

Green Numbers in Grey Areas

A study on what methods credit analysts use to integrate incomplete ESG data in the credit rating process

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Abstract

In response to the urgent need to address global warming, this study investigates the efforts of two credit rating agencies (CRAs), Aries and Orion, to integrate environmental, social, and governance (ESG) factors into their financial analyses amidst challenges posed by inconsistent and unstandardized data. Based on interviews with nine CRA representatives and Knorr Cetina's theory of epistemic cultures, the present study reveals the difficulties faced by the CRAs with directly linking ESG factors to credit ratings. It highlights their use of epistemic strategies, such as negative knowledge, frames of reference, and self-explanation, to navigate this challenge. These strategies are evident in their methodological approaches, calculative practices, and improvement efforts. The study contributes to the literature on ESG integration by detailing how these strategies aid in assimilating ESG considerations, thereby offering new perspectives. Additionally, it explores the prerequisites and potential pitfalls of true ESG integration, along with the broader implications of these findings. This leads to a discussion on the allocation of responsibilities in directing capital towards sustainable borrowers.

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1. Introduction

Following an increased awareness on actions required to mitigate the effects of global warming in order to stay within the planetary boundaries, stakeholders are increasingly demanding more transparency on corporate environmental, social, and governance (ESG) actions through non-financial reporting (Rockström et al., 2009). Simultaneously, financial analysts are working diligently to integrate the risks, opportunities, and similar elements relating to ESG that could impact a company, subsequently defined as ESG ‘factors’, into their financial analysis and decision-making processes. Despite an increase in the extent to which this information is being published, which is often done in public company reports, the area is still relatively unregulated and subjective. Many firms therefore experience difficulties in reporting and interpreting ESG information, and the reports can thus be of varying quality in terms of accuracy and reliability (Jonsdottir et al., 2022). This results in difficulties and inconsistencies with the comparability, materiality, measurability, and quantifiability of the data – hereafter collectively subsumed under the term ‘incomplete’ data (Berg et al., 2022). Clearly, these issues corrupt the identification of interlinkages between corporate’s ESG factors and financial figures, something which aggravates the work of professionals trying to generate knowledgeable financial decisions based on the information. Simultaneously, since financing a company often entails incurring debt on the balance sheet, and because credit ratings are frequently used for securing and possibly reducing the cost of this debt, the importance of understanding *how* ESG factors are integrated into the credit rating analysis is accentuated. Specifically, credit ratings (or just ‘ratings’) aim at quantifying an entity’s capacity to serve its debt obligations, also known as creditworthiness, through an alphanumeric scale. As such, through their product of credit ratings, CRAs contribute to the development of efficient and well-functioning capital markets by providing transparent information and insight to multiple market participants (S&P Global Ratings, n.d.)

Due to corporate ESG factors’ increasingly important role on financial decisions, multiple studies on the practical integration of ESG into financial analysis have been done. In general, these highlight the complexities attributed with the practice, but also the evolving methods to address the issues. The integration often follows a hands-on approach including situational assessments made by the individual analyst – a result of the unstandardized nature of the field (Du Rietz, 2014). Further, while the vast majority of studies primarily discuss the integration of ESG into *equity*

analysis, previous studies regarding ESG and credit mainly concern statistical correlations between ESG performance and either corporate credit ratings or financial performance, where it is often found that performing well in ESG related areas tends to be rewarded with better performance on the other two (Zanin, 2022; Kiesel & Lücke, 2019). The combination of the absence of literature on how ESG factors are accounted for in credit analyses, and the problem of incomplete data that impedes the establishment of clear cause-effect relationships between ESG factors and a corporation's financials, leads us to the following research question:

What methods do credit analysts use to integrate 'incomplete' ESG data in the credit rating process?

To answer this question, a qualitative, dual case study was conducted by interviewing at two credit rating agencies that manages accounting in action by providing ratings for organizations seeking to obtain one (which are also called 'the issuer'). A total of nine semi-structured interviews were performed with employees with insight into the credit analysis process from the two agencies, which are pseudonymized through the names Aries and Orion. The primary data obtained during the interviews were subsequently complemented by secondary data in the form of both public and proprietary documents received from the two rating agencies.

Further, in accordance with the findings from the empirics, which underscores the fields prevalence of incomplete data, the analysis was conducted through the lens of Knorr Cetina's (1981, 1991, 1999) framework of epistemic cultures. Drawing upon this framework, the study finds that both companies employ multiple epistemic strategies to address the issues of incomplete ESG data in an attempt to incorporate these factors in the credit rating process. Such strategies are prominent in the companies' methodologies, calculative practices, and improvement effort. In doing so, this paper finds similarities with the methodologies used by other fields subject to similar data-problems, such as the calculations of quarterly national accounts (QNAs) by statisticians, and measuring performance of employees in the pharmaceutical industry (Du Rietz, 2023; Dambrin & Robson, 2011). Through acknowledging the issues with the quality of current ESG reporting, the two rating agencies alike have adopted an approach which, instead of quantifying and financializing the qualitative aspects of ESG data, serves to take the whole situation of the unique

issuer into consideration. This is done by integrating ESG factors holistically throughout the credit analysis by identifying risks, comparing, and allowing for adjustment to commensurate the result with the analysts aggregate conception of the issuer. The study contributes to the literature on ESG integration by detailing how these strategies facilitate for integrating ESG factors, through offering a way of thinking that can enable easier identification of practices that can ease the integration. Ultimately, the research delves into the prerequisites necessary for achieving true integration of ESG factors, alongside the pitfalls associated with such efforts. It also examines the deeper potential implications of the empirical results. This further progresses to a discussion about the allocation of responsibility in directing capital towards environmentally sustainable borrowers.

The text is structured as follows. The first section provides a review of relevant literature covering ESG integration in both credit and equity analysis, but predominantly the latter, as well as relevant background on the ESG field. Subsequently, the theoretical background is presented, where closer examination is assigned two studies subject to similar data problems as the present study, before the theoretical framework of epistemic cultures is introduced. Then follows a methodology section outlining how the gathering of empirical material and data analysis has been conducted. The next chapter presents and analyzes the empirical data through Knorr Cetina's theory on epistemic cultures. Lastly, a discussion on the results, implications, and contributions is held, before offering concluding remarks and proposals for future research.

2. Reviewing Previous Literature

Due to the limited literature on ESG integration into credit analysis specifically, the phenomenon needs to be approached from multiple angles. Therefore, the following literature review focuses on various research areas that are closely related to the objective of this paper, thus serving as background for the present study.

2.1 Findings on the Interrelation Between Credit and ESG

Following the increased focus on corporate ESG practices, a large number of studies on the integration of ESG into equity analyses and its associated challenges has been undertaken, but to a lesser extent regarding credit analyses (Kanno, 2023). Since credit ratings serve as an important

and comparable metric in the decision-making process for both fixed-income investors, creditors, and lenders, valuable insights can be derived from studying previous work on the topic of credit ratings' interplay with ESG. The conclusions from Zanin's (2022) study are that for companies in both North America, Europe, and Asia, ESG scores, which serve to determine how 'ESG friendly' a company is (which are distinctly different than a credit rating), have a significant positive effect on credit ratings, where the environmental element of ESG is deemed a key driver of this relationship. Supportingly, multiple studies infer similar conclusions for companies in eastern Asia, such that ESG scores have a positive effect on credit ratings, even though they find the sustainability and governance pillars to be of greater importance in comparison (Jeon, 2021; Kambe & Tamamura, 2022). Further, another study from the Asian markets also found that companies on the Bombay Stock Exchange that disclose satisfactory ESG data, tend to be rewarded with higher credit ratings, although exclusively for small and medium-sized companies (Bhattacharya & Sharma, 2019). With greater geographical proximity, additional fortifying conclusions propose that for European firms, studied between 2003 and 2018, weak performance in environmental and social areas was concluded to increase credit risk, and thus worsen the rating (Bannier et al., 2022). Lastly, in terms of the development of a firm's corporate and instrument ratings, a study on European banks found that anticipatedly, ESG controversies tend to hurt credit ratings and make it more difficult to obtain a high rating in future reviews, something which speaks in favor for thoroughly managing the firm's ESG practices (Samaniego-Medina & Giráldez-Puig, 2022).

On the other hand, partially contradictory and mildly counterintuitive findings are described in a study by Rahman & Nainggolan (2021), which found that performance on the environmental aspect of ESG had a negative relationship with the credit rating, while the governance aspect exhibited an expected positive relationship, although solely in the Indonesian market.

Moreover, another area of focus on the interrelations between ESG and credit is the implications of ESG performance on corporates' capital markets performance and default risks. The extent to which a firm considers ESG is found to be a significant determinant for both stock returns and credit default swap (CDS) spreads, proposing that the performance on both the equity and debt capital markets are positively influenced by satisfactory corporate ESG actions (Kiesel & Lücke,

2019). Further, it is found that a higher ESG rating also helps mitigate firms' default risk (Li et al., 2022), a view that goes hand-in-hand with the conclusions that ESG performance can contribute to the prediction of corporate defaults in the long run (Kanno, 2023).

