel and petrochemical industries and the five electricity-generation companies owned by the Korea Electricity Power Corporation. Given the significance of these companies in the Korean economy, the government did not want the accounting standards to become a complicated burden. Consequently, compatibility with the existing accounting standards was a priority. The interests of investors were also at stake, for they should be able to compare investees' emissions to those of their competitors. To make investment decisions, they required comparable as well as reliable information (Solomon et al., 2011). Hence, comparability was also prioritised. Our interview with an accounting standard-setter from the ANC (Interviewee 8) confirmed that it is a desirable practice to take companies and investors into primary consideration. Interviewee 9, an accountant, confirmed:

> [T]he question would be: "Is it a wise conclusion or is it helpful accounting if the accounting itself results in information that first must be translated into different numbers before providing decision-useful information?" I would take the view and say if analysts have to reverse the numbers and [if] other users of financial statements have to reverse the numbers in order to get to a meaningful picture for the company, why wouldn't accounting result in the picture that is correct from the perspective of the users?

Since 2011, Korea has adopted IFRS as its general accounting standards. As a result, companies with total assets of 2 trillion Korean Won or higher are mandated to apply IFRS to their financial statements and report them quarterly and biannually (KASB 2013). Although the companies are also subject to IAS 8 and are not obliged to follow the generally accepted accounting principles (GAAP) for Korea for emission rights, many of our interviewees—including Interviewee 3 from the KASB, Interviewees 10 and 11 who are accountants, and Interviewees 13, 16, and 18 from industry—predicted that most companies would cooperate in applying the Korean GAAP for emission rights in the expectation that they were to be designed reasonably within the IFRS framework. As Interviewee 10 commented:

> Although the companies listed on the Korean Securities Dealers Automated Quotations (KOSDAQ) are not mandated to follow the Korean GAAP, most of the listed companies would be likely to follow the Korean GAAP for emission rights....The premise is that [these] emission rights should be compatible with IFRS.

We can infer from the above quote that if the new accounting standards for ETS are not devised to be compatible with IFRS, it will be difficult to expect a high level of compliance. The low level of compliance would in turn result in a broad variety of standards among companies. Such a lack of consistency would result in reduced comparability for investors.After multiple rounds of collecting opinions, evaluating alternatives and internal decision-making (see Fig. 3), the KASB unveiled the exposure draft on 11 July 2014. The pivotal stakeholders widely welcomed the suggested accounting treatments. At least at this point, i.e. Phase 1, the companies did not seem to be concerned about the adverse impact on their debt ratio, as they had to deal with 100% free allowances. With limited options, the treatments were not perfect and stakeholders were able to spot some flaws. Even so, they did appreciate that the KASB had come up with the best possible option accommodating diverse interests of the main stakeholders, as indicated in the following statement:

> We (the institution) agree overall on the exposure draft; however, we have a different view on re-measurement for the remainder of emission rights after surrendering, recognition of deferred income arising from selling and borrowing emission rights, and categorisation of emission liability (Accounting practitioner, KAI forum, 11 July 2014).

