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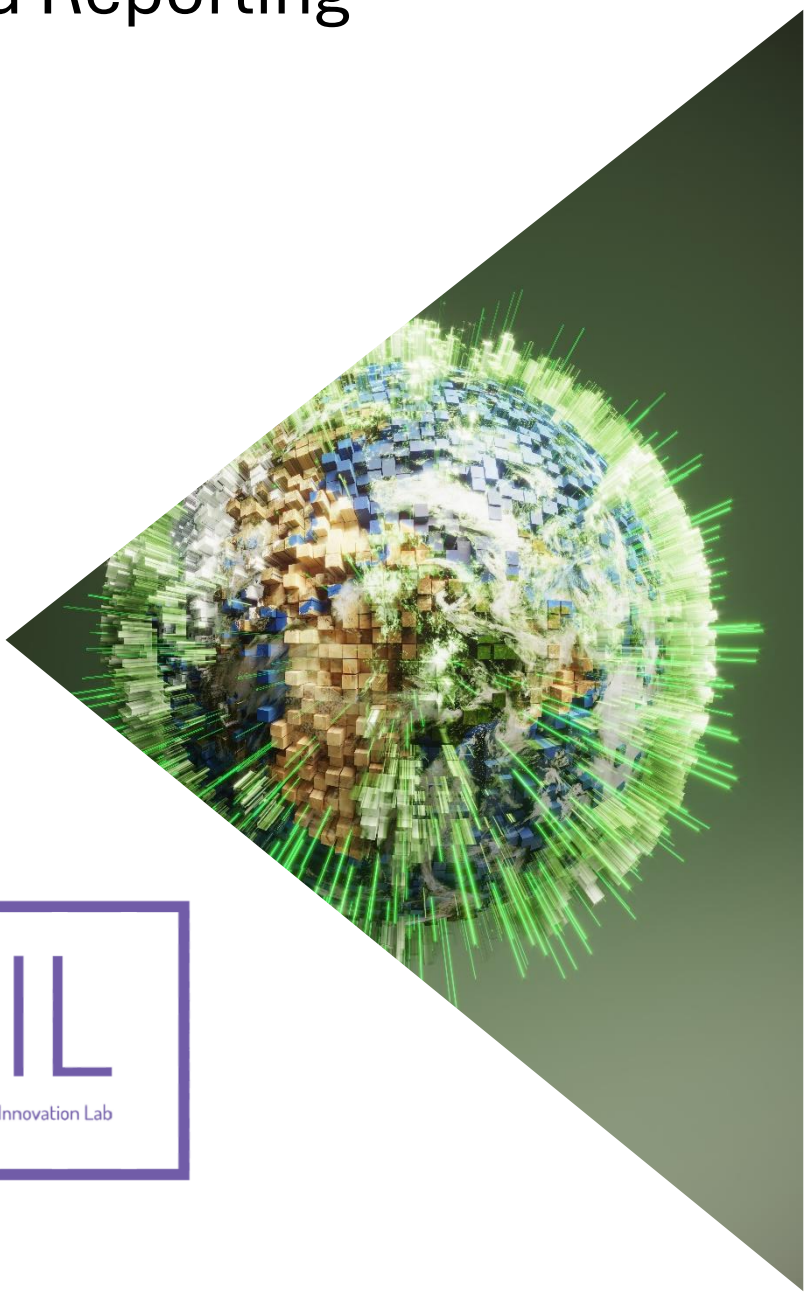
Systems in the Making: the Role of Companies in Implementing Sustainability Policy and Reporting



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Financial Regulation Innovation Lab

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Financial Regulation Innovation Lab

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Systems in the Making: The Role of Companies in Implementing Sustainability Policy and Reporting

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Abstract: This paper focuses on the implementation of corporate sustainability, or Environment, Social and Governance, reporting. The introduction from 2023 of mandatory reporting is a key milestone in sustainability. Adopting a comparative case method, we identify as related case studies Materiality (in reporting), Transition (in corporate strategy), and Stewardship (in fund management). We compare these by applying the theory-led themes of system openness, the agency or power of coalitions in producing and acting upon reports, contests in the qualification of key data, and through business exchanges related to or enabled by sustainability reports. Drawing on a two-year applied project, we elaborate upon policy, regulation, business and industrial markets, and business relationships. We find that Materiality is the most stable and well-framed system. It produces key outcomes in depicting a reporting company's sustainability risks and opportunities. Transition is the most open, influenced by global and jurisdiction task forces, for example tasked with achieving net zero policy obligations. Stewardship in the UK articulates a set of principles, which guide fund managers in engaging with investee companies. We conclude that sustainability policy is at the same time setting in progress the forming of three systems, corresponding to this paper's three case studies. Each has its own development, function and sets of facts, though each is beginning to achieve its function through interactions and exchanges with the other two.

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1. INTRODUCTION

This paper examines the ways in which businesses interact with policy in the introduction of mandatory sustainability reporting standards. Sustainability, typically focussing on a set of Environmental Social and Governance (ESG) factors, is the focus of a widespread set of related policy initiatives, for example across the European Union's Green Deal, opening several business activities in compliance, transition, and stewardship. With sustainability, the implementation of the reporting requirements and initiatives are not yet routine within and across organisations, though can in time be integrated into established functions such as risk, compliance and finance. Input from other organisations, such as data potentially its analysis, and outputs, as the reports summarise statements of sustainability risk and opportunity, are in becoming business services to be exchanged among companies and stakeholders (Chakrabarti et al., 2020; Möller et al., 2020; Siemieniako et al., 2022; Voola et al., 2022).