Having established that corporate ESG considerations actually affect credit ratings and market performance, despite limited studies on the actual integration, it is vital to uncover the *potential* methods for how ESG factors *could* be integrated into credit rating decisions. For instance, Roy (2023) proposes an ESG-based credit rating model originating from firms' performance on ESG factors, while still keeping the issuers' financials as the fundamental factor in the rating decision. Although this model serves a different purpose than traditional credit ratings, namely for creditors to allocate capital to the most sustainable borrowers, the methodology shows a clear, alternative example of how the integration could be performed. Additional scholars further challenge the fundamental purpose of credit ratings by proposing a method for aggregating ESG scores and linking it to the credit rating in order to nudge the direction of capital in favor for the best-performing companies with the least harmful impact on the environment (Agosto et al., 2023). Finally, further emphasizing the importance of ESG considerations in the rating process, Chodnicka-Jaworska (2021), finds that following the COVID-19 pandemic, the methods used by CRAs have evolved such that more importance is now placed on ESG factors as one of the basic measures used to determine credit ratings.

2.2 Practical ESG Integration & Associated Challenges

Evident, however, is that although the research outlined above can yield an understanding of how ESG can affect ratings and creditworthiness, previous literature tends to primarily focus on the quantitative correlation between ESG performance and credit ratings, rather than qualitatively analyzing the methods used for integrating ESG into credit analysis. Fortunately, specific insights about integration in similar decision-making settings can be derived from exploring the more extensive literature on the integration of ESG into equity-related decision-making processes, but also the challenges associated with the practice. The following section therefore delves deeper into the literature concerning the practical work streams, the broad challenges, and the methods that are used by analysts that attempt to merge ESG data with financial analysis.

By observing a French asset management firm, Arjaliès & Bansal (2018) contrast the methods used by fixed-income analysts and equity analysts to handle the incorporation of ESG data into their investment decisions. Significant differences were found between the two, where the fixed-income analysts were more skeptical about the reliability, concreteness, and tangibility of ESG data, and found it less trustworthy than regular financial data. Hence, they argued that it was impossible to integrate ESG into financial analysis. In contrast, equity managers were more accommodating to ESG information, especially when presented in an easily grasped, visual format like emojis. This method of visualizing ESG data, by equating it to an emoji with a certain facial expression, helped the analysts appreciate the importance of ESG data without desperately trying to convert it into financial metrics. Thus, the simple use of emojis allowed equity managers to effectively consider ESG in the investment decision-making process. A similar study in terms of tangibility of the practical methods is concerned with the integration of the specific ESG factor of carbon emissions at a large Australian water utility. While what methods are successful will differ between organizations, the researchers found that for this organization, implementing a new line item for the cost of carbon emissions in their net present value (NPV) model, effectively manages to financialize the practice of accounting for environmental factors (Vesty et al., 2015). Thus, this practice not only manages to make ESG considerations affect internal decision-making processes, but also become relevant for multiple of the organizations business units, including the accounting department instead of only the environment and technology division. Relatedly, another Australian study illustrates what can happen to ESG factors if they are not implemented correctly, by observing one of the country's universities' attempts at implementing water accountability. Egan (2014) showed that, because of reluctance from management to connect the 'factor' to financial accountability measures, when the time came to cut costs in the organization, the initiative did not persist and was terminated. This example not only shows how inefficient implementation could look, but also emphasizes the importance of genuine commitment throughout the organization.

Studying two Nordic asset management firms, Cederberg's (2019) study examined the practical work undertaken in the process of integrating ESG into investment analysis and decision-making. It was found that ESG integration was performed through quantifying the data into rating methodologies, scores, and performance standards, and inserting this information into the relevant valuation models, such as the discounted cash flow (DCF) model. This integration-practice is

commensurate with the argument that, in order to change the financial flows in favor of ESG, the integration is made possible by challenging the established work practices used by analysts. Relating to these established practices, the paper also describes how the outcome of the concern among professionals to “get ESG in there” depends on organizational collaboration between the separate groups of ‘financial’ and ‘ESG’ analysts, and that such separations can uphold the disconnections they were intended to overcome (Cederberg, 2019, p. 13). In summary, this paper not only observes the challenges and the practical efforts undertaken to realize the integration, but also searches for fundamental answers to *the reason for its complexity*, and finds a potential answer in the observed companies’ residing organizational structure, similar to how Vesty et al (2015) manages to disclose how the Australian water utility bridged the discrepancies between its departments.

Zooming in on the problematic characteristics with the integration-practice, Du Rietz (2014) reveals how investment analysts proceed to find information on ESG to integrate it in financial analysis. When sifting through multiple pieces of data, to determine what ESG information is relevant, the definition of *what* they want knowledge about is found to be crucial. However, the task can be corrupted because there often is not clear, universally accepted standards for what constitutes relevant ESG information. Therefore, the integration relies heavily on the analysts’ interpretations, both in regards to what existing information is deemed relevant, but also to what relevant information that is missing. The absence of standards thus requires the practical work of analysts to involve a lot of hands-on, manual work (Du Rietz, 2014). While also emphasizing the problem of lacking ESG disclosure standards, the study by Young-Ferris & Roberts (2023) finds additional fundamental challenges for equity investors when considering ESG data. These relate to the difficulties in attaching a monetary value to the data, which further obstructs its relevance for the valuation of equities, and that the attempts of quantifying the data paradoxically can diminish its importance. The study also finds that the time horizon that the accounting numbers cover is not commensurate with the duration for which ESG factors are present, and that this makes it harder to factor in the true value of them. Further, the act of identifying ‘financially material’ ESG factors is subject to interpretation, and thus may result in false confidence in one’s risk management. Concludingly, the study discusses that what is deemed ‘material’ depends on

perspective, indicating the presence of a gap in priorities and agendas between society and investors.

The following section of literature shifts the focus from common challenges of integrating ESG factors, such as difficulty in including them in valuation models, the perceived ‘impossibility’ of accounting for them, or issues related to organizational structures. Instead, it emphasizes the primary issue of ‘incompleteness’ in ESG data.

Even if qualitative factors such as limited knowledge on ESG risks and lack of dialogue between the reporting companies and investors are found to exacerbate the integration, quantitative data problems are underscored as a primary obstacle in the study by Efimova (2018). In addition to the previously mentioned lack of standardized data, barriers such as information comparability, reliability, completeness, and timeliness are emphasized in the study on the integration of ESG factors into investment decision-making processes. In contribution, the paper also presents an approach of integration that entails considering ESG factors at different stages of the investment analysis and business valuation, even though it is more centered around identifying the ESG risks’ potential effect on the finances, instead of adopting a broader view. In addition, a study by Jonsdottir et al. (2022) also mentions the lack of ESG data with sufficient quality, and elaborates on the consequences of this, namely that it can deter institutional investors from considering such factors in the investment decisions. These investors hold the view that the data exhibits lack of materiality, reliability, and accuracy, while the companies issuing the data perceive it as highly usable. As such, the two studies aggregately recognize the presence of specific issues pertaining to the inadequacy in data quality, as well as a plausible, temporary remedy towards them.

In broader context however, the previous literature has thus far been concerned with things such as the correlation between ESG performance and both credit risk and financial performance, and also the practical integration-work and its challenges, but little is mentioned about the origins of ESG in the first place. Therefore, the following section intends to concisely lay out the relevant sequences that constitute the foundations for why the ESG landscape looks like it does today.

The study by Arjalies (2010) is focused on the emergence of ESG in France and outlines that people who advocated for businesses to adopt socially responsible investment (SRI) practices also wanted to establish a clear link between ESG performance and financial performance, in an attempt to incentivize accounting for ESG factors. Further, by hiring ESG analysts, the ESG considerations reached broader over investment firms, and underwent a “mainstreaming” phase (Cederberg, 2019). Arjaliés therefore questioned whether the ESG movement would be able to keep its intended ambition, to create impactful change, in the wake of becoming mainstream. Moreover, the widespread adoption of ESG practices and scores called for standardization. Much of the integration therefore built on the quantification of ESG data to make it commensurate with existing, ruling financial interests. However, the conversion from what tended to originally be data of qualitative nature, into quantitative, seemed to reproduce a less colorful and narrower picture of what it was intended to portray (Chelli & Gendron, 2013). The narrowing gave rise to both proponents and opponents of ESG’s ability to generate change, where some manifested genuine worry and argued that considering ESG was necessary, while some mostly saw it as a ‘hygiene factor’ for businesses to show some level of ESG engagement. This became evident in Solomon’s et al. (2013) research, where interviews with institutional investors tasked with sustainability analysis reveal that, despite ongoing private ESG dialogues between investors and their holdings, it is essentially considered an “empty counter” with nothing of substance in it which serves as window dressing. By this background, the implications of the financialization of ESG data clearly equates to issues with the genuinity of ESG integration, which warrants questioning if traditional financial instruments are sufficient for true and resilient ESG integration.

