

# Information Flow Perspective for Capturing the Impact of Corporate Environmental Performance on the Cost of Debt

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**Abstract**—Stakeholders’ increased concern for environmental sustainability has resulted in many firms placing greater emphasis on environmental performance management. Creditors are often major corporate stakeholders and as such when evaluating firms’ applications for debt financing examine how the environmental sustainability of an organisation may impact on default risk and thus the cost of debt. This study identifies the elements of the information flows between corporate borrowers and lenders and how environmental performance impacts on the cost of debt financing. It develops a conceptual framework based on stakeholder, agency theory and data flow diagram which traces the flow of environmental and financial information between lenders and corporate borrowers. The proposed framework is designed to identify information that determines the impact of corporate environmental performance on a firm’s cost of debt.

**Keywords**—information flow; corporate environmental performance; cost of debt; stakeholder theory; agency theory; data flow diagram.

## I. INTRODUCTION

Environmental issues are a key part of corporate sustainability considerations and have become a topic of both theoretical and empirical research [1-5].

In a world of stricter environmental standards, organisations are now striving to capture the benefits associated with superior environmental performance. The increased risk of financial penalties for failing to meet minimum environmental standards also carries with it an increased default risk on borrowings, especially if a company is highly leveraged [6, 7, 8, p.xxv, 9].

Debt financing is an important part of the capital structure of most firms. Creditors are a major stakeholder and thus govern firms’ access to debt [7, 10]. While previous research has been undertaken on the relationship between corporate environmental performance and cost of equity, the equity market and the debt market are quite different. Unlike shareholders creditors bear the firm’s downside risk but do not share in the firm’s upside growth [11]. Most research to date has only considered the relationships between organisational functions rather than the flow of information between the functions. The study attempts to fill the gap. It deals with the information flow for determining the impact of a firm’s corporate environmental performance on the

firm’s cost of debt. In order to achieve this, the study aims to identify the elements that govern the information flow. There are five types of information elements[12]. They are input, output, governance, constraint and feedback. To recognise the relationship between the functional areas and corporate environmental performance, the research uses two theories: stakeholder theory and agency theory. Agency theory is based on the relationships between an organisation and its creditors. Stakeholder theory can be used to identify the relationship between the organisation and its stakeholders including suppliers, employees, shareholders, the broader community and creditors who are also stakeholders. Stakeholder perceptions of the firm and their actions can strongly influence the activities of corporate managers and thus corporate environmental performance. This study will contribute to the literature on corporate environmental performance and the cost of debt generally and specifically provide insights into this relationship using information flow mapping.

## II. CORPORATE ENVIRONMENTAL PERFORMANCE

Corporate environmental performance is a complex multidimensional concept that brings with it considerable debate as there is to date no consensus on the definition and measurement of corporate environmental performance [8, 13-17]. Environmental performance has been measured with variety of ways which has resulted in a number of conflicting and inconsistent empirical studies on this area[18]. Inconsistent measurement of corporate environmental performance makes it difficult to undertake temporal comparisons across firms eroding confidence in the value of what has been measured [9, 13, 19]. Although there have been growing efforts to develop standard measures for corporate environmental performance, these are still elusive [9].

According to the International Standards Organization (ISO)’s ISO 14001:2004, the definition of environmental performance is: “*Measurable Results of an organisation’s management of its environmental aspects*”. The environmental aspects are “*elements of an organization’s activities or products or services that can interact with the environment*” [cited by 20].

The ISO 14000 series’ definition is ambiguous due to the consensus-orientated definition process.[21,

p.54] consider the ISO definition as ambiguous because it does not address which parts of the organisation management the impacts come from. Schaltegger & Wagner [21, p.54] consider the time factor and define environmental performance as: “*Environmental performance is the change of a firm’s environmental impact over time.*”. Ilinitich, Anne Y, Soderstrom & Thomas [15] deal with the process dimensions and the outcome dimensions of environmental performance and identifies four sets of components that constitute the corporate environmental performance. These components are (1) internal system measures; (2) external stakeholder relations (Disclosure and political contributions); (3) external impacts; and (4) internal compliance. This paper adapts the description of Ilinitich, Anne Y, Soderstrom & Thomas [15] in order to map the information flows between the various components of the corporate environmental performance in a way that identifies the impact of the environmental performance on the firm’s cost of debt.