ESG has engaged questions as to the purpose of companies and the role and legitimacy of state and other institutions to shape and influence these purposes (Edmans, 2023, 2024; Foss & Klein, 2023). At the same time, ESG has through successive initiatives in sustainability reporting and regulation, including as a successor to voluntary Corporate Social Responsibility reporting, been made more technical and standardised (Esser & MacNeil, 2024; Hummel & Jobst, 2024; MacNeil & Esser, 2022; Vera-Muñoz, 2023). The policy expectation of disclosures and standards is in companies producing reports that are potentially valuable to many stakeholders through their reporting of sustainability risks and opportunities (Hristov & Searcy, 2024).

Sustainability has been integral to companies' reporting corporate and social responsibly voluntarily, often taking United Nations Sustainable Development Goals and policy announcements at successive COP meetings as guidance (United Nations, 2021). Since 2023, larger companies (meeting two out of: a balance sheet total exceeding EUR 25,000,000, a net turnover exceeding EUR 50,000,000, and an average of more than 250 employees during the financial year) have been implementing the change from voluntary disclosures to mandatory reporting and compliance with standards, primarily International Sustainability Standards Board (2023) and European Sustainability Reporting Standards (2023). The standards have been produced by expert groups, namely EFRAG in the European Union, and IFRS elsewhere, and adopted into legislation, for example as the European Union's Sustainability Reporting Directive (IFRS, 2023; European Union, 2023). Data requirements, where material to the focal companies' sustainability reporting and to users of the reports, extend to those larger companies' suppliers, supply chains, customers, and stakeholders.

As we investigate in this paper, companies are facing expectations that they take actions to both comply with sustainability reporting standards and address their reported sustainability risks and opportunities in the form of transition planning (Hristov and Seacry, 2024). Companies mandated to produce sustainability reports face challenges in acquiring and collating data within their own organisations, across their supply chains and customers, interpreting this

data to form statements of risk and opportunity, and making judgements as to how to plan for follow-on transition actions ((Transition Plan Taskforce, 2023) (Taskforce for Nature-related Financial Disclosures, 2024). We argue that disclosures and reporting are part of a framework that includes transition guidance for companies as they act on the risks and opportunities that they identify in their reporting, and principles for investor stewardship by which investors can influence companies' sustainability plans (Puchniak, 2024).

To present a framework, we draw on the concepts of system-thinking and power. Arnold & Wade (2015) define systems-thinking as*:* "a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviors, and devising modifications to them in order to produce desired effects. These skills work together as a system". Within this, Arnold and Wade indicate that their systems thinkers are planning action and have agency. Schildt, et al. (2020, p. 242) define power "as influence towards a course of action that an agent would not otherwise undertake". As a framework, we see the power of regulators, standards-setters and companies, their agency, interacting within systems of reporting, transition, and stewardship, to form and implement sustainability policy. Our key insight is that implementation requires systems to allow for the emergence of specialist capabilities and knowledge, and to simplify how the many organisations involved can interact.

2. LITERATURE REVIEW

We extend current research in systems-thinking to include systems-in-the-making or framing and draw together concepts of power and agency. This allows us to consider how power to introduce sustainability reporting involves various forms social, performative and collaborative agency, for example between companies and regulators (MacKenzie, 2006; Beunza and Garud, 2006; Callon, 2009; Lenglet, et al., 2024). For example, Latour (1984) summarises: "a chain of agents each of whom 'translates' it in accordance with his/her own projects. … power is composed here and now by enrolling many actors in a given political and social scheme and is not something that can be stored up and given to the powerful by a pre-existing 'society'".

We identify four themes to organise our analysis of sustainability reporting.

1 - System openness: While we expect that any system is open, we need to evaluate how open, how openness shapes both thinking and activities deemed framed within, and exchanges with that system's environment. Systems create environments, and similarly framings create overflowing (Callon, 1998). Both imply boundaries and openness.

For example, sustainability and ESG can be an ecosystem or a complex system with emergent properties. As Chick & Dow (2005) point out, systems themselves and thinking about these systems, can be more or less open. Research in business ecosystems indicate fairly open systems, with diverse interactions and relationships (Chakrabarti et al. 2020; Cozzolino & Geiger, 2024). By contrast, the system depicted in Siemieniako et al. (2023), of a buyer centre and seller centre interacting in the exchange of business and industrial products and services seems less open. Both buyer and seller centres are approximating something like Simon's (1962) architecture of complexity, with less openness allowing greater stability and more intricate system design. Irrespective of the degree of openness, the processes

of coalition-building characteristic of systems, power, and agency, also indicate vulnerability as the relationships and interactions, the negotiations as to what standards and data count in forming a system, are likely to be on-going.

2- Coalition stability: Taking a dynamic and agency-led view, we question the stability of coalitions. How does heterogeneity or plurality in the coalition affect the degree to which relationships may require a degree of incentivising and coordination (Cabrera, et al., 2018)? The coalition requires its own resources and investments for the purposes of coordinating actions and can extend to infrastructural dimensions such as standards. This investment in coordination can be vulnerable to defection in the coalition if one member of the coalition defects, possibly a data supplier or fintech supplying data analytics. Drawing also on performativity, we expect the agency and power, systems-thinking and doing, to feature both material and cultural agency. A modular/architectural system is consistent with material factors such as platform technologies ((Wei et al., 2022; Wei & Geiger, 2024)), which typically combine standards, enabling technologies and offer possibilities for propriety technologies to become bottlenecks (Albers, et al., 2024). A cultural focus considers values and principles, as we will present with stewardship further on in this aper.