In the light of the historic issues following the desire to quantify ESG data, coupled with the limited research performed on the integration of ESG factors into credit analysis, this paper intends to contribute the field that engages in the methods used to tackle the challenges with data ‘incompleteness’, and especially with ESG integration into financial credit analysis and decision-making. Analyzing this gap is particularly interesting considering the different risk-appetites between equity and debt investors. This has its roots in equity instruments unlimited yield-potential, which can incentivize taking higher risk, while debt instruments’ limited-yield nature often entails an increased focus on mitigating risk. Considering this, examining the approaches to

ESG integration in credit analysis might reveal distinctions in comparison to those applied in equity analysis.

Additionally, the present paper's research topic is also motivated by a theoretical basis. The theory described below has not previously been applied to the integration of ESG factors into credit analysis. Utilizing this theory in a new context could lead to its further development, offering new insights and potential applications in other research areas. Furthermore, instead of investigating this by looking at, for example, traditional fixed-income investors, this paper focuses on CRAs. One of the motivations for this choice is that their industry-agnostic approach gives them insight into a great number of industries (more on the motivations in the methodology chapter). As such, these factors aggregately give rise to the following research question that the paper is set out to answer:

What methods do credit analysts use to integrate 'incomplete' ESG data in the credit rating process?

2.3 Theory Background

In order to analyze the research question, it was deemed necessary that the chosen theory would be able to yield insightful findings on how decision-making is made possible when not all information is available. There exists several studies on how practitioners make use of incomplete data. For instance, by exploring the process of measuring the performance of professionals responsible for the prescription of drugs, referred to as 'drug reps', to other healthcare professionals Dambrin & Robson (2011) delves into the problem of government regulation hindering full data transparency. Objectively measuring their performance is thus aggravated because of hidden sales data of drugs in the healthcare sector. The authors acknowledge that "problems with the numbers" seem to be endemic in this process and conclude by elaborating on how the problem of missing data is handled. This is done by creatively comparing, combining, and contrasting the different performance measurement systems, such as the balanced scorecard (BSC) and economic value added (EVA), and despite some of them serving ostensibly different purposes, when used this way they manage to bridge the gaps created by the lack of available data and generate reliable knowledge.

Another paper dedicated to this matter is a study by Du Rietz (2023) which focuses on how Norwegian statisticians calculate the country's quarterly national accounts (QNA) that lies as the foundation for the GDP measure, while not having complete data available. Instead they use proxies, stand-in numbers, or projected figures to still yield reliable results, which collectively exhibits the usage of epistemic strategies. Even when the data is available, it may not perfectly match the required standards in terms of reliability and timeliness, which generates a demand for estimating these as accurately as possible. Albeit focused on a different economic topic than the present paper, this study explores the recurring strategies used by professionals to generate well-founded results despite these issues, which are reliable enough to serve as input for important institutional publications and statements.

2.4 Theoretical Framework: How the Sciences Make Knowledge?

In order to analyze the research question, the thesis draws upon the concepts of epistemic cultures, problems, and strategies, derived from the work by Knorr Cetina (1981, 1991, 1999) and the subsequent insights contributed by primarily Du Rietz (2023). This section provides an overview of the theoretical framework. First, section 2.5.1 introduces the concept of epistemic cultures and identifies the specific culture that is most relevant for analyzing the research question. Second, in section 2.4.2, a description of epistemic problems is provided along with applicable epistemic strategies.

2.4.1 Epistemic Cultures

According to Knorr Cetina (1999), epistemic cultures refer to the cultural aspects of scientific practices, encompassing the “aggregate patterns and dynamics on display in expert practice”. In other words, epistemic cultures refer to how knowledge is *produced* and *understood* in a particular field. Different areas of expertise have their unique way of "knowing" based on what they study and how they study it (Knorr Cetina, 1999). Knorr Cetina's study of various scientific disciplines has led to the identification of three distinct epistemic cultures, namely a *technology of correspondence*, a *technology of treatment and interventions*, and a *technology of representation* (Knorr Cetina, 1999).

In a technology of correspondence, objects of research are placed in a controlled environment, such as a laboratory, to stage a real-world phenomenon. The idea is to establish a correspondence between the experimental setup and the real-world scenario it aims to replicate or understand. This approach is commonly used within social psychology. In contrast, a technology of treatment and interventions involves actively manipulating the objects of research to study the effects of these interventions. For instance, in molecular biology, researchers focus heavily on the direct interaction with the empirical world, working hands-on with actual biological materials, such as DNA. Hence, their epistemic culture is deeply rooted in the tangible experience with the subjects of their study. This approach distinctly differs from merely observing or representing a phenomenon, as it involves direct interaction and alteration of the study's objects (Du Rietz, 2023). Finally, a technology of representation involves the processing of signs rather than direct interaction with the actual objects or events of interest. As described by Du Rietz (2023), in the field of macroeconomics, researchers work with “processed signs”, namely data and indicators that represent economic activities. Rather than using direct, hands-on experience, the production and understanding of knowledge is mediated through the interpretation of signs and symbols, which are often complex and require specific methods to analyze the information (Du Rietz, 2023). In essence, this approach is characterized by a "loss of the empirical," where the direct empirical connection to the phenomena is not present.

This study focuses on examining how credit analysts make use of incomplete data to understand how ESG factors affects a company’s creditworthiness. This is assessed through studying the practical work of credit analysts, who, on a daily basis, rely on interpreting signs and data to evaluate various companies’ ability to repay debt. Hence, emphasis will be put on a *technology of representation* when analyzing our empirical findings.

2.4.2 A Technology of Representation

2.4.2.1 Epistemic Problem

As suggested by Knorr Cetina (1991), in fields where experts deal with indirect evidence or "signs", experts will face certain so-called *epistemic problems*. These are issues that scientists and researchers face regularly in their work that make it difficult to conduct research and find answers. They are tricky because there is not a straightforward way to solve them (Knorr Cetina, 1991).

More specifically, in a technology of representation, experts commonly face epistemic problems relating to a lack of direct connection. According to Du Rietz (2023), this builds on the reliance on second-order measurements and interrupted representations, which leads to a mediated character of the representations, introducing uncertainty and an absence of direct connection to the original phenomena.

2.4.2.2 Epistemic Strategies

According to Knorr Cetina (1991), so-called epistemic strategies can help practitioners deal with epistemic problems. Epistemic strategies are methods or approaches used by practitioners to deal with complex problems in their fields. For instance, these strategies can help practitioners understand and interpret data, deal with incomplete numbers, make sense of difficult concepts, and navigate other uncertainties and challenges they encounter in their work. As argued by (Dambrin & Robson, 2011, p. 429), such strategies are prevailing in accounting related fields when the numbers are not reversibly traceable – when it is impossible to reliably track a representation back to its original phenomenon, also called “interrupted” numbers. Du Rietz (2023) offers an alternative explanation, emphasizing that epistemic strategies are not only used to solve epistemic problems, but for revealing them as well. According to Knorr Cetina, there are three epistemic strategies within the technology of representation, namely *self-explanation*, *negative knowledge*, and *frames of reference*.

Negative knowledge as an epistemic strategy entail recognizing and learning from the limitations and challenges we encounter. Instead of ignoring these obstacles, we should try to understand how they might impact our knowledge. In doing so, we become more aware of the context in which we are gaining knowledge, which helps in transforming obstacles into valuable lessons and bridging gaps (Du Rietz, 2023). The study by Dambrin & Robson (2011) demonstrates how knowledge about the limits of self-reported data from drug representatives was well known amongst pharmaceutical companies, and how this helped the drug representatives develop methods to bridge this gap (Dambrin & Robson, 2011).

Next, self-explanation is about focusing inward to analyze and improve one's own methods and practices. In the context of a technology of representation, it is about understanding and refining how we process and interpret information. Knorr Cetina (1999) further breaks down self-

explanation into three sub-processes: self-understanding, self-observation, and self-description. Self-understanding is about learning about the practice, including changes over time and the reasons behind these changes. It might involve understanding the equipment, routines, and algorithms used. In turn, self-observation is about monitoring the practice and self-description involves documenting what has been observed and understood (Knorr Cetina, 1999). Self-explanation is crucial for accountability, understanding, transparency, learning from errors, and improving future practices (Du Rietz, 2023).

Finally, frames of reference involve comparing pieces of information with similar data. These comparisons help to verify, manage, expand, or balance the initial information. The process can be either confrontational; contrasting different data sets against each other, or complementary; using one data set to fill in the gaps of another (Du Rietz, 2023). Dambrin & Robson's (2011) study helps illustrate this epistemic strategy in practice. The study describes how drug representatives' self-reported sales figures were cross-checked with other data sets, such as cost account claims and expenses, and how this approach helped reduce uncertainty about the accuracy of the sales reports (Dambrin & Robson, 2011). Similarly, Du Rietz (2023) noted how investment analysts used a method called triangulation, which essentially means comparing information from multiple sources, in order to confirm instances of corporate sustainability violations (Du Rietz, 2023). Below, in figure 1, is a visualization of the theoretical framework to facilitate the reasoning and understanding.