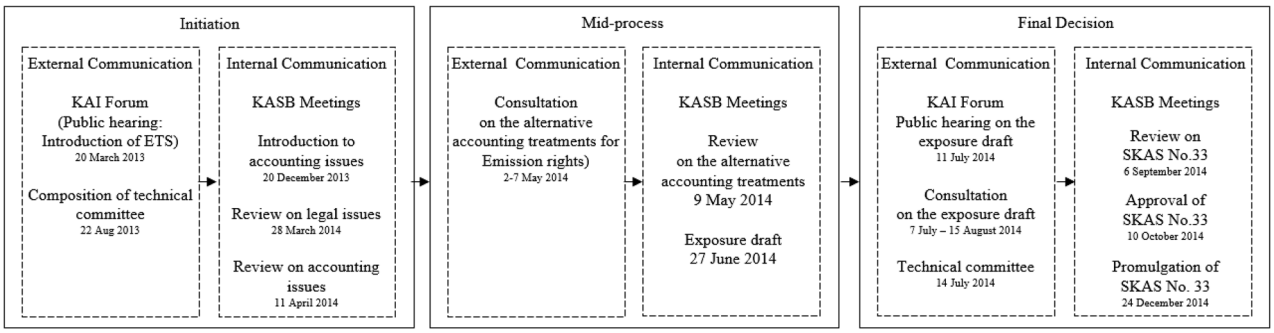

Fig. 3 The accounting standard-setting process for ETS

The high degree of agreement was possible since the KASB formulated the exposure draft to accommodate the distinct interests of the various stakeholders that were consulted in the process. The wide acceptance of the draft was confirmed in a public hearing and consultation and by the technical committee. In the last KASB meeting that took place on 10 October 2014, the KASB proceeded to finalise the accounting standards for non-public entities 'Emission Rights and Lability to Deliver Allowances'. Named SKAS No. 33 'Greenhouse Gas Emission Permits and Emission Liability', it was successfully promulgated on 24 December 2014 and put in place to be reinforced as of January 2015.

The instant high level of compliance of the new standard upon its implementation was predicted by many of our interviewees, including accountants and practitioners. This reaction may simply be explained by the inherent legitimacy granted to the KASB by the statutory law as it was established on the foundation of the Act on External Audit of Stock Companies. Accordingly, the accounting standards provided by the KASB are generally considered to be 'authoritative' and 'legitimate' (Interviewee 10). Nonetheless, it is noteworthy that large emitters under IFRS are not legally bound to adhere to the standard. In fact, they could develop their own accounting treatment for emission rights under IAS 8 if they deemed KASB's standard unreasonable or inadequate. This explains why the KASB had to undergo multiple rounds of discussions with such information providers and accounting firms and was able to set the standards within the 'reasonable' and acceptable range.

Anthropocentrism and Conflicts

Cooperation among diverse parties played an essential role in the scheme selection and the acceptance of the standards, yet there was inevitable discord as well since the interests of different parties are often incompatible (Beck, 1997). The KASB began the process immediately having already pinpointed the most crucial issues—thanks to the previous examples of IFRS and the ANC. Whilst smaller issues were bound to crop up throughout the standard-setting process, as in the case of IFRS and the ANC, the most critical ones were (1) recognising and measuring *free allowance* and (2) *presentation* of asset and liability.

Free allowance

Most of our interviewees concurred that free allowance is the biggest challenge of accounting ETS. In the case of the Korean ETS, companies were to be offered 100% free allowance in Phase I, as in the case of EU ETS. Essentially, there are two alternative ways to recognise free allowance: at fair value or at nil value. As Interviewee 9, an accountant in our study, explained:

> I guess the main question, if and when you address the accounting for emission trading schemes, is whether you also deal with a situation of free allowances. So I think that was the biggest hurdle at my time from a conceptual point of view.

Interviewee 10, another accountant, added:

> When it comes to accounting for emission rights, the main issue is how to account for free allowances. If emission rights are allocated for free at the initial stage, the accounting issue arises because emission rights being received for free can be sold in the market in a deliberate manner.

Interviewee 5 further confirmed this notion, noting that the major reason for the withdrawal of the IFRIC 3 was the inappropriate recognition of free allowance.

In determining the method for recognising free allowance, the KASB and the key stakeholders were not aligned. Whereas the fair value method was preferred by the KASB staff for being able to provide more relevant information, the nil value method was strongly favoured by the stakeholders because of the ease of its application. Interviewee 9 represented the view of the latter, as evidenced in the following: "An easier and simpler accounting treatment for emission rights is recognising emission rights at nil value and applying net presentation. This would be more appropriate for Korean companies at the initial stage of ETS".