3- Qualification and re-qualification: How do material (technical) and culture (values and principles) factors combine and interact (Tellman, 2020)? For example, the mandated sets of categories or techniques, such as the European Union's taxonomy of sustainability factors (European Union, 2020) and the double materiality assessments (Asif, et al., 2023; European Union, 2023; (Mezzanotte, 2023), qualify the disclosing and communicating companies' sustainability performance and plans. We anticipate that actions within a coalition will involve calculations as to what counts as qualifying decisions, for example in adjusting a product portfolio and developing an investment case. As a system, these could be justified by an initial recognition of sustainability risks and opportunities, which previously has not been calculated and reported, or had been calculated under an early voluntary regime, as with a with early adopters in corporate social responsibility using the UN Sustainable Development Goals. We expect calculations in support of transition to include material and cultural factors. Where Albers et al. (2024) outline their case of the design and implementation of strategic in the airlines ticketing sector, this can be compared with the use of taxonomy and double materiality in sustainability reporting. Albers et al.'s case study it comprises both cultural narratives, and material experiments and investments. Multiple episodes over 1996-2021 became part of the historical context to the next investment case, to include regulation, notions of fairness, and anticipations for enhanced service and capability. Cultural dimensions are clear in research into multi-national subsidiaries, which are important especially of the supply chain questions prominent among ESG factors and sustainability reporting (Hopkinson & Aman, 2019; Sayed & Frenkel, 2024). They identify postcolonial settings in which subsidiary members regularly engage in micro-political processes, power struggles, with narratives, career and promotion designs, training, product and process development, financial reporting and control. And yet subsidiary members were skilled in hybrid actions, addressing the performance measures of a multi-national subsidiary, and yet with engagement also including subtle forms of resistance

including mimicry that were important in qualifying actions in the subsidiary location and context.

4- Business exchanges: In detail, where are the external business exchanges, as complements to the internal business processes, and what are their qualities? Are they sufficiently pacified among supply chains, procurement processes and end-users to be considered as transactional exchanges across a boundary between a system and a more distant environment (Callon, 2009)? We will examine this later in the paper in the case of relationships and interactions of fund managers with those companies making sustainability disclosures and subsequent cases for transition planning. This also draws attention to the nature of exchanges, for example as investment cases supported by sustainability disclosures in return for investment funds to implement sustainability transition plans. In general, for systems to be so, they differentiate themselves from their environment. We expect calm and orderly exchanges between a system and its environment, in contrast to exchanges and interactions within a system, that require greater attention, oversight, adaptation and interaction. In other words, exchanges between entities located, interacting, and relating within a system, will differ from those focussed on outputs, products and services, including sustainability reports and ESG profiles, exchanged with suppliers or users deemed to be in a system's environment (Flammer & Bansal, 2017; Garavaglia et al., 2023).

3. METHODOLOGY

We chose a comparative case method owing to the relatively small number of current policy initiatives, which overlap. By identifying cases, themes that can apply to each case, and comparison across the cases, we can undertake some controlled analysis (Eisenhardt, 1999, Van der Ven 2007, Volmer and Eisenhardt 2024).

3.1 Research Setting

Sustainability reporting has intensified through the standardising, merging and introduction in 2023 of mandatory requirements and guidance. Some of which, as with the Glasgow Financial Alliance for Net Zero, have origins in inter-governmental agreements signed at COP26 in November 2021, leading to consolidation and development of ESRS and ISSB sustainability reporting standards. By contrast, stewardship has its origins in financial regulation reforms in response to the global financial crash in 2008 and expanded its guidance to include ESG (UK Financial Reporting Council, 2020). Given the international scope and broadly inter-operable quality of the standards, these indicate system-making (EFRAG & IFRS Foundation, 2024). The extent of the reporting standards, allied with other guidelines, for instance in the UK as the HM Treasury Transition Planning Taskforce and the Financial Reporting Council's Stewardship programme, indicate that sustainability has become the subject of 'datafication' (Zetzsche, et al. 2024). Sustainability reporting has become approximately a business product/service and exchangeable object, currently among ESG ratings agencies (Clark & Dixon, 2024; Lee et al., 2023). For example, companies can exchange sustainability or ESG profiles through procurement exercises and supply chain or value chain sustainability reporting and can adjust specific products and services or product portfolios.

The reporting regime draws investors and fund managers into business networks. Financial services companies have overlapping roles in sustainability reporting, and so in the system-wide

production and use of the resulting disclosures. Most clearly, they are required to report on their own sustainability performance, often under multiple jurisdictions. Financial services companies' offers vary, to include banking, insurance, investment, auditing and consultancy. Customers come from all sectors of the economy and will leave an imprint of their sustainability profiles in the financial services companies. The exchanges are multi-dimensional and have lengthy durations. A customer of financial services is also a supplier of ESG and sustainability profiles into financial services.

3.2 Data Collection

Our data collection is based in part of a two-year funded research project on Financial Regulation and Innovation (FinTech Scotland, 2022) . The current paper focuses on the project's ESG and sustainability workstream, which took place between March and December 2024. The ESG and sustainability innovation call invited fintech companies to address problem statements provided by financial services companies. The project team and a group of financial services representatives developed and refined the problem statements in the initial months of the workstream. This is a well-established model, comparable with tech sprints administered by many organisations including the UK Financial Conduct Authority (Financial Conduct Authority, 2020).