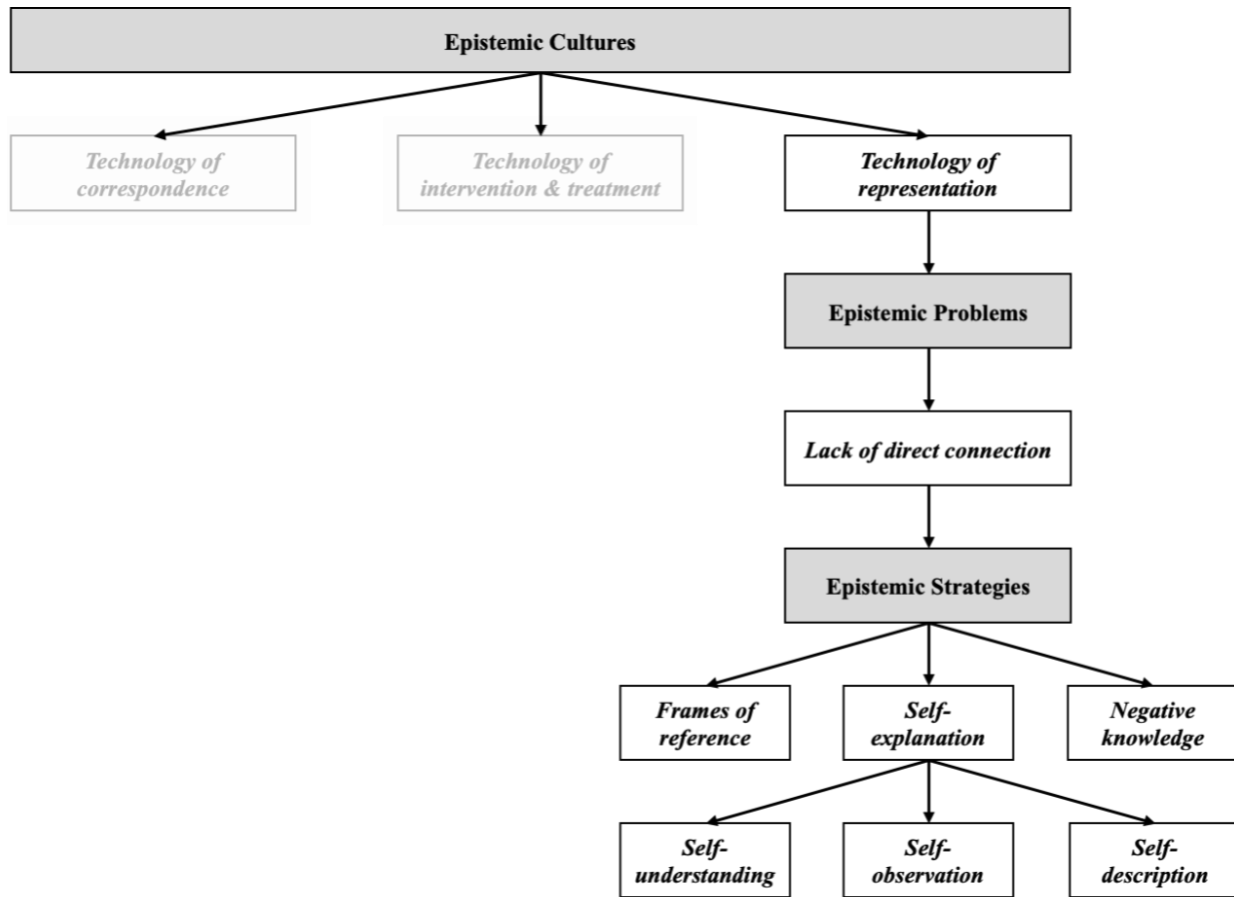


Figure 1: Illustration of the theoretical framework

3. Research Methodology

This section provides an overview of the design and execution of the empirical study. First, section 3.1 presents the research design with a delineation of the chosen methodology. Next, in 3.2 a description of the data collection process is provided, followed by an outline of the data analysis in section 3.3.

3.1 Research Design

Given the nature of the research question and the study's intentions to contribute to a field of research dominated by qualitative studies, a quantitative approach was considered inappropriate. Instead, a dual case study approach was used, primarily consisting of semi-structured interviews. A qualitative research method is a particularly relevant approach when there is limited previous knowledge or understanding of the phenomenon being studied, as it allows for rich insights into

new fields of research (Eriksson & Kovalainen, 2008). This approach therefore allowed for deeper examination of the specific ways credit analysts deal with incomplete ESG data, exploring nuances and details that might not emerge in a quantitative study. Furthermore, studying two credit rating agencies allowed for drawing upon common themes and providing more accurate generalizations as opposed to studying one single firm on a deeper level. It thus facilitates investigating if similar phenomena are present across different contexts and companies, and therefore help with understanding the complexity of the subject on a more granular level. On the contrary, a dual case study might imply missing out on important insights that could potentially arise should one company have been analyzed in more detail (Aberdeen, 2013). However, with the objective of providing insights valuable to more than one single CRA, the risk of not being granular enough was deprioritized in favor of the goal of getting multiple data points. Moreover, the dual case study does not intend to compare the two organizations, but rather describe existing, common phenomena as accurately as possible, which is thus commensurate with a descriptive approach (Atmowardoyo, 2018).

In terms of the interview format, in contrast to more structured and close-ended formats, semi-structured interviews provide a more comprehensive understanding of the interviewee's perspectives, by providing the interviewer with the freedom to explore relevant ideas as they arise during the interview (Adeoye-Olatunde & Olenik, 2021). Opting for an interview format that promotes more detailed answers was favorable considering that the aim of this study is to gain an in-depth understanding of the methods used by credit analysts.

3.2 Data Collection

3.2.1 Primary Data

To ensure the relevance and quality of the information gathered, the two case companies were selected based on three criteria's: (1) The company must actively engage in evaluating the creditworthiness of other businesses, as this would enhance the chances that the company has an understanding of credit analysis methodologies. (2) Evaluating creditworthiness must be the primary objective of the company. While, for instance, investment banks perform credit risk assessments, it is not their only central focus. Consequently, they may not possess as

comprehensive an understanding of credit analysis processes as a company whose core business is centered around credit risk assessment. (3) The company must consider ESG factors in its credit analysis process, as the current thesis aims to investigate the methods of their incorporation. Based on the above criteria's, CRAs were deemed the most appropriate type of case organization. Moreover, regarding the interviewees, the sampling was purposive at first, considering all employees who possessed 'adequate' knowledge about the incorporation of ESG factors into the credit rating process as relevant participants. Hence, the selection was not necessarily limited to credit analysts, but allowed for a diverse group of participants working across various departments and hierarchical levels within the organizations. Once an initial contact within each organization had been established, snowball sampling was used as the initial contact referred to additional interviewees.

The first contact was made via the professional online network LinkedIn, before migrating to email where an overview of the thesis' objective was sent to the organizations, and an approval of their participation was obtained. Of the five company representatives contacted, four of them replied and showed interest in participating. Ultimately, the final selection of the two companies was based on their apparent willingness to share in-depth information on the research topic, aligning with the study's need for detailed and comprehensive data. Further, one of the companies chosen was a CRA based in the Nordics, and the other one based in the US, even though they cover the Nordic region through their office in Stockholm as well. In this thesis, both the interviewees and the two companies will be anonymous. The companies are referred to using the pseudonyms Aries and Orion.

The interviews were conducted using an interview guide (see Appendix 2). The interview guide was constructed prior to the interviews and then updated regularly throughout the study when new findings were made that made us want to expand or change the guide. The interviews started with presenting the aim of the study, guaranteeing anonymity, and securing consent in regard to audio-recording and personal data collection through a signed GDPR form. In addition, a few closed-ended questions regarding the interviewee's title and employer were asked to collect the necessary information needed to categorize the participants. Thereafter, the substantial parts of the interviews continued in a series of open-ended questions related to methods in ESG integration.

Comprehensive and rigorous research on the case companies had been conducted prior to creating the interview guide, including a review of their public reports on methodology, stance on ESG integration, and portfolio companies. This preparatory work provided in-depth knowledge about the institutions, which enabled formulation of well-targeted questions. As a result, this approach facilitated more specific and detailed discussions with the interviewees about the practical aspects of ESG integration. In essence, the interview guide helped in providing a structure to each interview, which facilitated the collection of data in case the conversations would drift towards subjects less relevant to the study.

