Real Options for IFRS-S1 and S2 2024 Mandatory Disclosures: An Alternative Approach to Capital Budgeting Valuation

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Posted Date: 6 August 2025

doi: 10.20944/preprints202508.0124.v1

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 doi:10.20944/preprints202508.0124.v1

Article

Real Options for IFRS-S1 and S2 2024 Mandatory Disclosures: An Alternative Approach to Capital Budgeting Valuation

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Abstract

The arrival of new accounting standards has transformed companies' financial operations by creating regulatory uncertainty that affects more than just compliance. The constant change in standards makes valuation models inadequate to capture the dynamic risk environment. Companies need models that are agile and flexible in uncertain scenarios and thereby generate shareholder value. This paper introduces a valuation model based on the real options model that complements the existing ones that companies use, but fails to capture the risk created by new regulations accurately. The model incorporates modified variables that can capture the dynamic scenarios with flexibility that the managers need because of the new sustainability regulations. Through a theoretical foundation, the authors demonstrate why the modified real options model is the best tool that helps the internal practices around investment decisions under scenarios of uncertainty. Because of the confidential nature of valuation models used in companies, validating the research is complex. The study is the groundwork for future research that will use the model in real environments of changing financial regulations.

Keywords: project valuation; real options; IFRS S1; IFRS S2; sustainability disclosure; risk management; financial reporting

1. Introduction

Technological advances, constant innovation, and global economic conditions have made the development of industries and companies advance by leaps and bounds. These rapid and unexpected changes have made the business environment unstable, so traditional models cannot quickly adapt to this new reality. (Calle Fernández & Tamayo Bustamante, 2009).

All stakeholders in the economic world are now, more than ever, considering new factors that can affect business operations. Among these factors is climate change and its implications, so investors and firms are looking to adapt to climate change requirements. Accounting and financial reporting standards are not immune to these new market trends and needs and have therefore evolved to adapt and create new standards that impact all companies and markets.

Companies are concerned about compliance with the new financial standards due to legal issues and reputational risk related to accounting standards around climate change. For these two simple reasons, appropriate compliance is essential, adding to certain benefits such as early adoption, which can create higher firm value and better liquidity. (Gao et al., 2019)

Unlike other accounting standards updates, this is the first time investors and company management will use these standards to report and analyze the risks and opportunities that sustainability factors imply (Pearce, 2008) and emphasizes the importance of considering ecological

 doi:10.20944/preprints202508.0124.v1

sustainability in infrastructure planning and the need to identify cost-effective sustainability strategies for capital projects. (Swilling, 2006).

It is well known that project valuation has its complexities when creating financial models to add value to the company. Still, it is even more complex to make informed decisions when market conditions are riskier due to new financial regulations.

This paper proposes a model for capital budgeting valuations in an uncertain and flexible scenario related to postponing the investment, following the principles of IFRS S1 and S2 using the Real Option Valuation (ROV). This uncertainty comes from the new regulations of the financial system and the other factors that create volatility around an investment project.

Various sustainable factors will be presented in the financial statements, and companies will have to be more effective in using economic resources to make investment decisions based on economic and sustainability factors. We also propose a disclosure framework that can be a relevant complement to the S1 and S2 norms.

The research focuses on the investment project valuation process, which is part of capital budgeting. It is relevant to understand that not only will the valuation determine whether to invest in a project, but also whether to continue, postpone, or cancel a project.

The study is innovative because the standards S1 and S2 will be applicable and mandatory for the first time in 2025, and the need for a project valuation model that adapts to this new reporting reality, not only financial but also sustainability, is vital to give certainty to investors.

To address the gap identified, this study seeks to answer the following research questions:

-Does the ROV model involve any payment of an upfront premium like financial option contracts?

-How do we practically use the ROV model to facilitate the integration of risk identification in the IFRS S1 and S2 sustainability disclosures requirements?

-What are the core issues organizations encounter in the ROV model application for the scenario of regulatory uncertainty and sustainability reporting?