Presentation

The second issue is presentation, specifically how assets and liabilities should be presented. The IASB staff paper 7C indicates the three types of presentations under consideration: gross, net, and linked presentation. For this matter, unlike the case of free allowance where the main stakeholders' interests were united, they were found to have varied preferences. On the one hand, gross presentation was widely preferred among investors for its superior transparency. As one interviewee remarked:

> From the investors' point of view, generally, investors want to be provided with full information.…In this regard, investors firstly prefer a gross presentation that displays a total number of assets on the one side and a total number of liabilities on the other side. (Interviewee 4)

On the other hand, companies whose biggest concern is the potential adverse effect on debt ratio were less enthusiastic about the gross presentation method. Net or linked presentation was preferred by the information providers. As Interviewee 9 put it, "Gross presentation is more transparent, but some [companies] would object and say that it also

has some impacts on your ratios—on your equity ratio". However, linked presentation is not compatible with the IFRS framework that takes gross presentation as a primary approach for asset and liability presentation. The competing interests of companies and investors, i.e. the two key stakeholders, and incompatibility with the existing standards were expected to create a great deal of controversy down the road.

Staff Proposal

Table 7 lays out the combinations of free allowance recognition and presentation prepared by the KASB staff. After their own evaluation of the possible options and in consultation with the accounting experts in the technical committee, the KASB representatives initially concluded that the combination of fair value recognition and gross presentation would work most effectively in theory (note from the KASB meeting on 28 March 2014). Even so, they encountered serious concerns from large emitters within the technical committee. As Interviewee 13 explained, "This approach may cause a sharp rise in the debt ratio as well as a degree of volatility of profit or loss arising from the fluctuation of the market price of emission rights". Since these large emitters are the chief stakeholders of the scheme and the accounting standards, the KASB took their concern into account and adjusted its initial decision. Albeit aware that the linked presentation may be incompatible with the IFRS framework and yield inconsistent information to investors, the KASB still put forward the fair value recognition and linked presentation combination in its staff proposal (see Table 7).

As expected, however, the potential negative impacts of incompatibility and incomparability of the free allowance recognition, especially on the information users, were found to be critical. As Interviewee 1 remarked: "We've been told that if the KASB adopts linked presentation in relation to emission rights and liabilities, it might give a signal to information users that the KASB would *not* follow IFRS". Interviewee 10 and Interviewee 20 supported the view that such uncertainties would even cause a 'dormant market' for emission trading.

Table 7 Alternative combinations of free allowance recognition and presentation

Method	Free allowance recognition	Presentation	Proposal or Standard
1	Fair value	Gross presentation	IFRIC 3
2	Fair value	Net presentation	N/A
3	Fair value	Linked presentation	Staff proposal (KASB)
4	Nil value	Gross presentation	Exposure draft (KASB)
5	Nil value	Net presentation	ANC's proposal

Exposure Draft

The KASB could not proceed with the submitted proposal (KASB meeting on 11 April 2014). Instead, they again decided to seek an alternative that would be more amenable to both information providers and users (see Table 8). This time they looked at an alternative for emissions rights and liability that is used most prevalently in Europe compared to the one in the staff proposal. In developing this alternative, the KASB actively consulted the accounting experts in the technical committee. More importantly, all the companies that were mandated to participate in the ETS were invited to the conversation.

When it comes to free allowance recognition, most of the participating companies, especially the large emitters, favoured the European practice over the KASB staff proposal for the minimised adverse impact on financial statements. With regard to presentation, however, opinions were again divided as expected. Some preferred the linked presentation for its usefulness as information and its superiority as an accounting method, whereas others worried about its incompatibility with IFRS. Some were sceptical about the gross presentation as well for its potential to produce misguided information for users.

Although neither method was deemed ideal, extensive communication between the KASB and the major stakeholders led to an agreement whereby the KASB staff proposal was to be disapproved. As Interviewee 1 put it, "Although the KASB staff proposal could be more

Table 8 Alternatives for emission rights and liability

	KASB staff proposal	European practice
Measurement of asset	At fair value (regardless of allocation for free or purchase at own expense)	At cost (in case of free allowances: at nil value)
Measurement of liability	At fair value	At carrying value of emission rights (in case of excessive emissions over emission rights being held: at fair value)
Presentation	Linked presentation	Gross presentation

Source: Abstracted from the presentation material in the KAI forum (11/07/2014)

desirable with a better and firmer rationale in the light of the accounting conceptual framework, the proposal was considered to be inapplicable" mainly for its incompatibility with the IFRS framework and imperfect reflection on the Korean emission trading market. The KASB made a decision to adopt the European practice in the exposure draft at the KASB meeting held on 9 May 2014.