In total, nine interviews were conducted across the two case companies, with each interview averaging approximately 51 minutes. For additional details regarding the interviews, see Appendix 1. Out of the nine interviews, four of them were conducted unrecorded as per the interviewees request. As noted by Adeoye-Olatunde & Olenik (2021), this could have potentially caused two problems. First, not being able to record could negatively impact the interviewer's ability to effectively capture data for analysis. Second, it may hinder the interviewer from being present during the conversation due to being occupied with taking notes, affecting the natural flow of the conversation as well as the ability to ask follow-up questions. To combat this problem to the best of the interviewers' abilities, they alternated between asking questions and taking notes; one would ask a question while the other took notes, and then they would switch roles for the next question. In doing so, one stayed actively engaged in the conversation, while the other concentrated on capturing the material. When necessary, extra time was requested for notetaking. However, rather hypothetically, one could speculate if this entailed that the unrecorded interviewees answered the questions more honestly and openly compared to if they would have been recorded. Additionally, the interviewers received supplementary material on the subject from the organization which helped reinforce and verify the information gathered.

Furthermore, four participants asked for sample interview questions in advance, all whose interviews were recorded. While this could lead to them being more prepared for the interview, it also raises the possibility of them preparing scripted answers, which might result in less authentic responses. While this is hard to control for, an attempt was made by not sending the exact same questions as intended to be used in the interview, but instead providing similar sample questions.

Moreover, the participants were given the option of either conducting a physical or digital interview. Since most interviewees were located at an office in Stockholm, most of the interviews were conducted in person. Out of the nine interviews, two of them were conducted digitally. In addition, the interviewees were given the option to speak Swedish or English to ensure that the interviewee felt comfortable and could converse more freely. However, one interviewee requested to speak a mix of Norwegian and Swedish. Although this interview was recorded, it required the interviewers to transcribe it more meticulously to address any potential language barriers.

3.2.2 Secondary Data

The secondary source of information used in this thesis consists of the supplementary material received after the interviews along with publicly available reports. This secondary data included information on internal rating methodologies, ESG policies, and clarifying examples from the two case organizations. The secondary data have primarily been used as a complement to the information gathered in the interviews. More specifically, this data has been used to get a deeper understanding of the methodologies used within the two case companies, as well as their general approach to ESG integration in the credit analysis. To uphold ethical standards related to intellectual property, permission was obtained from both companies before utilizing their information. Furthermore, to maintain the confidentiality of both companies, neither internal nor external sources will be disclosed in the references.

3.3 Data Analysis

Data analysis was an ongoing process conducted throughout the research period and between interviewing at the two companies. All recorded interviews were transcribed and the notes from the unrecorded ones were summarized. The transcription phase involved the researchers transcribing separate portions of the recorded material. Thereafter, the researchers reviewed the accuracy of each other's transcripts by listening to and reading their respective parts to carefully identify and correct potential inaccuracies. In addition, all non-English interviews were translated into English. The transcription phase and subsequent review constituted an initial step of the data analysis as it was essential for familiarizing oneself with the data and to start to identify themes to be explored in the formal analysis.

In the formal analysis, a thematic approach was used. As suggested by Nowell et al. (2017), a thematic approach, which entails identifying themes in the data, is valuable when analyzing qualitative data. More specifically, a system of color coding was utilized. This system was first used to structure and categorize the findings and highlight similarities and differences between the interviewee's responses. Thereafter, an abductive approach, which involved iteratively checking the findings against various theoretical frameworks, helped clarify what theory would be appropriate to use considering the empirical findings. Following our efforts to apply multiple theories on our findings, it was decided that Knorr Cetina's concept of epistemic cultures was the most suitable. This framework helped interpret the empirical data by providing an analytical depth not visible in other theories. With this theory in mind, we subsequently used the color-coding system to highlight different themes in the transcribed material. More specifically, the interviewees' responses were color-coded based on how they aligned with, and provided examples of epistemic cultures, problems, and strategies. This approach made it possible to sort the findings according to our theoretical framework, which facilitated a structured analysis.

3.4 Limitations

This study relies on a sample which implies that other credit rating agencies and analysts may have different approaches to integrating ESG factors. Consequently, the findings of this thesis may exhibit bias towards the two companies examined and may not be generalizable to credit analysts at all CRAs. An alternative approach, such as a multiple case study with more than two organizations, could have been used to allow for broader generalizations. However, this approach could have limited the ability to gather sufficient data from each organization due to time constraints, inhibiting deeper exploration. Furthermore, it is crucial to emphasize the potential presence of response biases in the data, since interviewees might have motives to provide inaccurate or misleading responses, such as presenting themselves or the company in a different light. However, given that both the interviewees and the companies involved in this study remain anonymous, the incentives for such manipulation are decreased and the risks mitigated. Expanding on the topic of subjectivity, it is worth noting that the researchers' preconceptions can potentially impact the interpretation and analysis of the data, which may induce bias into the conclusions. Nevertheless, this potential bias is mitigated by having each researcher independently interpret and

validate the data during the analysis phase, and by grounding the analysis in a theoretical framework.

4. Empirical Analysis

In the following section, the empirical insights are presented simultaneously as they are being analyzed through the theoretical framework presented above.

4.1 A Technology of Representation in Action

All participants from both Aries and Orion stressed the importance of actively integrating ESG factors in the credit rating process. The primary reason for this being that these factors constitute risks or opportunities that could potentially impact a company's debt repayment capacity. In other words, there is a causality between ESG factors and creditworthiness. After all, the objective of a credit rating is to capture an organization's creditworthiness, which could be influenced by ESG factors.

Asset managers and asset owners are in the business of managing and directing funds, whereas our role is to provide rigorous, independent and insightful commentary on the credit risks surrounding an entity with respect to its ability to repay debt. – Secondary data, Aries

However, according to one of the credit analysts at Orion, apart from accounting for the risks and opportunities that ESG integration bring, there is also pressure from the company's shareholders to consider ESG in the credit rating process – “[...] we are pressured by the owners to integrate ESG in our work. While they are not involved in the methodology itself, they still want us to reflect ESG risks in our ratings.”. This deliberate choice to integrate, helps constitute the foundation for a top down approach of ESG integration, which shows proof of awareness and self-explanation from focusing on improving internal processes. However, as evident from the interviews with the analysts, this approach is not something that is enforced onto the analysts, but rather, there is a permeating consensus through the whole organization regarding the importance of accounting for these factors.

In order to assess the creditworthiness, both Aries and Orion rely mainly on self-reported data from the issuing company when gathering the information relevant to the credit analysis, both in regard to financial and non-financial information, including ESG. Common ESG factors for both CRAs include emission-levels, energy management, customers, governance structure, and reporting quality. In general, the ESG factors accounted for in the analysis all relate to one of either financial risk, operating environment, or competitive position. Further, the lead ESG analyst at Orion emphasizes that this implies that they do not perform any in-house auditing, nor investigative journalism to verify the data received.

In addition, employees at both organizations testify that a continuous dialogue is held with the issuers management throughout the process to ensure that sufficient data is gathered. Such data includes both the issuer's organizational policy, risk management, and nominal ESG figures, but primarily also their ESG related goals. These goals foremostly consist of key performance indicators (KPI's). The progress of the KPI's is then monitored over time, and their performance is later reviewed and incorporated into the rating. For example, if one issuer had a goal of increasing the share of electric vehicles in their machine fleet, but the development is going in the opposite direction, this can impact the rating. The combination of these aspects is used because it shows the issuer's ambition and willingness to incorporate new and sustainable technologies, which can signal whether they take ESG risks, such as global warming, seriously or not. In turn, this can affect the possibility to obtain funding from financiers, which is a strong sign of the likelihood for creditors to get both return *of*, and return *on* investment, meaning receiving both the lend amount back, plus interest.

We believe that if you do not adapt your business according to the ESG risks and show that you take them seriously, then you will most likely deter financiers because you are not keeping up with the standards that are expected of you. – Credit Analyst C, Orion

However, different ESG factors will be material to different issuers depending on the industry they operate in. For example, since Orion's client portfolio includes forestry and fish farming companies, there will be ESG factors specifically tailored to these industries, such as for example

biological factors which are of great importance. One of the senior credit analysts concretizes this through the example of a forest company that discovered a threatened bird species living in their forest, just as they were about to log the wood. Subsequently, they would be heavily fined by the government if they proceeded despite knowing this.

The value of this forest lot practically went down to zero because of this bird,
and obviously this affects the company's profitability and repayment capacity.

– Credit Analyst D, Orion

Similarly, this industry is also faced with the risk of pest damage, specifically the eight-toothed spruce bark beetle. Further, the same type of risks are also present in salmon production, through the threat of the pesticide salmon lice, which risks making the salmon inedible, possibly rendering the production worthless. These types of biological risks can affect both the issuer's market position and cause volatility in production cycles.

Through the lens of Knorr Cetina's (1991, 1999) concept of epistemic cultures, the empirics above make it clear that neither of Aries nor Orion directly intervene with the work performed by the issuers, nor studies them in a controlled environment, but rather the opposite – in the real world. Instead, both companies rely on the interpretation of signs such as KPI development and other organizational characteristics in order to produce and understand knowledge about how ESG factors affect the creditworthiness of the issuer. As such, it is safe to conclude that the work performed by the CRAs corresponds closely with the epistemic culture of a technology of representation, simply because it involves the processing of signs rather than direct interaction with the actual objects or events of interest. Furthermore, as noted by Cetina, relying on signs is often characterized by "loss of the empirical," where the direct empirical connection to the phenomena is interrupted. How this disruption affects the work of CRAs is elaborated on in the following section.