2. Materials and Methods

Background and Relevance of the IFRS–S1 and S2

For nearly 40 years, the International Accounting Standards Board (IASB) and its predecessor, the International Accounting Standards Committee (IASC), have been working to develop a set of high-quality, understandable, and enforceable International Financial Reporting Standards (IFRS) to serve equity investors, lenders, creditors, and others in globalized capital markets. When the IASB took over from the IASC in 2001, few countries adopted International Accounting Standards (as IFRS was then called). That all changed--and quite dramatically-- with two events. First, in 2000, the International Organization of Securities Commissions (IOSCO) endorsed IFRS for cross-border securities offerings in the world's capital markets. Then, in 2002, the European Union body decided to require IFRS for all companies listed on a regulated European stock exchange starting in 2005. Those events started a snowball roll where roughly 100 countries require IFRS or a national word-for-word equivalent for all or most listed companies today. (Pacter, 2013)

Over 150 jurisdictions, including the G20, have adopted these standards. (Asumadu, 2018) Due to its near-global adoption and benefits, such as improved quality of financial statements. (Daske & Gebhardt, 2006)

The IFRS Foundation is a public interest organization established to develop high-quality, understandable, enforceable, globally accepted accounting and sustainability disclosure standards. Two standard-setting boards developed these standards, the International Accounting Standards Board (IASB) and the International Sustainability Standards Board (ISSB), which was created in 2021. (IFRS Foundation, 2018)

Sustainability financial disclosures have evolved significantly since the early 1990s (Lamberton, 2005) This standard emerged due to the rising requirements of stakeholders requesting information

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related to environmental performance and corporate social responsibility. (Gutterman, 2023) Several frameworks and standards have been created to disclose more information about non-financial performance measures, including the Task Force on Climate-Related Financial Disclosures and the Sustainability Reporting Guidelines. (Johnston, 2018; Lamberton, 2005) The Global Reporting Initiative (GRI) and Dow Jones Sustainability Index (DJSI) are widely used, but differences in their approaches highlight the need for further standardization. (Christofi et al., 2012)

The need for standardization at an international level is one of the most important issues for the Standards Board (ISSB), which issued its first two global sustainability disclosure standards, IFRS S1 and S2, in June 2023. These standards set out general requirements for the disclosure of sustainability-related financial information for the needs of capital markets and provide climate-related disclosures (KÖSE & ÇETİN, 2024) and establish for the first time a common language for disclosing the effect of climate-related risks and opportunities. (IFRS, 2024)

While IFRS S1 provides a set of disclosure requirements designed to enable companies to communicate with investors about the sustainability-related risks and opportunities (including climate-related disclosures) they face over the short, medium, and long term, the IFRS S2 sets out specific climate-related disclosures. It is designed to be used with IFRS S1. (International Sustainability Standards Board, 2023)

Risks and Financial Standards

Organizations face various issues with the implementation of new accounting and financial standards. The issues include possible effects on major financial performance indicators like Return on Equity and Return on Assets. (Saiful et al., 2023), changes in debt ratios (Firaz et al., 2022) and changes in risk management policies. (Lins et al., 2007)

New standards might require substantial improvements to information systems and internal controls (S. Arnold, 2009), which may increase operational risks. At the implementation level, organizations face challenges in continuing with dual reporting systems. (S. Arnold, 2009) The issuance of such new standards can impact the economic hedging of a firm (Lins et al., 2007) and also impact the extent of asymmetric information prevailing in the market (Panaretou et al., 2013). In addition to the above, organizations might also face issues related to incorrectness, fraud practices, and negative legislative evolution. (Semenova et al., 2021)

It must be clear that Industry-specific analysis is crucial for evaluating sustainability performance and identifying unique risk profiles; this is because there are differences in how companies use natural and other social resources when bringing their goods and services to market and in the manner they impact society and the environment, without leaving aside the risk that a new IFRS entails that can create crash risk (frequency of extreme negative stock returns); so it varies between industrial and financial sectors. (Herz & Rogers, 2016) The experiences and personalities of managers also affect the managers' interpretations of risk, which differ across industries, suggesting the need for differentiated risk measures (Pablo, 1999); therefore, firms are faced not only with a new accounting standard but also with the way they analyze it and perceive the risk of implementing the standard.