Of the project team, FinTech Scotland is an ecosystem manager, supporting the development of fintech, financial regulation, and financial services in Scotland. The project drew from FinTech Scotland's financial services partners in setting up its ESG group, including representatives from 12 financial services companies – all with a strong presence in Scotland and operating globally. We met for one hour each week during the programme, mostly as on-line meetings. Our purpose was to set out what became six problem statements for the innovation call, with the financial services companies sponsoring these problem statements, typically collaboratively. At the end of May, the project team advertised the problem statements in the form of joining a 12-week development programme for Fintech companies. The programme included a kick-off day meeting held face-to face in Glasgow, a virtual week of deep-dives with the financial services sponsoring companies and with the university partners offering insights from research. Fintechs developed their pitches and demos in response to the problem statements and presented these in early in September.

We summarise our data collection in Table 1 (below). Our project's innovation call allowed the authors to observe and participate in the ESG workstream. The group meetings and discussions allowed us to gain deep insights into the roles that ESG and sustainability professionals play in financial services companies, the challenges that they were facing, and as reflected in the problem statements. While we undertook formal and informal interviews with members of the group, of comparable importance were opportunities for informal discussions during the longer meetings, as with the kick-off day, demo day, and judging the fintechs' submissions. As researchers, we identified themes in the ESG and sustainability challenges that financial services companies were facing, from data and compliance, organisational development, and communications. We undertook interviews with some of the fintechs, industry participants beyond the project industry group, and with related business sector.

Table 1. Data Description

Data category	Purpose or function	When	Measurement	Summary of insights gained
Project partnership team meetings	Defining the regulation themes, identifying ESG as a current sector challenge, verifying need, aligning with project team capabilities	September to November 2023	Six meetings of one hour, mostly in-person	ESG as one of four project themes – a focus for actionable research, skills development, innovation call, and knowledge exchange
Industry steering group meeting	Validating and refining ESG as a project theme	February 2024	One 90-minute meeting on-line 10 industry participants in the steering group	Support for the ESG theme, initial nominations and suggestions for sub-group membership among financial services companies
ESG project working group meetings	Collaborating with ESG theme, focusing on developing and delivering uses cases and challenge statements for the innovation call	March to November 2024	15 members from financial services companies meeting mainly every two weeks across April to September, meetings of one hour, on-line	Development, delivery and review of ESG innovation call, support and suggestions for related actionable research and skills development project work. Strong identification of double materiality challenge, data acquisition and analysis
Innovation Call launch day observation	Informal discussion with Fintechs and financial services companies, observation of presentations	July 2024	One day, in person	Interactions among financial services and fintech companies, observing emerging perceptions around data acquisition and analysis
Innovation Call demo days	Sitting with financial services companies reviewing 20 fintech pitches and demos	September 2024	Two days, one hybrid day sitting with the ESG subgroup	Observing how different financial services companies value pitches and demos from fintech

Data category	Purpose or function	When	Measurement	Summary of insights gained
			members, with fintech pitches on-line, one in person	companies, given challenge statements
Interviews with ESG working group members	Explore issues raised in the group meetings in greater depth, especially with Materiality	March to November 2024	Five follow-up interviews, from one hour to 90 minutes	Skills, capabilities, internal corporate organization, and key ESG challenges
Interviews with financial services	Explore ESG challenges including and extending beyond compliance, into transition and stewardship	March to September 2024	Four interviews of between 45 minutes and 90 minutes	Different perspectives in ESG challenges, focusing on transition and stewardship
Interviews with fintechs	Understanding their product/services, interactions with financial services and other companies	April to October 2024	Four interviews of one hour, and two follow-up informal conversations	Compliance and transition capabilities in financial services, as evaluated from fintechs and their offers
Informal discussions with financial services	Sense-checking our emerging understanding, seeking direction as to which documents in regulation, standards and guidance	July to November 2024	Four meetings of between 30 minutes and 90 minutes, and one on-line meeting with four members of the project ESG subgroup	A number of additional leads to documents, transition reporting, comparing climate and nature-related disclosures
Perspectives beyond financial services and fintechs	Gaining perspectives from related sectors with notable risk/opportunity profiles - space sector (earth data observation) and industrial refrigeration (emissions related to 'cold chain' food	September to October 2024	Attended space sector trade show, two half days, sustainability workshop and related informal discussions. One-hour interview with industrial	Clear intentions, recent articulation of strategy documents, reflections on corporate and sector cultures, addressing Transition through net zero targets, organizing around UN Sustainable

Data category	Purpose or function	When	Measurement	Summary of insights gained
	and drinks distribution and retailing)		refrigeration company	development goals, rather than the more detailed reporting standards that are the dominant focus in financial services.

3.3 Documents

Financial regulation, including sustainability reporting, is characterised by authoritative documents, which we refer to throughout this paper. Typically, they are outcomes of commissions or expert groups, have wider-ranging membership and details of consultations, and report to an authority with recommendations to be adopted in legislation or guid ace for practice. The focus of our research is on the uses of such documents by financial services and fintech companies. Our choice of comparative case analysis led us first to collecting data through observation and interviews. Financial services representatives regularly mentioned several authoritative documents and standards, which later were reflected in the responses made by fintech companies to the project's innovation call.

We identified in our data collecting in the project's ESG and sustainability industry group financial and sustainability reporting documentation. Within these, we identified some mandated and some recommended techniques and frameworks, for instance with materiality and double materiality (Chiu, 2022; Dragomir et al., 2024). The documents, and their descriptions of techniques and frameworks, provide templates of ESG or sustainability, of what counts as reporting that can be communicated to stakeholders.