4.2 Challenges with Integrating ESG

The "loss of the empirical" that arises in the processing of signs can be seen through the difficulty of establishing a connection between how the ESG factors affect the issuer's creditworthiness.

According to one of the Senior Credit Analysts, this is due to the time-discrepancy between the validity of the credit rating and the materiality-horizon of the ESG factors. While the credit rating is intended to reflect the upcoming short- to medium-term, the identifiable ESG risks may not materialize in that period. Thus, for credit analysts, it is difficult to predict how these factors could affect the creditworthiness in that time horizon.

A consensus among all interviewees suggests that another prominent reason contributing to the disrupted connection is the absence of standardized ESG reporting and associated definitions. Even if much of the necessary data is often included in the reports, *what* and *how* it is presented differs widely. In turn, it becomes difficult for analysts to track the same issuers' progress on KPI's over time (a progress that is reflected in the rating), since the presentations often change between periods. Elaborating on this, multiple analysts also explain that the lack of standards negatively affects the comparability between issuers, which makes it hard to assess the issuers position in relation to its industry peers. Such benchmarking is considered a valuable technique in assessing how ESG risks are handled. As such, the analysts stress the importance of data-quality to accurately integrate ESG factors into the credit rating. This frustration is captured in the following quote.

Firms tend to publish reports containing different info, and even if the same metrics are included in the publications, they are often presented in different ways. We often feel overwhelmed by the multiple different ways in which the data is presented. – Credit Director, Aries

In depth, multiple of the interviewees from both Aries and Orion testifies how the relevant information is often diluted into multiple pages of buzzwords where the essence is hidden in between complicated formulations. They also state that they would like to see increased rules on the standards of ESG reporting. Elaborating on reasons for this incompleteness, the Criteria Officer mentions two possible reasons. Either the extensiveness is based on a “desire to show every single action taken [by the issuer] relating to ESG”, or it can be because they do not actually take any action of relevance, but portray the picture that they do by rambling on over several pages about ESG in general.

However, the problem of comparability does not only link to the lack of measurability and reporting standards, but also the fact that different companies have different products and services and thus belong to different value chains. Senior Credit Analyst B exemplifies this by elucidating that despite both belonging to the fish-farming industry, one company might supply the submersible cages, while the other supplies the fish food. Thus, how would one compare these two, despite them ostensibly belonging to the same industry? He emphasizes that this is a problem inherent to the discussion about measuring emissions of both scope 3, but also 1 and 2, and that this type of situation limits the possibility to compare ESG factors between companies. Moreover, apart from hindering comparisons and tracking development, large variations in the data also impedes infallible connections to be established between emissions and their effects on creditworthiness.

This makes the connection between it [emissions of all scopes] and the issuers operations very abstract, which further makes the integration almost impossible.

– Credit Analyst C, Orion

From the empirical findings, it can be seen that Aries' and Orion's ability to conduct research and find answers is aggravated for various reasons, thus resembling an epistemic problem, as per Knorr Cetina's theory. Both the time-discrepancy, the lack of standardization, and the different value chains make it difficult for the credit analysts to predict how various ESG factors (the signs) could affect the issuer's creditworthiness (the phenomena). Evidently, in this case, these factors aggregately lead to a lack of direct connection, which significantly exacerbates the integration. Further, this absence of connection makes analysts at both Aries and Orion agree that a company being sustainable or unsustainable is not in itself synonymous with a better or worse rating. This is simply because being unsustainable does not clearly link to a reduced ability to serve one's debt, and vice versa. Further, this implies that an analyst's subjective conception of a company being sustainable or not, does not affect the rating. The quote below pertains to a discussion about corporations in the oil industry.

As long as we do not think it is likely that they will experience higher costs due

to increased regulations, fines, or such, there is no reason for us to change the rating. We are no morality police, we do not let personal opinions on how a certain industry *should* develop affect the rating decision. – Senior Credit Analyst B, Orion

For all the reasons outlined above, which in total constitute a lack of direct connection, the practice of assigning a credit rating that considers ESG factors is no straightforward task. Issues such as differences in what factors are material, lack of reporting-standards, and time-discrepancy all constitute the fundamentals to why a type of ‘data-incompleteness’ persists, despite a desire by practitioners to simplify the financialization of ESG risks. Thus, since it has been observed that both Aries and Orion stress the importance of considering ESG factors into their credit rating analyses, this leads to the question of what methods they employ to make the integration possible?

4.3 Epistemic Strategies in Action

4.3.1 Displaying Negative Knowledge Through a Holistic Approach

The methodologies used by both Aries and Orion to integrate ESG factors in the credit rating process display similarities and differences alike. They are similar in that they take a comprehensive, holistic approach to the integration phase. This entails setting ESG factors in a broader, higher-level context, and considering the unique aspects of each issuer. Through this approach, both companies recognize that ESG factors are complex and require individual evaluation, instead of applying a universal approach, such as a one-size-fits-all formula. One example of how ESG factors are considered in a broader context can be seen in that rather than Aries and Orion assigning a lower rating to a ‘brown’ issuer or a higher rating to a ‘green’ issuer, the rating impact would be realized through looking at what these characteristics imply. For example, this could be through factors such as alterations in the firm’s competitive position, in turn affecting sales. An altered competitiveness could increase capital expenditures through investments in new technology, thus affecting the firm’s financial position. Further, anticipated future rules and regulations could strike hard against environmentally unfriendly organizations in terms of potential fines or mandatory implementation of practices to mitigate the environmental impact. In addition, placing ESG factors in a broader context entail comparing and adjusting them to the issuer’s industry. This entails that a company within an unsustainable industry can be

considered green if its ESG performance is better than its peers. Evidently, this indirect way of incorporating the organizational characteristics of being either ‘brown’ or ‘green’ is relatively complex. The additional analytical depth in the utilization of such a holistic approach therefore comes with increased requirements on the competence-level of the analysts responsible for the integration. This could potentially be one reason for the requirement of a minimum educational level equivalent to a master’s degree, even though relevant work experience from finance-related roles is also desired.

Despite being fundamentally similar in their holistic approaches, their approaches slightly diverge in where ESG factors are considered in the credit rating process. Orion integrates seven to eight ‘impact indicators’, or ESG factors, as an integral part throughout the various steps of the rating process. When determining an issuer's rating, they evaluate the business risk and the financial risk separately. These contain further sub-categories, all of which can potentially be affected by ESG risks and thus impact the overall rating. Examples of such sub-categories include operating environment, competitive position, and financial assessment. In the end, after arriving at a ‘stand-alone’ credit rating, if deemed necessary, they *can* assign a ‘notch’ to the rating, meaning that they adjust the rating down. Why the notch can only result in a downgrade is because Orion deem that the risks of being unsustainable are greater than the opportunities arising from being sustainable. The use of the notch depends on if their overall conception of the issuers ESG risks is not commensurate with what is communicated through the stand-alone rating, or in other words if the effect of the ESG factors is not considered to impact the rating enough. One example of the utilization of notching involved the rating of a weapons manufacturing company that had several governance-related issues, entailing limited possibilities to secure financing from investors. This identified risk did not fit the methodology, and as such, notching was the appropriate solution. However, the analysts emphasize that the regular approach is the desired solution, due to the risk of a single analysts’ subjectivity having an influence on the rating when notching.

Ideally, such an adjustment should not have to be used very often. Instead, ESG factors should be accounted for elsewhere within the methodology. The notch is reserved for particular factors that are not easily be integrated [...].

– Lead ESG Analyst, Orion

In contrast, Aries views the ESG analysis as separate from the credit rating process. First an initial rating is determined without considering ESG factors, then a ‘relevance score’ is calculated separately. This score consists of evaluations of how relevant and material various ESG risks are to the unique issuers rating, coupled with the issuers performance on all of the 14 different factors. Examples of such factors include energy management, employee wellbeing, and governance structure. Each ESG factor is then asserted a relevance score of one to five, where a higher score signals higher potential impact on the rating. Subsequently, an average is calculated to yield an aggregate relevance score, which then impacts the credit rating to greater or lesser extent. The relevance score is also published in companion with the credit rating, allowing to influence the individual investors decision-making further.

In summary Orion integrates ESG factors throughout by considering potential impacts of ESG within the different corporate evaluation stages, as well as applying a potential notch. Aries, on the other hand, calculates a ‘relevance score’ where ESG factors are considered in isolation from the rest of the corporate evaluation before the result of the score impacts the aggregate rating where its effect is played out.