The development of new accounting standards involves risk in sustainability because it was precisely this risk and the need for information on sustainable measures that gave rise to the new IFRS S1 and S2.

Sustainability risk management has become a key issue in the modern corporate landscape. It recognizes that environmental, social, and governance (ESG) factors are pivotal in shaping a company's long-term viability. Sustainability risks encompass a broad spectrum of issues, ranging from climate change and resource scarcity to labor practices and supply chain disruptions. These risks can significantly impact a company's financial performance, reputation, and stakeholder relationships. (Bâtcă-Dumitru et al., 2022)

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Many of the most critical business and economic risks are directly linked to environmental and social issues. The risk concerns reputation and, even more importantly, innovation capability and legislative change in inevitably more sustainability-driven markets. (Schulte & Hallstedt, 2018)

Evidence states that high environmental and social risks may reduce corporations' financial stability and raise their default risks, incurring default costs. (Cohen, 2023) Specific financial numbers may not be as relevant for non-public companies. However, companies can experience severe losses from social, ecological, or ethical problems that exist in their supply chains. (Hofmann et al., 2014)

It is impossible to overlook the risks inherent in the issuance of new financial standards, just as it is impossible to disregard the sustainability-related risks that all companies face. These risks compound the typical uncertainties already present in corporate operations. Suppose the level of risk a company is willing to assume is a key determinant of the expected return on any investment project. In that case, the current financial environment underscores the necessity of developing a flexible valuation model. Such a model should enable investment decisions to be made with the highest possible level of information, accommodating variable scenarios characterized by uncertainty.

The context of a financial standard radically alters the valuation model, making conventional models unsuitable to deal with cross-risk interactions. The application of the standards creates not just acceptance but, in some cases, the merging of project valuation techniques with real options. The standards present, alongside the existing regulation risks, risks that directly influence cash flows. For example, in the case of Standard S1, the Sustainability Assessment strongly depends on subjective managerial judgment, resulting in stark differences in cost estimation, revenue projections, and overall risk exposure. This context of dual uncertainty underlines the need for a valuation model that is flexible and responsive to changing conditions.

Real Option Valuation

The history of valuation projects and capital budgeting has evolved significantly over time. The industrial revolution in the late 18th and early 19th centuries created a demand for capital budgeting processes and techniques. (Haka, 2006) Capital budgeting refers to the process where managers make decisions about long-term investments or capital expenditures to determine if they are worth pursuing by their organizations, always thinking about the long-term goals of the entity. When these goals need investment, the finance team needs to plan, analyze, select, and manage capital investments.

Advanced capital budgeting practices involve methods and techniques that consider cash flows, risk, and the time value of money, such as the internal rate of return (IRR) and net present value (NPV) (Verbeeten, 2006). The timing of capital budgeting decisions is also a key factor (Hall, 2000). The capital budgeting process typically includes four stages: identification and development of investment proposals, financial evaluation of projects, implementation of projects, and project review. (Batra & Verma, 2014)

It is essential to point out the difference between capital budgeting and project valuation since they are often used as synonyms in the financial industry, although they are distinct concepts.

Capital budgeting involves the process of planning, evaluating, selecting, and managing long-term investments by organizations. (Verbeeten, 2006) This process involves the appraisal of the practicality of various investment projects through the systematic allocation of resources to maximize profitability and reduce risk while considering the time value of money. Project valuation, on the other hand, forms the core element of capital budgeting with a focus on the appraisal of the value of specific investment projects.

The process usually involves the consideration of the forecasted cash flows of a specific project and the application of various valuation techniques such as Net Present Value (NPV), Internal Rate of Return (IRR), and other relevant methods to assess the financial viability of the project in the context of capital budgeting. (Biondi & Marzo, 2011) In essence, while capital budgeting encompasses the broader strategic decision-making process of allocating resources to various investment opportunities based on financial criteria, project valuation is a specific aspect of capital budgeting

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that involves assessing the value of individual investment projects to inform decisions on whether to proceed with the project or not.