3.4 Data Analysis – Identifying Cases

Our method is comparative case study. Business exchanges offer the likelihood of relationships, interactions, and networks as ways of generating and organising the production of intermediate products and services. This sets a research need in identifying case studies that are multi-agent, with the cases to be units of observation and analysis, and then analytically in allowing comparison of the cases. We identify three cases, all of which feature collaborative activities in sustainability reporting, to be our cases: Materiality, Transition, and Stewardship

Materiality

Materiality refers to 'whether omitting, misstating or obscuring that information could reasonably be expected to influence decisions of primary users of general-purpose financial reports' (EFRAG & IFRS, 2024, p. 4). These are set out in the European Commission's sustainability reporting standards (European Union, 2023, sections 3.3, 3.4 and 3.5). Double materiality refers to the interrelated dimension of impact and financial materiality, to cover social and environmental impacts of a company's activities, and the financial risks and opportunities it is exposed to across environmental, social and governance factors. By contrast, the other major sustainability disclosure body, IFRS, requires a financial or single materiality assessment – that is, for companies to

disclose to stakeholders their risks and opportunities, primarily to climate change, as deemed material.

Transition

The sustainability reporting standards emphasise reporting and compliance on recent performance. They also include the possibility of disclosing companies' allocation of resources to implementing transition plans. Transition planning is, in the UK, focussed on companies achieving net zero emissions. The Transition Planning Task force published a series of reports in 2023, coinciding with and referring to the IFRS Standard 2, which focuses on climate and emissions (along with Paris Agreement of 2015 and Kunming-Montreal global biodiversity framework of 2022): "A robust approach to transition planning provides a blueprint for strategic delivery. Disclosure of transition plans can equip investors with the information they need to finance the transition at the speed and scale required" (Transition Plan Taskforce, 2023, p. 10).

Stewardship

Stewardship includes strong reference to culture, setting out explanations of how fund managers interact with the companies that they invest in. The first (of twelve) principles in the UK Stewardship Code (Financial Reporting Council, 2020) is purpose and governance. It states: "Signatories' purpose, investment beliefs, strategy, and culture enable stewardship that creates long-term value for clients and beneficiaries leading to sustainable benefits for the economy, the environment and society". The ninth principle is also critical in both sustainability reporting and business relationships and interactions, as it is on engagement: "Signatories engage with issuers [companies] to maintain or enhance the value of assets" (ibid., p. 16), to include meeting the chair and other board members and holding meetings and management. To give an example from a 2024 stewardship report (not from one of the companies in our project's ESG group):

"The ability to access business leaders and policy makers in order to represent our client's interests is an important duty and one that must be advanced in a thoughtful and purposeful manner. Our investment teams maintain active dialogue with companies to inform their investment decisions and carry out strategic engagement, based on ESG materiality".

Each case is an example of how companies play an integral role in connecting policy objectives with reporting and regulation. Members of our project's ESG group drew particular attention to double materiality in our initial meetings. Transition planning emerged later in our research, through interviewing. Stewardship was peripheral to most members in our project's ESG group, though important for three members where their financial services companies included, as distinct entities, investment, and fund management.

The three cases of Materiality, Transition, and Stewardship can be compared, side-by-side, to focus on power or agency in the interactions and relationships of those involved, and as systems-thinking, and systems-in-the-making. Each case captures thematic slices of data within the overall process of sustainability reporting (Van de Ven, 2007). At the same time, each case is related to each other as process or sequence, passing on stable data or reports between them.

4. Findings

In this section, we draw together the four theory-led themes from Section 2 as themes to compare across the three cases presented in Section 3. We summarise our findings first in Table 2 (below), and then elaborate upon this in the remainder of this section.

Table 2. Findings - Thematic Comparison of the Cases

	Case 1, Materiality	Case 2, Transition	Case 3, Stewardship
Theme 1, System openness	Materiality assessment is a coherent system owing to its definition as double materiality in the EU Sustainable Reporting Directive, and as financial materiality in the IFRS Standard 1. Materiality assessment draws in a focal company's suppliers, customers and stakeholders, and requires data about their related activities as evaluated to be material from the focal company's perspective. The frameworks of materiality present a system of stakeholders exchanging sustainability data, with the disclosures reported annually. A high-level output is a focal company's risk and opportunity relating to sustainability.	Transition is an emerging system, with multiple influences, such as the post COP26 Glasgow Financial Alliance for Net Zero, focussing on supporting companies to invest in transition, notably as emissions, decarbonising and net zero. Input from the sustainability reporting standards, where company plans and investments in transition should be reported. Valuing products and services that produce reductions in emissions.	'Stewardship is the responsible allocation, management and oversight of capital to create long-term value for clients and beneficiaries leading to sustainable benefits for the economy, the environment and society' (Financial Reporting Council, 2020). Emerging from the regulatory reflections post 2008, the UK Stewardship Code has 287 signatories. It establishes ways in which long-term investing fund managers guide and influence those companies they invest in, including ESG.
Theme 2, Coalition stability	Emerging from voluntary CSR, task force guidelines, recommendations. Coalitions have remained stable, reporting is after 2023 mandatory for larger companies. A new	Task forces, some global, some jurisdictional, have developed guidelines for net zero and recently nature-related transition. There are policy connections in net zero and just	As supported and legitimised through the UK Stewardship Code revised in 2020, investors and fund managers are B2B actors, with carefully guided ways for communicating with