The key take-away is that, despite these differences, both of these approaches recognize the problem pertaining to the lack of direct connection between ESG factors and creditworthiness, and that it is difficult to financialize these metrics, and thus hard to perform the integration. Instead of making an attempt at ‘brute financializing’ ESG factors into their rating models, both CRAs have exhibited an understanding for the complexities and negative consequences in doing so. They recognize that ESG information must be considered within a broader context where it can be contrasted with additional factors such as the individual characteristics and industry classification of each issuer. As such, they realize the limitations with integrating ESG factors into the credit rating process, and instead of ignoring them, they have developed a holistic approach that essentially attempts to address these obstacles in order to make it easier to integrate ESG factors. Thus, just as how the equity managers in Arjaliés and Bansal’s (2018) study effectively demonstrate negative knowledge by addressing their shortcomings with the integration by asserting emojis to the ESG factors, both Aries and Orion alike utilizes the same epistemic strategy

to bridge the gaps in their field. However, the question if the CRAs succeed in performing a complete and true integration of ESG factors still persists, which is explored further in the following section through analyzing the CRAs use of incomplete data. Thus, they realize the limitations with integrating ESG factors into the credit rating process, and instead of ignoring them, they have developed a holistic approach that essentially attempts to address these obstacles in order to make it easier to integrate ESG factors. Thus, just as how the equity managers in Arjaliés and Bansal's (2018) study effectively demonstrate negative knowledge by addressing their shortcomings with the integration by asserting emojis to the ESG factors, both Aries and Orion alike utilizes the same epistemic strategy to bridge the gaps in their field. However, the question if the CRAs succeed in performing a complete and true integration of ESG factors still persists, which is explored further in the following section through analyzing the CRAs use of incomplete data.

4.3.2 Elevating Data Applicability through Frames of Reference

In order to combat the lack of direct connection, and more specifically the problem of 'incomplete' data, both Aries and Orion utilize a series of procedures. First, to get as representable data as possible and to validate the issuers self-reported data, they use multiple sources of information, such as third-party data providers. Analysts at both firms mention that the third-party data providers often present their data in a standardized format and they often use this data to verify other data. Second, they complement this data with their own proxies and estimates for occasions when measurability is a problem, as often is the case with emissions. Third, the data is compared to peers, which fills a dual function. Primarily, benchmarking against peers helps evaluate whether the emissions are considered reasonable for the industry. Large emissions could indicate a credit risk since it can affect for example their competitive position, in turn affecting sales and future capital expenditures, whose cash flow implications can result in a rating alteration. In addition, it also helps the analysts critically evaluate the data by highlighting potential abnormalities. In conclusion, these methods help verify, expand, and bridge the knowledge about these factors, facilitating a connection to creditworthiness to be established. The importance of peers-comparisons are exemplified by an analyst at Aries through a hypothetical scenario where one issuer would send their emission-levels to the CRA, only for the analysts to find that these are completely out-of-line compared to an industry peer. This could in turn lead to a conversation with

the issuers management where the cause may be found in different methods for measuring emissions.

No matter if it is pure CapEx needed to renew your production, or if it is because you are losing customers to competitors, high emissions relative to peers can put you in a bad position. – Senior Credit Analyst B, Orion

As such, this triangulation approach can help generate reliable knowledge out of ‘incomplete’ data, and thus mitigate the assignment of incorrect credit ratings. This is done in a similar fashion to how a pharmaceutical company, despite exposure to ‘incomplete’ sales data, was able to measure the performance of their ‘drug reps’ by triangulating different performance measurement systems in Dambrin’s and Robson’s (2011) study.

The empirics reveal that, since Aries and Orion do not have all the data, nor the desired quality of it that they would like, both CRAs strategize by using *frames of reference* in an attempt to enhance its useability. This is because of the rating institutes’ awareness that ESG factors may play a distinct role in altering a corporate’s creditworthiness. By using several sources of information, such as third-party data, they are able to expand on, verify, and build additional knowledge about the ESG factors. While the second-order nature and the time-discrepancy between credit ratings and ESG factors still persists, frames of reference helps combat both missing and lacking data, making it easier for analysts to see a connection between the signs and creditworthiness. As a result, the integration of ESG factors into credit analysis becomes more straightforward. Elaborating on this, most industries wrestle with the problem of measuring emissions-data. Thus, when tracking an issuer’s emissions-related KPIs, it is often the case that not all the desired emissions-data is available. This could for instance be because the issuer does not measure emission data for all of their operations. As such, there is a demand for a substitute or complement to the missing data. On these occasions, the CRAs utilizes proxies and estimates, which are calculated using the obtainable data as a base and reference. The use of these proxies and estimates thus help credit analysts to fill in the gaps of the missing data, providing a more complete picture of the issuers ESG factors, in turn facilitating the establishment of how the ESG risks could affect the creditworthiness. This use of the strategy is thus commensurate with Knorr Cetina’s (1999)

description of *complementary* frames of reference, since one dataset was used to fill in the gaps of another. On a further note, the empirics also suggest that the CRAs utilize frames of reference in a *confrontational* context. This is evident in the hypothetical scenario depicted in the empirics, where Aries confronted suspicious looking emission-data by contrasting it with data from industry peers.

A further note, neither of the CRAs have methodologies in place to overcome *all* challenges. For example, a credit analyst at Orion admits that due to the hardships with measuring issuers Scope 3 emissions, they have to leave this factor out of the rating methodology, even though it could affect the repayment capacity of the issuer through a weakened competitive position.

Due to lack of measurability and quantifiability regarding scope 3, the way in which this is handled is through not including it as part of the ESG factors that can influence the rating. – Credit Analyst C, Orion

Despite a clear willingness to reflect Scope 3 emission-levels in the credit rating, the data is simply too ‘incomplete’ and subject to individual interpretations to be given impact on the rating. One might experience this as more of a primitive work-around rather than an epistemic strategy, but it can be stated that they display negative knowledge to arrive at this insight, because the CRAs exhibit that they have recognized a limitation of their methodologies, namely that some ESG factors cannot be incorporated.

4.3.3 Depicting Self-Understanding for Further Improvements

Furthermore, Credit Analyst D describes how there are ongoing processes in place aimed at improving the internal practices and methods. This is showcased through, for example, monthly meetings with the company’s lead ESG analyst to discuss recent developments in the field, such as new regulations and educative cases. The goal is to stay informed of, and up to date with current events in the field, as these could influence their work and the methodologies they use. Furthermore, Credit Analyst C emphasizes that all of the analysts at Orion have undergone an education to become certified ESG analysts according to the European Securities and Markets Authority (ESMA). These efforts serve as evidence of the CRAs internal focus on refining the

ways in how they process and interpret information, similar to Knorr Cetina's (1999) epistemic strategy of self-explanation. These efforts more closely resemble the sub-process of self-understanding, since both the monthly meetings and the ESG training aim at developing their knowledge about the practices and routines used within their work. As implied by Knorr Cetina's description, increasing one's knowledge of the field can facilitate the identification of cause-effect linkages between ESG risk factors and creditworthiness, facilitating the integration of these factors.

In summary, the empirical analysis shows that Aries and Orion actively try to integrate ESG factors in their credit rating processes as these factors are deemed to constitute risks and opportunities that affect the issuer's creditworthiness. In order to integrate these factors, both CRAs rely on ESG data, or 'signs' from various sources that represent the issuers activities. However, this data is often incomplete and lacks standardization, which makes it difficult for the CRAs to directly connect them to the credit rating. To work around this problem, both Aries and Orion use three epistemic strategies, namely negative knowledge, frames of reference, and self-explanation, which is evident through their methodologies, calculative practices, and improvement work.

5. Discussion

5.1 Contributions

While previous literature has centered around the challenges exacerbating the integration of ESG factors into financial analysis, fewer attempts have been made at exploring potential solutions. However, justifyingly, a fundamental conception of the challenges is required to be able to formulate viable solutions. These challenges principally encompass issues collectively referred to as 'incomplete' data. While previous literature has focused predominantly on equity and somewhat overlooked credit, the following section outlines the contributions of the present study to the field of practical ESG integration, as well as the theoretical framework.

Building on the concept of epistemic cultures (Knorr Cetina, 1999; Du Rietz, 2023), this thesis has identified three distinct epistemic strategies employed by credit analysts to enable the incorporation of incomplete ESG data into credit analysis. In regard to negative knowledge, the

implicit use of this strategy is evident in previous literature, for example visible in Arjaliés and Bansal's (2018) study of how equity managers understand the limitations of financializing ESG data, and thus visualizes ESG data through emojis to enable integration. By emphasizing the applicability of negative knowledge in credit analysis as well, this study illustrates that such strategy is applicable in other settings than equity alone. In doing so, the study expands on the existing knowledge in previous research, demonstrating a broader use of this strategy within ESG integration. However, in contrast to negative knowledge, strategies that draw upon frames of reference and self-explanation are not clearly articulated in previous literature. By demonstrating the practical effectiveness of these two strategies when integrating incomplete ESG data in credit ratings, the study contributes to previous literature by providing knowledge about additional strategies feasible for integrating incomplete ESG information. These strategies can be considered particularly valuable to equity analysts as they face similar problems to credit analysts, in that ESG factors are difficult to account for in financial analysis.