### III. INFORMATION FLOW VS. WORK FLOW

Operations management researchers and practitioners look to the process as a series of activities that are linked by only two sets of elements; inputs and output. They examine the process from activities relationships viewpoint and they model the process with no regard to the role of information flow. The emerging discipline of Information Quality (IQ) looks to the process as information-based sequence rather than activity-based sequence [22]. The information flow between various functions of a process will determine the most efficient sequence of the work or functional flow. The principles of data flow diagram (DFD) are used to trace the flow of information between various entities [23]. An entity in DFA represents an external data source such as function, process or department[24]. This definition of entity suits exactly the purpose of our work. Arrows in the DFD show the movement of information from one point to another [23, 24].

The traditional process mapping techniques such as flow charts sequencing the activities or functions by answering the question; “what other activities / functions must be completed before the start of the current activity / function?” The newly developed Information Quality (IQ) theory directs researchers and practitioners to answer a very different question, that is, “what information is needed from other activities / functions before completing the existing one?”[25]. This suggests that the primary problem in an organisation is not the quality of the actual performance of any of its process, such as risk managing the cost of debt, but the quality of information regulating or constraining the implementation of the process [26]. This research refers to information that governs, regulates or constraints an activity or a function as ‘governance information’. Identifying the elements of governance information and their interdependencies is the first step toward improving the IQ of these elements. For the purpose of this paper we will use the term

function as a reference to activity, stakeholder such as creditors, or organisation functional area such as corporate environmental performance or cost of debt.

#### A. Information Flow Elements

Information flow between functions comprises five sets of elements; input, output, guidance, constraint and feedback. Input information about the raw resources required to perform the function while output is information about the characteristics of the results. The guidance is a collection of policies, procedures and rules that governs the implementation of the function. Information from prior functions may influence or constraint the selection of an alternative or adjust the current guidance. This type of information is referred to as a constraint. Feedback for a function is information received from a subsequent function that may require changes in the implementation of the current function.

#### B. Stakeholder Theory

Stakeholder theory argues that the needs and satisfaction of stakeholders such as creditors, governmental bodies, political groups, trade associations, trade unions, communities, associated corporations, current and prospective employees, current and prospective customers, as well as the public at large should be considered[27]. The stakeholder theory attempts to address is “Principle of Who or What really Counts”[28]. The basic proposition of the theory is that stakeholders’ satisfaction has significant effect on the firm’s success [7, 29], and accordingly there should be continual flow of information between the firm and its various stakeholder entities. In addition, conflict can not be managed effectively without identification of types and elements of information flow.

#### C. Agency Theory

Agency theory indicates that the nature of the agency relation is a contract between principal and agent which exists in all firms and cooperative activities[30]. The theory intends to solve conflicts resulting from interactions between principals and agent[31]. Agency conflicts lead to agency cost which consists of agency cost of debt and agency cost of equity[32]. Jensen & Meckling [30] argue that the opportunity costs because of the impact of debt on investment decision, monitoring costs resulting from the incentive effects associated with highly leverage, bonding costs and the bankruptcy and reorganization costs are the components of agency costs of debt. Jensen & Meckling [30] also present that the tax deduction on the interest payments of debt and the incentive of obtaining additional capital for investment opportunities result in the incurrence of agency cost of debt.

Bond holders employ covenants and monitoring devices to protect their claims on firms[32] which is one part of the cost of debt[33]. Webb [32] concludes that superior performance in both environment and diversity issues results in lower agency cost of debt financing. Obviously the quality of information flow between the firms and its various agencies affects has

a significant effect on the resolution of conflicts and then of the firm's success.

#### IV. CONCEPTUAL FRAMEWORK

While the agency theory deals with the relationships between the firms (the principal) and its creditors (as agencies), the stakeholder theory can be used to abstract the stakeholders' perception about the relationship between the firm and its creditors and accordingly, the firm based on the perception can effectively manage the relationship (Figure 1).