Based on the content from Baker & English (2011), project valuation plays a crucial role in determining whether to accept or cancel a project. Adopting sophisticated valuation practices has evolved, with the discounted cash flow (DCF) method as the dominant approach in evaluating capital investment projects over the past five years. Despite the continued use of non-discounted cash flow (DCF) methods, their usage has decreased with the rising use of other DCF methodologies. (Bennouna et al., 2010) Key sophisticated capital budgeting methods widely used include Net Present Value (NPV), Benefit/Cost Ratios, and Internal Rate of Return (IRR), all of which essentially consider the time preference of money. (Gitman & Forrester, 2009)

Despite the prevalent use of Discounted Cash Flow (DCF) techniques, cases of misapplication were reported in the United Kingdom, the United States, and Canada, possibly causing wrong investment decisions. (Bennouna et al., 2010) Real options analysis has emerged as a significant development, emphasizing the need to complement traditional evaluation methods with real options to determine the true Net Present Value (NPV) (Bennouna et al., 2010).

According to Siziba & Hall (2021), the more sophisticated valuation methods in capital budgeting include the Real Options Valuation (ROV) technique, which derives from the financial option valuation for the derivative markets. It is important to remember what a financial option is. "An option provides the holder with the right, but not the obligation, to buy or sell an asset, subject to certain conditions, within a specified period."(Black & Scholes, 1973) For having this right, the buyer of the contract must pay a premium.

Real Option Valuation (ROV) approaches encourage an appreciation by decision-makers of inherent flexibility surrounding future investment opportunities that underlie projects, hence encouraging a more extensive analysis of uncertainties and possible future outcomes. ROV approaches involve an analysis of the value linked with real options incorporated into investment projects, including expansion, delay, or abandonment of a project as a result of upcoming news. ROV approaches are noted to provide a more advanced decision-making framework recognizing strategic flexibility that is expected to have positive impacts on investment outcomes. However, despite the advantages that ROV approaches offer for investment decision-making optimization, they are often characterized by computation intensity and complexity, which may discourage some practitioners who prefer less complex and easily understandable approaches like Discounted Cash Flow (DCF) and non-DCF methods because of their simplicity and ease of application.

Arnold & Hatzopoulos (2000) state that the best valuation method is to use multiple criteria for evaluating a proposal. Management needs to consider different indicators and multiple methods to evaluate the results comprehensively. When different indicators align and agree, it indicates a reliable proposal assessment, signaling a favorable investment decision.

Every investment project's uncertainty also has a concept that other evaluation methods do not contemplate: irreversibility. At the same time, this is a crucial feature of all investment decisions; the NPV rule fails to recognize irreversibility as a cost, the opportunity cost of the money being invested, and the cost of giving up flexibility by committing resources irreversibly. (Brach, 2003)

In the event of uncertainty and the need for investment, for example, due to a new financial regulation, companies would have the right but not the obligation to make such an investment and could have the right to invest more in the future or reduce the amounts allocated due to changes in said legislation. For this reason, real options are one of the best valuation methods in times of uncertainty.

The first thing to evaluate is the uncertainty related to the project: if there is no uncertainty, management can make a decision today, and there is no option value, while higher uncertainty creates future management decision opportunities reflected in a higher option value. (Anderloni, 2011)

Several authors advocate using real options as a valuable method for project valuation, emphasizing its ability to incorporate managerial flexibility and uncertainty into decision-making.

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Many authors are mentioned in the work of Hairong Gui (2011); one example is Amram and Kulatilaka's work, which mentions that "real options are an important way of thinking about valuation and strategic decision-making." McDonald (2006) suggests that real options form a sophisticated understanding of value on the dimension of investment choices beyond conventional valuation techniques. Trigeorgis (1993) mentions the crucial role of real options in capturing the value of flexibility.