Throughout the process, active participation by key stakeholders was observed. However, our interview findings revealed that small emitters were largely excluded from the standard-setting process. Even though both large emitters and small emitters would be affected by the ETS standard development, their interests seemed at odds with each other. For example, Interviewee 30 stated, "The Korean ETS market will have about 400 participating companies. However, 10 of them occupy 50% of the total emissions". In addition, Interviewee 23 noted, "We ran a simple simulation in order to see which method would be more beneficial to our balance sheet. The results of different standards are significantly different for large emitters and small emitters". Furthermore, Interviewee 24 expressed concern for this matter in particular by pointing out that the accounting standards may end up benefiting only large emitters, mainly for their resources to conduct research and their power to lobby, eventually leaving relatively smaller emitters experiencing loss. The perceived immediate costs tend to discourage small emitters from focusing on *environmental risks* related to GHG emissions and make them instead more concerned about *financial risks*. As our Interviewee 24 from the Federation of Korean Industries noted:

> Those big companies and industries would care much and even proactively lobby. However, those that may lose…as you can expect, only those powerful can lobby…. At the end of the day, CO2 is a global issue. It is not local like soil, water. We do not even have clear evidence. They do not even understand why we have to do this in the first place.

Our interview findings even reveal tensions within companies, as different departments have separate agendas. Consequently, it is difficult to find clear communication and a sense of unity within companies in relation to ETS:

> In general, there is lack of communication between finance/accounting department and the department that deals with environmental issues. The former do not understand environmental issues and policies, whilst the latter usually do with the background in engineering [but] lack of understanding in finance and accounting….Hence, even when we [KASB] ask for their opinion on accounting standards, we receive only a handful of them (Interviewee 1).

This virtual absence of internal communication also had a negative impact on external communication with accounting standard-setters. According to our Interviewee 2, when the KASB invites companies to join the conversation at events such as forums, they turn to personnel from the finance department. Also, Interviewee 1 confirmed that for these reasons the smaller emitters tend not to respond to such requests to participate at all.

Discussion and Conclusion

There is no internationally accepted accounting standard for ETS. Whilst there is some merit in it for idiosyncratic national contexts can be considered in standard-setting, the concept of emission rights is not straightforward. Thus, it presents a challenge to both companies (seeking the appropriate accounting treatment that is preferably compatible with the existing standards) and investors (seeking financial understanding of impacts and comparability). There are crucial issues that must be addressed in the standard-setting process including those pertaining to free allowance and presentation. The complex nature of the subject matter and the multiple factors to be considered can explain the withdrawal of IFRIC 3.

Despite the challenges, it is apparent from our findings that the KASB managed to institute a standard that could be acceptable to the major stakeholders. The study reveals the critical steps that the KASB team had to take to yield this outcome. As an initial step, clear principles were established and salient issues were identified. This step was facilitated by referring to previous examples, namely the IASB and ANC, as well as by communicating with the leading stakeholders. Then, for each issue, they created alternatives, each of which was evaluated to reach a resolution and accommodated the views and expertise of the key stakeholders whose concerns were again considered in both interim and final decision-making. Again, the IASB and ANC offered a method for devising these alternatives.

Our study answers calls in the literature to theorise the standard-setting process, by highlighting both the roles of different agents within the process (Ascui, 2014) and the importance of the risk society framework, particularly with reference to the identification of risks (Bebbington & Thomson, 2007). Our findings support the framework and justify heightened attention to standard-setting research, particularly SEA research. Furthermore, our findings suggest the necessity to develop new policies to address the increasing pressures from governments to mitigate environmental risks. However, agents involved in the process had to consider several other risks, especially to their reputation and/or financial base. These risks all appear to have influenced their stance in the standard-setting process. The KASB also realised the

need to reduce operational risk of the proposed standard. The framework helps identify these risks; even if they were pre-existing, they now become more apparent (Bebbington & Thomson, 2007). Risk identification also represents a first step towards risk management.