Figure 2 illustrates the conceptual framework for the study in which the flow of information between the firm and its creditors (Link 1a&b of Figure 2) are effectively satisfying the stakeholders' perceptions. Understanding the importance of stakeholder satisfaction, information flow from the form's operations should reflect that these operations are aligned in order to achieve the required environmental performance (Link 2 of Figure 2). Creditors, in the other hand, are mainly concerned with information related to the cost of debt (Link 3). The firm, in such circumstance, should balance between the satisfaction of its agencies (creditors) and other stakeholders and attempts to carefully manage the flow of information regarding its environmental performance and its cost of debt (Link 4). The balance between environmental performance and cost of debt creates additional risk that needs to be supervised and the flow of information regarding its risk management should be carefully controlled (Links 5 & 6). Risk management, commitment to stakeholders regarding environmental performance and cost of debts are three factors shape the characteristic of the firm as well as the characteristics of the firm's debt itself (Links 7 to 10). Information flow between the firm characteristics and debt characteristics (Links 11a&b) plays a vital role on determining the success of the firm risk management plan and the elements of information that characterised both the firm and its debt. Information from the debt maturing (Link 13a) and the firm debt size (link 13b) shapes the debt characteristics. Firm characteristics are affected by information flow from several factors including as industry effect, firm size, leverage, undiversified owners, firm's growth and R&D (Links 12a - g).

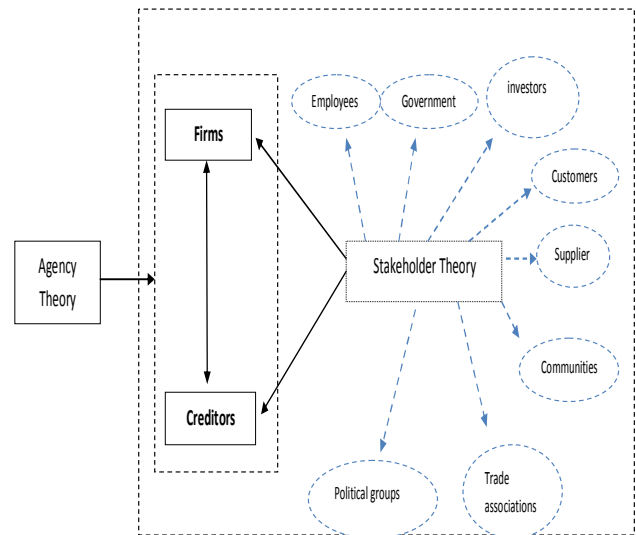


Figure 1. Information flow between entities of stakeholder theory and agency theory

Table 1 shows the type of the element that forms the information flow between various functions of the framework. The flows within the functions mentioned in the framework (Figure 2) do not consider input and output flows. Figure 2 explores the movement of guidance, constraints and feedback between various entities of the framework.