The term "real options" was first coined by Stewart Myers in 1977, who recognized that traditional discounted cash flow (DCF) methods often undervalued investment opportunities by ignoring the flexibility and strategic options available to managers in uncertain environments. (Brach, 2003)

Brennan and Schwartz were innovators in using real options to value projects in the natural resources industry, demonstrating how real options can be used to value the ability to defer or abandon investments based on current market conditions. (Zhang, 2009) Additionally, their use is seen in the pharmaceutical industry, where they help to value investments in research and development projects. (Ford & Wu, 2005) In a similar vein, real options have been used in the energy industry to value investments in renewable energy projects, especially with the high impact of uncertainty in decision-making. (Gonçalves & Colombo, 2023)

It is important to note that early applications of real options arose in the area of natural resource investment (Trigeorgis, 1993) and when the theory matured, it found applications across various sectors, including pharmaceuticals, telecommunications, and infrastructure (Martins et al., 2015).

Table 1 shows the options the firm must consider according to the investment project decision.

Table 1. Type of options according to the investment project decision.

Action	Description	Type of option
Postpone the investment	The option to delay or defer investment provides its owner with the right to invest in a project at a later date. The company or investors will decide to wait a specific time if the NPV of the project is negative or if the future uncertainty is very high.	Call
Expansion	This option is common in those companies that have high-growth opportunities, especially in periods of economic boom. The strike price of the call option is the cost of creating this additional capacity, discounted to the time of option exercise. An investment project may have a low or negative NPV without flexibility; however, if there are growth opportunities, the option to expand can increase its value significantly.	Call
Contraction	The option to contract an investment project provides its owner with the right to give up a part of it in exchange for savings (the strike price). In a scenario contrary to the option of expanding, the company may find incentives to reduce its production capacity or size if market conditions turn out to be worse than expected. The strike price is the present value of the future	Put

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	expenditures saved as seen at the time of exercise of the option.	
Abandonment	This option provides its owner with the right to sell, liquidate, close, or abandon a project when conditions warrant it. The strike price is the liquidation (or resale) value of the project less any closing-down costs. When the liquidation value is low, the strike price can be negative. Abandonment options mitigate the impact of inferior investment outcomes and increase the initial valuation of a project.	Put

1 Source: Own elaboration, 2025.

Method

The authors focused on a theoretical research design due to the relevance of the literature review on IFRS S1 and S2, risk and financial standards, and Real Option Valuation. This study structures its methodology into three phases: First, it analyses how international financial standards have changed alongside companies in response to climate change. In addition, the authors review the literature on financial risks and their connection with changes in accounting legislation.

Second, it explains how the ROV has been relevant in the valuation process due to the project's uncertainty. Third, the study proposes a ROV model for capital budgeting, adapting the S1 and S2 norms and their respective variables.

The model proposal is based on the methodology of financial options, particularly in the binomial valuation model of Cox, Ross, and Rubinstein (Cox et al., 1979); it is the most appropriate when capturing project flexibility and uncertainty that can be presented in response to the changing market conditions.

The model's formulas are summarized as follows:

$$call = max\ [S_0 u^i d^{(i-j)} - X,\ e^{-rt}(Qu*p + Qd*1\text{-}p)]$$

$$put = max\ [K - S_0 u^i d^{(i-j)},\ e^{-rt}(Qu*p + Qd*1\text{-}p)]$$

Where:

So is the market price at time i

K is the strike price

e is the exponential constant number

r is the risk-free interest rate

Qu is the payoff for the up market price; the formula is: So - K

Qd is the payoff for the down market price; the formula is: K - So

p is the probability for the price to increase; the formula is: $p = (e^{rT} - d) / (u-d)$

1-p is the probability for the price to decrease

u is the factor by which the price rises; the formula is: $e^{\pi(\sqrt{T})}$

d u is the factor by which the price falls; the formula is: 1/u

Implementation of the above formulas in the study enabled the derivation of a valuation model designed to integrate more variables and concepts relevant to the project preparing S1 and S2 information.

The suggested approach has been outlined sequentially so that the organization applies and implements the model in its conversion to cash flows, something that will inform the decision-making paradigm for running the project. Depending on the flexibility of the methodology, the organization needs to decide based on the interpretation of the analysis whether it is a call or a put option.

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Finally, an analysis of each part of the financial model was performed and analyzed to adapt it to the project valuation's elements and assign a specific variable. This model can be adapted to each sector or specific business.