Evidently, rather than assisting with a concrete step-by-step guide, the present thesis contributes to previous literature by providing “ways of thinking” that can be utilized to identify practical solutions for how to handle the problem of integrating incomplete ESG data, across various organizations. Of course, the practical integration will look different from case to case, but the fundamental understanding of these epistemic strategies can act as a guide for organizations looking to develop their ESG integration practices, or scholars looking to understand the phenomenon. As epistemic strategies resemble ways of thinking, rather than tangible actions, has the theoretical framework identified methods and thereby answered the research question? As per the definition, a ‘method’ is a procedure for accomplishing or approaching something. In the present study, it can be concluded that, through epistemic strategies, credit analysts have accomplished an alternative way of integrating ESG factors.

5.2 Broader Implications

First, while the strategies used by the CRAs allow for sufficient integration to be made, such that they can provide their product while maintaining credibility among customers, one could raise questions regarding if ESG factors are truly integrated? Evidently, the fundamental lack of direct connection is caused by multiple factors, such as incomplete data and time-discrepancy, which

will inevitably continue, due to the impossibility to predict what ESG factors will materialize in the future. As such, it is plausible that the CRAs have not fundamentally solved the lack of direct connection, but rather have found ways in which they manage to make use of the available data anyway. Looking forward, while some degree of disconnection most likely will persist, decreasing it likely requires an efficient interplay between multiple actors, not at least those providing the data. As such, it can be concluded that it is of highest importance to get rigorous reporting standards in place, since these most probably play a role in increasing the linkage between ESG factors and creditworthiness. However, on the other hand, while the CRAs desire greater standards of ESG data, with that comes the risk of narrowing the picture of what the ESG factors are intended to portray. In combination with increasing adoption rate of ESG reporting, this ‘mainstreaming’ and less colorful display of ESG factors may inevitably undermine the whole ESG integration, since they no longer portray what they once were intended to?

Second, it has been established that no matter how sustainable or unsustainable the CRA employees consider a certain issuer to be, their opinions do not impact the rating. As per the product of a credit rating, such characteristics *can* instead be reflected indirectly, through for example forecasting increased capital expenditures, or decreasing sales figures following the issuers potentially altered market position. However, it is not certain that reflecting ‘unsustainability’ in such a way is always possible, for example because not all clients will avoid products or services just because they are produced unsustainably. Further, it is evident that an issuer can be considered ‘green’ despite operating in an unsustainable industry, such as the oil industry. The combination of these two factors allows for a paradoxical phenomenon to exist, especially considering today's urgency of climate action. The phenomenon is that the cheapest capital can be allocated to unsustainable companies, as a result of their ability to obtain a high credit rating. This directly contradicts what is required to happen considering the sense of urgency stated by Rockström et. al (2009) and many other climate experts.

The logical counter argument to this discussion is that the *purpose* and *responsibility* of a credit rating is not to direct capital to the most sustainable borrowers, but rather reflect creditworthiness. While true, this begs the rather speculative question whose responsibility it actually is to ensure the promotion of sustainable companies? Is it the individual, yield-seeking investor? Or the

regulatory bodies? While there is no consensus around a single answer to such questions, it is most likely a shared responsibility between multiple stakeholders. Thus, one could argue that there is a gap in the market for a rating-product that combines the aim of traditional credit ratings, with that of ESG scores, so as to ensure that the cheapest capital is allocated to the most sustainable borrowers, which would incentivize the development of low-environmental-impact products. The establishment of such a rating-product on the financial markets is also proposed by both Roy (2023) and Agosto et.al., (2023). On the one hand, to accurately produce a reliable outcome, this type of product would rely heavily on ‘complete’ ESG data. On the other hand, following the empirical positive correlation between ESG performance and financial performance, as outlined by previous studies, producing such data would likely lie in the interest of the sustainable issuers because of the implied reduction in funding cost, which could further help the emergence of increased standardization in ESG reporting.

6. Conclusion

6.1 Summary

Following a growing emphasis on mitigating the impacts of global warming, financial analysts are actively striving to incorporate ESG in their financial decision making-processes. This study offers insights into the efforts made by two credit rating agencies, Aries and Orion, to make such an integration possible in a context of incomplete and unstandardized data. Drawing upon nine interviews with representatives from both rating agencies, and Knorr Cetina’s (1981, 1991, 1999) concept of epistemic cultures, this study demonstrates how Aries and Orion struggle with establishing a direct connection between ESG factors and credit ratings. However, the study showcases how both companies employ epistemic strategies in an attempt to address this issue and to integrate these factors. The epistemic strategies include the concepts of negative knowledge, frames of reference, and self-explanation, and they are prominent in the companies’ methodologies, calculative practices, and improvement efforts. Moreover, the findings provide a contribution to the existing literature on practical ESG integration through outlining a comprehensive overview of how the utilization of epistemic strategies can facilitate the ESG integration via new ways of thinking. The study also discusses potential requirements for establishing true integration of ESG factors, but also potential fallacies with doing so, as well as

the implications of the empirical findings on a more fundamental level. This further leads to questions regarding whose responsibility it is to ensure efficient capital allocation to sustainable borrowers.

6.2 Future Research

While still drawing on epistemic cultures, utilizing the culture of *technology of intervention and treatment* to study the work of private equity firms and how they work with integrating ESG into their portfolio companies is viable for further studies. This theory could potentially yield intriguing insights through the hands-on nature of this branch of the framework. Further, even though not particularly unique, due to the inherent limitations of this study with regards to the sample size of both the number of case study organizations and interviewees, a replication study on a larger sample would be of great interest, at least to the authors of this study. Such an investigation could uncover both similarities and differences across CRAs and sectors. This could then either amend or reinforce the findings of the present paper, helping to extend the research on ESG integration into credit analysis and decision-making. Along similar lines is the possibility of studying the same phenomenon in different geographies, since the present study is focused solely on the Nordic market, as well as expand the study to additional sectors, such as financial institutions or real estate. It is worth highlighting that while these suggestions are quite generic, it would fill an important function to continue the research on the integration of ESG into credit analysis, due to the inherent capacity of capital allocation to materially affect if the capital is used to contribute to mitigating climate change or not. Lastly, conducting a longitudinal case study on a credit rating agency over an extended period of time could reveal how their strategies develop over time and how they ensure the integration of additional ESG factors.

7. References

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8. Appendices

8.1 Appendix 1: List of Interviews

Interviewee	Role	Organization	Duration	Date
Interviewee 1	Credit Analyst A	Aries	58 minutes	2023-10-17
Interviewee 2	Credit Director	Aries	56 minutes	2023-10-17
Interviewee 3	Criteria Officer	Aries	1 hour 14 minutes	2023-10-17
Interviewee 4	Credit Analyst B	Aries	59 minutes	2023-10-17
Interviewee 5	Lead ESG Analyst	Orion	56 minutes	2023-10-23
Interviewee 6*	Credit Analyst C	Orion	41 minutes	2023-10-23
Interviewee 7*	Credit Analyst D	Orion	41 minutes	2023-10-23
Interviewee 8	Senior Credit Analyst A	Orion	38 minutes	2023-10-23
Interviewee 9	Senior Credit Analyst B	Orion	32 minutes	2023-10-23

* The interviewees were interviewed simultaneously at the same meeting

8.2 Appendix 2: The Interview Guide

When required, this interview guide has been translated from English to Swedish

Formalities

- Present aim of study
- Recording the interview
- GDPR form
- Anonymity

Introductory Questions

- What is your role at [Company Name], and what do you do in your daily work?
- For how long have you worked for the company?
- What sectors do you work with?

ESG and Credit Rating Questions

- According to [Company Name], what are the main reasons ESG factors are integrated into the credit rating processes?
- What are the main challenges you see in regards to ESG and credit ratings?
- Do you experience any pressure from stakeholders to incorporate ESG factors in your credit rating process?
 - **If yes:** What stakeholders and why do you think that is?

- What type of ESG data is used in the rating process?
- Are there any ESG factors that are more interesting than others?
- From where do you source ESG information?
 - **If not covered in answer:** Is data collected from the issuers own publications, a third party, or similar?
 - **If so:** How can you ensure the comparability and reliability of the data?
 - **If not:** Why?
- Are there any external guidelines or rules you need to follow when incorporating ESG factors into credit ratings?
- How has the development of standardized disclosures and guidelines on ESG reporting impacted how you incorporate ESG into credit ratings (e.g. EU Taxonomy)?
 - Would you like to see a broader standardization in ESG reporting? Why?
- How do you prepare for upcoming disclosure regulations? How do you think these will impact how you incorporate ESG into credit ratings?
- Could there be a point for credit ratings to not only capture creditworthiness, but also incorporate ESG metrics, or are they better off as two separate ratings?
 - What possibilities and risks do you see with this?

Concluding Questions

- Are there any additional issues or aspects you want to mention that we have not yet discussed?
- Can we contact you if further questions arise?