	Case 1, Materiality	Case 2, Transition	Case 3, Stewardship
	category of reported compliance risk has been created for companies, which is measured, documented, and standardised. Imprints of company profiles are mobile across established coalitions such as supply chain, customer, and investor relationships.	transition, and some reporting requirements. Emphasis on companies and acting upon materiality assessment outcomes of risks and opportunities, so an impetus to action emerging from sustainability reporting, influenced by stewardship	leaders of their investee companies. Systemically, this also stabilises a space that we can term 'long-term investment'.
Theme 3, Qualification and re-qualification	Materiality Assessment is a benchmark document for an organisation. A mandated framework to guide engagement and reporting. Impact materiality of an organization on environment and society, financial materiality risk and opportunities faced by an organisation. With the ESRS data can be reported as limited assurance by 2026 and reasonable assurance by 2028. Stakeholders include product and service value chain. Could be a competitor document to sustainability and ESG ratings services, which has implications for system boundary.	If organisations devote resources to transition, addressing financial risks and opportunities, these should be disclosed. UK Transition Planning Taskforce (2023), which articulates with reporting frameworks, includes a step-by-step guide in designing and reporting transition planning. Transition highlights strategy, planning and investment, being mostly internally focussed. Organisations face strategic choices for sustainability project development and investment.	The UK Financial Reporting Council is a voluntary Stewardship Code (revised in 2020) for fund managers. It includes 12 principles, one of which focusses on ESG: 'Principle 7 - Signatories systematically integrate stewardship and investment, including material environmental, social and governance issues, and climate change, to fulfil their responsibilities'. Fund managers report annually on their approaches to engaging with companies. An expectation is voice rather than exit from investing.

	Case 1, Materiality	Case 2, Transition	Case 3, Stewardship
Theme 4, B2B exchanges	Focal company evaluates and perceives risks in its sales work, procurement work, product and service development, engagement with financial services, and its reputation. Typically, long periods of sales and procurement process, some longer-term contracts, and multiple relationships where no product/service exchange at present. Profiles of sustainability risks and opportunities are: reported, disclosed, embedded in product/service exchanges, and detached from companies by ratings agents and made into intermediate B2B product/services.	Materiality assessment and sustainability reporting draw focus on risk and opportunity. Adapting a product or service portfolio requires strategy, innovation management, product development, and financial analysis. It will impact on customers and suppliers, so required a thorough understanding of supply and value chains. It also highlights relationships with investors, notably fund managers.	Stewardship provides guidance and legitimacy for fund managers to engage as interactions and relationships with the companies that they invest in. This reflects both ESG/sustainability performance, and transition planning. It also shifts the identify of fund managers into B2B actors in the ways they interact with investee companies. Finally, stewardship makes a space to support long-term investment.

4.1 System Openness

Materiality assessment is for the purposes of this paper a coherent case and system owing to the definition of and implementation guidance for double materiality in the EU Sustainable Reporting Directive (which implements the ESRS), and as financial materiality in the IFRS Standard 1. With the integration of reporting standards after COP26 in November 2021, EFRAG and IFRS have provided expert forums to manage, refine and present criteria and offer implementation guidance (Sekol, 2024). Materiality assessment draws in a reporting company's suppliers, customers and stakeholders, and requires data about their related activities as evaluated to be material from the focal company's perspective. The frameworks of materiality present a system of stakeholders exchanging sustainability data, with the disclosures reported annually. A high-level output is a reporting company's risk and opportunity relating to sustainability. Focusing on materiality assessments, this system is highly designed with a method to

collate and present a multitude of data. As it is reported, it is also exchanged with stakeholders, capturing as summary data an organisation's sustainability risks and opportunities.

Members of our project's ESG group, all with sustainability leadership roles in financial services companies, raised the question of double materiality (meeting notes, 6th March 2024 and 18th April 2024). The industry participants discussed the challenges of ESG, especially the double materiality in the European Sustainable Reporting Standards (ESRS), particularly as the challenge, of the availability, provenance, comparability and quality of data including among stakeholders and suppliers. Compliance is prominent in financial services, partly owing to the established risk and compliance focus and so established competence in financial and regulatory reporting, and partly as business customers are from all sectors of the economy. In systems terms, the materiality case is framed in an orderly way, though data availability is a challenge, and engaging with data vendors and fintech analysts presently poses a challenge to the system's settled boundary.

Transition as a case study is an emerging system, with multiple influences, including the post COP26 Glasgow Financial Alliance for Net Zero, focussing on supporting companies to invest in transition, notably as emissions, decarbonising and net zero. Among these influences is the connection or anticipation made in both ESRS and ISSB standards that companies can extend their compliance reporting to transition planning. The impetus to such action is in the summary outputs as risks and opportunities relating to sustainability. For example, "IFRS S2 does not require an entity [reporting company] to have a transition plan. However, it requires disclosure of any transition plan the entity has developed" (Transition Plan Taskforce, 2023, p. 38). In comparison with Materiality, Transition is a more open system, with guidelines being developed by taskforces in a number of countries. While the IFRS S2 focuses on climate-related disclosures in the UK, the global Taskforce for Nature-related Financial Disclosures published draft transition guidelines in October 2024 for consultation among its stakeholders (Taskforce for Nature-related Financial Disclosures, 2024). Of the 20 fintech companies participating in our project's ESG innovation call, one included discussion of the link or impetus from reporting and compliance to risk and opportunity, to transition. The majority focussed on compliance in reporting itself. Discussion during the launch day (observation notes, July 2024) among financial services companies indicated that reporting on transition plans in sustainability reporting was unusual, given the norms for reporting current performance established in financial and regulation reporting.