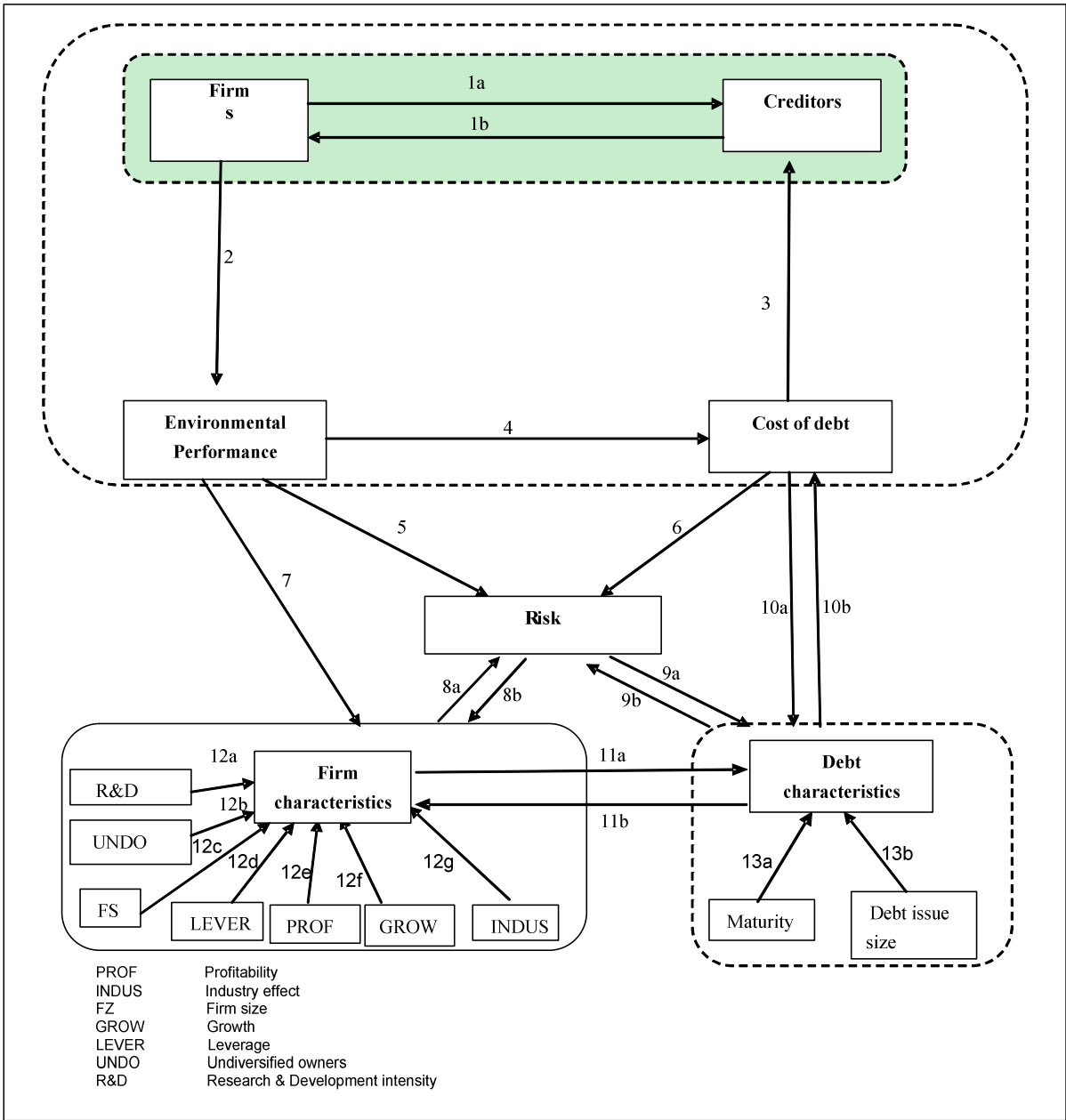


Figure 2. Information flow within the conceptual framework entities / functions

TABLE I. ELEMENTS OF INFORMATION FLOWS BETWEEN VARIOUS FUNCTION OF THE CONCEPTUAL FRAMEWORK

Link	Type of information element
1a	Feedback. This information element provides creditors with information about the status of the firm.
1b	Constraint. The element represents the creditors' requirements that constraint the firm's strategies.
2	Guidance. Based on 1a and 1b, the firm formulates its environmental performance policies.
3	Feedback. This element provides creditors' with feedback about the firm's cost of debt.
4	Constraint & guidance. The firm's environmental affects and governs the firm's policies regarding cost of debt.
5	Constraint. The firm's environmental performance governs the associated risk.
6	Constraint. The firm's cost of debt governs the associated risk.
7	Constraint. The firm's environmental performance affects the firm's characteristics.
8a	Constraint. Firm's characteristics affect the associated risk.
8b	Guidance. The risk resulted from the firm's environmental performance guides the firms to formulate new policies.
9a	Constraint. Firm's debt limits the capacity of the firm in taking risk.
9b	Guidance. The risk issue guides the firm to formulate policies to govern its debt.
10a	Constraint & guidance. The cost of debt constrains the firm and pushes it to adjust its policies.
10b	Constraint, guidance & feedback. Debt constrains the firm and governs its policies. This element forms the main feedback for explanation the cost of debt.
11a	Constraint, guidance & feedback. Firm characteristics affect the firm's debt and guide the firm's policies. This element also provides explanation (feedback) for the reasons of debt.
11b	Constraint. Debt constrains the firm characteristics.
12a - g	Constraints. The factors that govern the firm's characteristics.

## V. IMPORTANCE AND CONTRIBUTION

There is limited research linking corporate environmental performance, cost of debt. This study looks to link from a new facet, that is, from information flow perspective and develop a conceptual framework that maps the information flow between various stakeholder entities and the firm's functional entities. Therefore this study will add empirical evidence to the literature on corporate environmental performance and the cost of debt generally and specifically to information flow. In addition, this study determine the elements of shape the firm characteristics as well as its debt characteristics. From the perspective of practice, it will provide useful insights to environmental management through the way corporate environmental performance impact on the cost of debt.

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