Viewing the agents' responsibilities alongside the risks seems to have contributed to a more comprehensive understanding of the standard-setting process. For the KASB, of paramount importance was the need to minimise operational risk responsibly to primary investors and other key agents, such as industry and indirectly the IASB. Agents involved in standard-setting attempted to balance their anthropocentric priorities with ecocentric responsibilities. Ultimately, pragmatism seems to have prevailed and a compromise was reached between anthropocentrism and ecocentrism in this case. As with the early decision to adopt ETS as opposed to a carbon tax, an accounting standard on ETS was introduced. As it had a minimal impact on the financial statements, economic risk as well as reputational risk was reduced for the parties involved in the process. Nevertheless, it is concerning that anthropocentric motivations largely influenced the outcome. Our findings thus substantiate Cho et al.'s (in press) research that underscores the limitations of traditional accounting approaches to achieve long-term sustainability change and proposes more radical alternatives to mitigate environmental risks. Even so, the introduction of mandatory ETS and financial reporting standards offers a way to measure environmental impacts of operations and risks. This is an essential step towards a more inclusive accounting practice that protects the interests of the environment (Bebbington & Thomson, 2007).

Additionally, the study sheds some light on the sub-political actions associated with standard-setting. We framed these actions according to whether they included confrontation or cooperation as per Beck's (1997) relevant discussion. Although no obvious confrontation strategies were identified, our study points to areas of clashing interests and how they were resolved. These conflicts included those between the KASB, companies and investors around the issues of free allowance and presentation, smaller and larger emitters regarding the impact on their financial risks from alternative accounting standards or even conflicts within companies. Ultimately, cooperation seems to have prevailed. Indeed, breaking down the issue into questions such as technology, policy, compliance with the framework, and competitiveness seems to have assisted the agents in resolving conflicts and achieving an acceptable outcome. However, it would be interesting to delve more deeply into how these choices are influenced by other factors including cultural settings.

Furthermore, our study gives credence to Beck's and Giddens's arguments about the changing role of experts in risk society. The accountancy profession "represents itself as an expert technology which purports to measure and communicate a 'true and fair' view of complex social organisations" (Bebbington & Thomson, 2007, p. 48). Although an expert solution based on careful analysis of all the scientific facts was originally put forward, it was eventually disapproved. Following extensive consultation with stakeholders, an alternative emerged with wider acceptance. Politics ultimately took priority over expert reasoning (Beck, 1997; Hanlon et al., 2006), providing a range of challenges for standard-setters. In the field of SEA, it has been suggested that producing more inclusive accounts by considering insights and knowledge sets from non-experts or stakeholders may help alleviate these challenges (Bebbington & Thomson, 2007). Our findings also point to this direction, as much of KASB's consultation with both accounting experts and a range of other stakeholders took place within the remit of the technical committee advisory group.

Moreover, the study helps expand our understanding of the political nature of accounting standard-setting by applying the underexamined risk society frame to explore the process. This framework seems to be particularly relevant to SEA standard-setting as the emergence of SEA practice coincided with, and arguably is an integral part of, the risk society and the rise of manufactured risk (Giddens, 1999). Through this theoretical lens, we can also gain insights into the SEA regulation debates. Studies on the impact of regulations on SEA practice have looked at a variety of initiatives that have clearly had varying degrees of success (see e.g. Bebbington et al., 2012; Chauvey et al., 2015; Luque-Vílchez & Larrinaga, 2016), and with notable failures being attributed to a lack of normativity. Our findings in relation to the importance of referring to the precedents, including the main stakeholders in the process, and having an adequate level of authority (as KASB had as a rule-setting organisation) in producing a standard for ETS, would also resonate with premises of normativity. Chauvey et al. (2015) suggest that normativity can be achieved over time if the regulated practice reaches a diffusion stage and becomes taken for granted. The dearth of authoritative guidance on ETS has allowed for a variety of legitimate approaches to be developed and to seek normativity from practitioners. Combining the risk society and normativity frameworks could potentially help explain why some SEA regulatory initiatives have greater success than others. Our findings suggest that the specific roles of, particularly key, agents in standard-setting with respect to their perceived risk and responsibilities, the efficacy of sub-political actions taken, the conflicts among stakeholders and the role of experts participating in the process influence the regulatory outcome produced and ultimately may impact on its normativity. However, further research is needed to support these links.