"Stewardship is the responsible allocation, management and oversight of capital to create long-term value for clients and beneficiaries leading to sustainable benefits for the economy, the environment and society" (Financial Reporting Council, 2020). It is a principle or duty, guiding investor engagement with the leadership of those companies they invest in. Emerging from the regulatory reflections in the UK following the 2008 financial crash, the UK Stewardship Code has 287 signatories. It establishes ways, indeed expectations, in which especially long-term investing fund managers guide and influence those companies they invest in, including in the 2020 revision of the Code inclusion of ESG. An interviewee with an ESG and risk role stated:

"The idea is, actually, are you being irresponsible if you divest from some of these companies instead of just putting some sort of sanctions in place because there will always be a part of the market that is willing to buy. So, if you come out of that company because you're saying no, it's too risky for me. Are you having the real-world impact that you're committed to having because there will always be somebody with, you know, the risk appetite. And also, doesn't have the same sort of ESG purpose".

The Stewardship system brings to the surface questions of investor values and culture, with an expectation of action and influence among fund managers with those companies they invest in. Aligned with some of the ESG controversies (Edmans, 2023), Stewardship reinforces expectations of a cross-system alignment of sustainability, long-term value, and investment, through the interactions of fund managers and company leaders (Financial Reporting Council, 2020; Puchniak, 2024).

4.2 Coalition Stability

We expect to observe coalition stability and resilience, as membership and consensus over purpose, measurement and reporting, through interpreting systems-thinking and power as systems-in-the-making and agency. Stability is already inferred above for Materiality. The coalition includes definitions of materiality and description of the data to report, including among companies' stakeholders. Data acquisition and analysis indicates one possible disturbance to the coalition. The fintech companies participating in the innovation call all offered data analytics, enabled by machine learning and artificial intelligence. The challenge for Fintechs and financial services companies was in devising ways of formatting data services as a business transaction so retaining the established coalition's system-boundary and integrity (fintech interview, November 2024; innovation call pitches and demos observation, September 2024).

Transition, which refers to the strategic actions in adjusting products and services, possibly processes, of those companies making sustainability reports, is a more open and so potentially less stable system. The EU taxonomy (European Union, 2020) offers some clues as to relative coalition instability of transition, as does the ESRS, the basis for the EU's Corporate Sustainable Reporting Directive, and IFRS. The taxonomy includes climate change adaptation, use and protection of water and marine resources, circular economy, and protection and restoration of biodiversity and ecosystems. These taxonomy parts require specific expertise under each part, so an expanded coalition or collective agency to support the transition from reporting to sustainability planning. Transition is a system that provides a focus in companies' activities for the outcomes in policy, of achieving net zero and nature positive objectives. These objectives are guided by task forces, which are themselves business-led coalitions, COP conferences in climate and biodiversity, as well as being guided by the outcomes from the related systems of Materiality and Stewardship.

4.3 Qualification and Re-qualification

A further dimension by which we can investigate stability and agency is with the calculations undertaken by agents within each system – of materiality risks and opportunities, of investment cases that contribute to transition, of good practice in stewardship. Referring to Section 2 (above), these are the qualifications and re-qualifications, which necessarily create overflows or spillovers, so contributing to boundary condition (Callon, 1998). They signify either responses to new

information, or debates among coalition members as to counts in each setting. With sustainability reporting identified in our Materiality case, companies reporting under ESRS are required to address the assurance of their data, using established audit standards already established in the areas of financial and regulatory reporting, of limited (initially) and reasonable assurance (by 2028).

Qualification and re-qualification are apparent and important with respect to the connections, and sequencing, across the three systems in our findings of Materiality, Transition, and Stewardship. The reasonable assurance of sustainability data under Materiality supports the communication through reporting by companies to the users of their reports, including investors, and to themselves to support transition work. Readers of reports, referring to more established categories of financial and regulatory reporting, are used to reading reports prepared against reasonable data assurance standards. The challenge for companies is with reporting on sustainability into their transition plans, and using this to inform how resources set aside to address those risks and opportunities that they have identified. The transition process can be supported by investor stewardship, with fund managers referring to ESG guidance in the UK Stewardship Code. Taking the EU taxonomic cases of climate and biodiversity, companies require additional insights, including from current climate and biodiversity science research. The Transition system, led by those larger, reporting companies, faces further challenges in the qualification and re-qualification of its knowledge base as additional views are invited through forums, seminars, and responding to discussion documents.

Stewardship presents a more stable form of guidance, for example with the UK Stewardship Code. The 2020 version of the code currently is the subject of periodic consultation, with previous revision in 2010 and 2019. Signatories to the code, predominately fund managers, report annually on their approach to Stewardship, presenting examples from specific cases, though not accounting for their engagements in a case-by-case basis. What qualifies as Stewardship is understood broadly, as one interview illustrates.

"No, [forming low carbon funds] that's based on old-school thinking of pick the lowest of the stocks with the lowest carbon intensity from what I can learn. So, it's very heavy in pharmaceuticals and tech stocks. It doesn't necessarily allow the … additional flexibility in thinking that Stewardship brings to the table in terms of not just dropping the stock, that's high [carbon] intensity. But using your leverage to try to bring them on the journey and actually introduce real world change. Which I think has been a major game changer in the last five years and it's something that we're all very supportive of." (fund analyst, interview notes, September 2024)

In other words, Stewardship for fund management has led to a different view on qualification and re-qualification, possibly with a view of companies undertaking transition with reported plans, itself informed by companies reporting and disclosing current sustainability performance, risks and opportunities under Materiality.