3. Results

3.1. Proposed ROV Model

- **Underlying Asset Value (UAV):** For this research, the underlying is going to be the present value of the Free Cash Flows (FCF) from a capital investment project (Anderloni, 2011), but the financial professional must know that other variables can be considered as the underlying, like natural resources (Gui, 2011), intellectual property (Sudarsanam et al., 2006) and market opportunities (Baker et al., 2011).
- **Time (T)**: This critical component represents the time left until the option period expires. In this context, investment time is divided into discrete periods (quarters), which allow the valuation of the option at any moment. The longer the period until expiration, the higher the probability of reducing uncertainty, which increases the option value.
- **Strike Price (SP)**: This is the initial cost and includes the outcomes related to the investment proposal. The organization would consider exercising the option in situations where the intrinsic value of the underlying asset is higher than the strike price, thus making the investment beneficial.
- **Discount rate (r)**: The Weighted average cost of capital (WACC) is the proposal rate for the ROV model.

Volatility (V): Is understood through the profitability of a firm because profit numbers indicate the volatility of cash flows and represent the ability of the organization to create value during changing circumstances and external shocks. Unlike volatility that is based only on market information, profits that appear on income statements necessarily include operational risks, cost elasticities, and vulnerabilities to external shocks, thus providing a more tangible expression of financial behavior. As part of the analytical structure of this study, volatility is estimated over ten years using a weighted average, which assigns more than 50% of its weight to the last five years. The rationale for the use of the weighted method is the capacity to capture extraordinary events—such as pandemics, war, global negotiations, or underlying risks—that have had a significant impact on financial results. Profits themselves are subject to the impact of accounting standards, and the link between operational effectiveness and valuation from the market makes them an exceptionally reliable indicator of volatility in the context of real options.

Based on these components, the proposed model for evaluating the investment project is:

$$call = max[UAV\ u^i d^{(i-j)} - SP,\ e^{-rt}(Qu*p + Qd*1\text{-}p)]$$

For every valuation step, the ROV must be compared with the NPV at the valuation time (the one without flexibility to postpone); if this is greater than the NPV, it means that the firm creates value and the right decision is to defer the investment, otherwise it has no sense to delay it. It is recommended that this comparison be made every quarter for 2 years.

3.2. Factors of Uncertainty That Could Affect the Cash Flows of the Investment Projects

1. New or changes in regulation: Regulatory change represents one of the most significant sources of uncertainty in project valuation. This uncertainty arises not only from the introduction of new standards but also from the continuous amendments to existing ones at international, national, and industry-specific levels. Climate-related regulations, such as Standards S1 and S2, exemplify this dynamic environment, where compliance requirements evolve rapidly in response to global sustainability challenges. Firms should place particular emphasis on monitoring regulatory developments and incorporating flexible valuation approaches.
2. An economic crisis derived from external factors such as wars, a healthcare pandemic, international negotiations, potential disruptions from extreme weather events, etc: Economic

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crises triggered by external factors constitute another critical source of uncertainty that companies must address. These crises often arise from events beyond corporate control and can severely affect supply chains, production capacity, and ultimately the cash flow generated by the firm. Natural disasters like floods, droughts, or wildfires created a need for the company to integrate risk measures that account for such external shocks.

3. New or changes in political statements: Political shifts and changes in governmental statements have increasingly become a significant source of uncertainty. The ideological orientation of policymakers can influence regulatory priorities, trade agreements, and legal frameworks, such that political volatility affects investment security, market access, and operational continuity.
4. Internal financial factors: governance and risk management. Internal financial factors, particularly corporate governance and risk management practices, represent a crucial source of uncertainty. Companies with boards of directors or committees lacking expertise in sustainability may fail to correctly identify and evaluate the risks to which they are exposed, while also overlooking significant opportunities. When governance structures are weak or risk management processes are insufficient, scenario analyses may be superficial or inaccurate.
5. Transition risk: Transition risk, arising from the global shift toward low-carbon economies, has become a critical driver of uncertainty. As governments adopt stricter regulations around climate change, companies face increasing compliance costs and potential penalties for failing to meet emissions targets. Meanwhile, the movement of consumer demand towards sustainable products also risks decreasing demand and affecting revenue.