The practical implications of this study are clear. In addition to helping practitioners understand accounting issues particularly in relation to presentation and the treatment

of free allowance under ETS, our research provides a reasonable way to address the issues to eventually produce an acceptable standard. By specifying the accounting issues, introducing alternatives devised by the standard-setters of the KASB, and demonstrating how the final decisions are made, this study offers viable solutions for dealing with the accounting issues of emission rights. Our suggestions could be adopted and referred to by other jurisdictions in need of accounting standard-setting for emission rights.

We acknowledge that our study is bound by limitations in relation to its focus on a single national context and the nature of data collection methods. As the first Asian country to adopt a nation-wide ETS, South Korea constitutes an important and multi-faceted context in which to investigate the accounting standard-setting process. Even though our findings will make a useful reference for those countries contemplating ETS standard-setting, the limited generalisability of our study should be acknowledged. We underscore the fact that the KASB consults the cases of the ANC and IASB throughout the process. Future research may include a comparative study involving these three accounting standards.

As previously noted, we relied on interviews as our primary data collection method and took an extremely selective approach in terms of sampling. The interview participants are mainly the board members of accounting standard-setting bodies and industry experts who are highly esteemed in their respective fields. This purposive selective approach was chosen to ensure the inclusion of opinions of individuals directly involved in the standard-setting process. We also validated the interview data with observations and archival documents. However, a possibility of bias still exists despite the interviewees' pivotal roles in the process. Therefore, our data may not be able to represent the entire standard-setting process. We believe that future researchers could build upon our study by conducting surveys on the key stakeholders, exploring the desirability of treatments, and carrying out multiple levels of analysis.

Finally, we have not followed up and investigated the actual application and implementation of the standard. We concluded that such an undertaking would be beyond the scope of the study. Our aim was to understand the participation and interaction of relevant individuals in the process of developing an accounting standard for an ETS. Evaluating how well the standard is adopted and used by companies will be another interesting avenue for future research.

Appendix: Key words, (sub-)categories, (sub-)themes

Key words

- GHG Emission
  - Carbon reduction
  - Corporate social and environmental responsibility
- ETS
  - A measure to reduce carbon
  - Global/ Domestic reputation
  - Global & Domestic Politics (the government)
- ETS Accounting standards
  - A measure to complement ETS
  - Participants
    - Accountants, tax authorities, companies, banks, insurance companies, academics, information users (investors, public)
  - Usefulness of information
    - Comparability, consistency
    - Increase of benefit and decrease of cost
  - Standard setting process
    - Communication among different parties
      - Vertical, horizontal
    - Communication within companies
      - Task force team
      - Lack of communication between departments (e.g. between finance and environment, technology related departments)
  - Emission allocation
    - The issue of free allowance
    - The issue of Asset-liability presentation
    - Financial instrument, commodity
- Carbon trading/ carbon market
  - Market based GHG reduction
  - Market monopoly
  - Market uncertainty (Incomplete market)

Categories and Sub-categories

OBJECTIVES of ETS
Korean Govt – Carbon reduction, global reputation, global politics
"The fundamental purpose is 'mitigation' of GHG emission. ETS is merely a complementing policy measure to reduce GHG, not for trading (Interview 31)."
Industries – Global/ domestic reputation, domestic politics

_____of ACCOUNTING STANDARDS SETTING
Standard setters – Compatibility and comparability
"I think it is a little better to set up individual national standards than waiting for IASB to come up with something because then these countries can at least secure compatibility with the existing standards and comparability among companies within the countries (Interviewee 4)."
Information providers – Cost reduction through compatibility
"I think the overall objective is to try and give useful information to users and to do something that passes the cost-benefit test as well (Interviewee 5)."
Information users – Benefit increase through comparability
"The first priority is information usefulness. … whether the accounting information is useful for the information users (Interviewee 3)."

PROCESS of ETS
Supranational institutions-> domestic government -> Industry
"We are obliged to submit a nationally determined contribution (NDC) by the first quarter of the next year [2015] that includes a detailed plan to reduce emission by 2020 (Interviewee 30)."