4.4 Business Exchanges

Our analysis and findings have focussed on the implementation in 2023 of mandatory sustainability reporting for larger companies. The financial services companies participating in our project and many of their clients or customers are

undertaking mandatory materiality assessments for the first time, and fintech companies are offering data analytics services to support this. We highlight two business exchanges that give different perspectives on sustainability reporting. While our methodology is of comparative cases as Materiality, Transition, and Stewardship, these exchanges allow us demonstrate saturation as detailed or micro-level examples.

We interviewed (October 2024) an industrial refrigeration company, as sector which is potentially vulnerable to higher climate impacts through greenhouse gas emissions. The company, which is not itself large enough to be mandated in sustainability reporting, has in the past two years developed an internal business unit which acts as a fintech, offering additional data services to its customers in, mainly in food retailing. The company has a long-established sustainability and innovation culture. Given a range of requests from customers for sustainability documentation as part of the procurement, it has produced a strategy based in the UN Sustainable Development Goals. These support its customers' reporting of materiality.

At the same time, the company has developed its fintech business unit over the past the past four years. Reinforcing the need for assured data, specifically on climate reporting, it has developed a simulation and reporting model demonstrating the climate benefits of its refrigeration, known as cold-chain services. This requires gathering data from sensors across its many installations and analysing these with machine-learning techniques. These support customers' activities in transition planning and deliver a flow of data in support of future materiality reporting. Similarly, our project's innovation call provided insights from 20 fintechs' business services in data acquisition and analysis. These are aimed at supporting the sustainability reporting requirements of large financial services companies and can be adapted top other sectors.

We also gained insights into some of the interactions between the fintech companies and their prospective financial services sponsors (sponsors rather than

customers as this is pre-commercial work). These were in 19 of the 20 cases addressing compliance and reporting needs, which we analyse under materiality. The critical feature we observed in the innovation call was a need for fintechs to demonstrate their analytical capabilities, while at the same time the financial services companies not being able for regulatory reasons to compromise their data management and integrity. Analytically, the Materiality system demonstrates a stable and resilient boundary, which favours transactional exchanges and presents challenges for the development of new service propositions. A transactional, and system-boundary reinforcing, model was also favoured by many fintechs, who seek to scale their solutions as products and services across companies.

5. DISCUSSION AND CONCLUSIONS

In this section, we evaluate three sets of priors, as developed across our paper. We illustrate our findings in Figure 1 (below). First, our proposition is that the concepts of power and system-thinking can be combined as system-in-the-making. We evaluate this by organising our data into the theory-led themes of system, coalition, qualification, and exchange. Empirically, theory-led themes enable cross-case comparison.

Second, the proposition from Section 3 is that three phenomena – candidate systems-in-the-making – could also be cases, suitable for cross-case comparison (Möller, et al., 2020). We presented these as Materiality, Transition, and Stewardship. We evaluated each case in terms of being multi-organisational, to include or be influenced by at least some of regulators, standards-setting organisations, investors, fund managers, reporting companies, suppliers, fintechs, and taskforces. The main benefit of our analysis is that we identify three cases that are functioning as distinct systems, at different stages of development, of being in-the-making, and which interact coherently with each other.

Third, our period of observation during 2024, and related extension into assessing documents that concentrate on 2023 with others dating to 2020, covered a period of intense development for sustainability reporting. Each of the three cases has its own process and historical influences, in addition to their interacting and mutual influencing. Our Financial Regulation Innovation project was motivated by many financial services companies being in at the start of an implementation process. Partly through this historical context, we were able to focus on three instances of systems-in-the-making.

In summary, Materiality has the most stable system qualities, with an established coalition of humans, frameworks, and data assurance, and well-defined boundaries. We observed these being tested in practice through financial services companies' interactions with fintechs. One area that will become more prominent in coming years is the requirement for companies to report transition plans and resources, which has the potential for Transition to interact with and disturb this relatively settled view of Materiality.

Transition is more open and less stable in its coalitions, techniques, frameworks and qualification of what counts. Transition responds to the ways in which risk and opportunity in sustainability are reported under Materiality. There is also a science base, including for climate and for biodiversity that is more evident in Transition – though it is there too in Materiality – as companies act upon their knowledge of sustainability to address risks and opportunities.

Stewardship is the most intriguing system. The UK Stewardship Code has adapted to include ESG. It aligns well with the arguments of Edmans (2023, 2024), that ESG and sustainability are simply sensible or rational long-term value and investment propositions. In our findings, Stewardship helps create a long-term market space for fund managers to become more active long-term investors, which correlates well with many of the anticipated sustainability transition behaviours and investments required of companies. In this sense, Stewardship is more obviously a cultural interaction (Hopkinson & Aman, 2019; Sayed & Frenkel, 2024), and less so a material (ie, devices, categories, data assurance standards) one (Beunza &

Garud, 2007; Callon, 2009; MacKenzie, 2006).

Overall, by invoking a systems approach, we have shown how policy and regulation can be translated into practice in manageable ways. While Materiality is the most designed of the three cases that we identify as systems, Transition is emergent and more open, and Stewardship is an adaptation of a code adapted to include the governance indicated in ESG. Each case study shows the likely vulnerability in each system, of acquiring data in materiality, drawing in science-knowledge in Transition, and relaying on insights, code and principles in Stewardship. Alongside these vulnerabilities, each has its own depiction of power as agency through coalitions, including material and technical as well as human relationship and interactions. Finally, while recognised that we are only now entering a new phase of development in sustainability, we highlight how the systems allow simplified sequences interactions and exchanges in terms of systems.

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