_____of ACCOUNTING STANDARDS SETTING
Government & KAI: Bottom-up
"They [the Ministry of Environment] did not reach us,…we had to first to contacted them to ask for a formal request cooperation. .. When they adopt policies like ETS that are not initiated by the Financial Services Commission, they often do no realise accompanied accounting issues (Interviewee 3)."
Government & KRX: Bottom-up
"KRX was very enthusiastic and volunteered to be the market platform while deficit in the beginning is apparent (Interviewee 32)"
KAI & Large emitters: Two-way (proactive participation)
"When an opinion is raised, we try our best to accommodate it… as long as it is reasonable and reserves consideration. There preposterous ones though (Interviewee 2)."
"Posco has been doing a lot of research and hence making their voices (Interviewee 10)."
KAI & Small emitters: Top-down (passive participation)
"So there is a big chance that the other (smaller) industries might suffer a loss, … those that are less powerful and cannot lobby … and those do not have accumulated data to use a reference (Interviewee 24).
KAI & Information users: Top-down (no active participation)
"At forums, we call for all stakeholders, however, … , information users seldom take part in (Interviewee 1)."

ALTERNATIVES of ACCOUTNING STANDARDS
Precedents: IFRS (withdrawn), IASB, EFRAG, ANC
Business models: Compliance model, production model, trading model
Free allowance: fair value, nil value
Presentation: linked, net, gross presentation

PROSPECTS of ETS
Expectations – GHG reduction, Secondary market, foreign investment
"GHG reduction is not an option anyways… There may not be a lot of trading in the beginning, but as it is a market anyways, once one or two transactions occur, there will be more and more…at least domestically… and once the domestic market is settled, we will have to open to foreign investment as well (Interviewee 29)."
Concerns – Market failure/ slow market growth (operational risks), monopoly (competition risks), loss of cause
"The most problematic in a market would be monopoly [oligopoly]… and this is typical oligopolistic situation here. About 10 companies takes up 50% (Interviewee 30)."

_____of ACCOUNTING STANDARDS SETTING
Expectations – Providing IASB and other countries with a reference, optimizing carbon market trading
"A more important task is to push for making the standard made by Korea a global standard… If it happens, you do not have to make any changes later on (Interviewee 4)."
"for instance, I met one accounting standard setter at Chinese standard setting board, and was asked to send ours so that they can use it as a reference (Interviewee 3)."
Concerns – Increase of cost in case companies has to adopt a new (different) IASB standards
"Since we adopted IFR, if there turns out to be a big difference between our standard and the one to be set by the IASB, the companies would have to bear the cost of making all the required changes accordingly (Interviewee 3).

Themes and Sub-themes

ECOCENTRISM AND COOPERATION
Among
Supranational institutions for *Environmental risks*
and
National institutions for *Environmental risks*

ANTHROPOCENTRISM AND COOPERATION
Among
National institution for *environmental risks, reputational risks*
and
Accounting standard setter for *operational risks, reputational risks*
and
Companies for *reputational risks, financial risks, environmental risks*

ANTHROPOCENTRISM AND CONFLICTS
Between
Accounting standard setter for *operational risks*
and
Companies for *financial risks*

Around
Free allowance and *Presentation*

Between
Large emitters for *financial risks*
and
Small emitters for *financial risks*

Acknowledgments We are very grateful to the editors and anonymous reviewers of the paper for all their encouragement, support and very constructive feedback, from which the paper has immensely benefited. We are also very grateful to Lynne Oats for all her guidance, encouragement and support, particularly at the crucial early stages. We would like to additionally acknowledge the helpful comments of participants at the 3rd Congress on Social and Environmental Accounting Research (CSEAR) France Conference in Paris (11–12 June 2015) and at the 10th Congress on Social and Environmental Accounting Research (CSEAR) Spain Conference in Carmona (17–18 September 2015). All remaining errors or omissions are a result of our own unassisted work.

Declarations

Conflict of interest We can confirm that this paper has not been published anywhere else, including in conference proceedings, nor is it under consideration for publication elsewhere. We can also confirm that there is no conflict of interest.

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