The IFRS Sustainability Disclosure Standards emphasize the importance of these risks. IFRS S1 requires entities to disclose sustainability-related risks that could reasonably be expected to influence cash flow, access to finance, or cost of capital over various time horizons. Similarly, IFRS S2 highlights that climate-related risks—including both physical and transition risks- can have direct financial implications, potentially altering a company's performance and valuation outlook. Given this context, firms must integrate transition risks into their project assessments.

3.3. Proposed Voluntary Notes Under IFRS S1 and S2

Currently, the IFRS Sustainability Disclosure Standards do not require organizations to disclose the valuation models used. In our opinion, doing so voluntarily would be highly beneficial for enhancing transparency and building investor confidence. The ability to present the valuation methodology, particularly in contexts of high uncertainty, allows stakeholders to understand not only the financial outcomes but also the resilience of the company's decision-making process.

This proposal draws on the disclosure practices established in IAS 16 (Property, Plant and Equipment), IAS 36 (Impairment of Assets), and IFRS 13 (Fair Value Measurement). Standardized disclosures would require organizations to report in the financial statement footnotes the valuation methods used, the key assumptions applied, and the sensitivity analyses performed to show the effects on the reported numbers of differences in important parameters—like discount rates—by revealing the sensitivity analyses used. By adopting a similar approach to the IFRS S1 and S2, organizations can opt to report more detail on the consideration of sustainability-related risks in the valuation of investments.

We propose the inclusion of specific notes under IFRS S1 and S2 to achieve the following objectives:

1. Describe the valuation model applied, such as the real options approach proposed in this study, highlighting its theoretical foundation and adaptability under conditions of uncertainty.
2. Disclose the key variables and assumptions, with particular emphasis on those that capture transition risks, climate-related risks, and other sustainability-related uncertainties as outlined by IFRS S1 and S2.
3. Present sensitivity analyses, similar to those required under IAS 36 and IFRS 13, to illustrate the potential impact of changes in critical variables (e.g., interest rates, carbon prices, regulatory scenarios) on cash flow projections and valuations.

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4. Explain the connection between the model and the management of uncertainty, demonstrating how the approach supports dynamic decision-making and enhances the company's resilience in an evolving regulatory and environmental context.

This framework does not intend to create additional mandatory reporting but rather to encourage companies to adopt a proactive stance in sustainability reporting. Providing this information gives investors clearer insights into how they assess, manage, and mitigate sustainability-related risks.

4. Discussion

According to our research questions, it is concluded that there is no real disbursement or payment for the option (as in the financial one). The valuation using the real option model assesses the value creation in the case of postponing the project, considering its flexibility.

In the financial world, it is expected to hear professionals talk about the risk-return relationship and its role in creating a valuation model. However, financial standards are rarely included as a determining factor in reporting the risks to which the company is exposed and the returns generated by any investment.

The need for comparable financial information is one of the cornerstones for the birth of international financial reporting standards. The evolution of the investor has meant that various standards must be updated. When an update is no longer sufficient, new standards are created to satisfy all those interested in these financial reports. Sustainability reporting is a tool that can be used to increase transparency and accountability in issues that traditional financial reporting does not address.

One problem with the traditional NPV approach is that many projects contain embedded options. Conventional methods of business valuation, such as applying a price/earnings multiplier to current earnings, are not effective for new businesses. The project must be valued by estimating future earnings and cash flows under different scenarios, and the real options valuation can be helpful in this situation and add considerable value to the company.

A project that is initially rejected can be accepted with a net profit in subsequent periods. So ROV will help to quantify risks and opportunities and incorporate them as an organizational process. It can represent a framework to integrate this non-financial information from various parts of the organization into the investment decision-making process.

The application of the ROV model poses significant challenges to companies. The strength of the approach assumes sophisticated financial competencies and efficient internal systems to forecast variables like volatility, weighted cash flows, and regime environments. The companies will also be unable to access reliable information to capture the sustainability risks. Resistance from organizations to the application of the valuation methods and value added to the making of voluntary disclosure also inhibits the application. Even as the model provides value in the environment of uncertainty, application entails investment in training, information infrastructure, and governance practices aligned with sustainability reporting.

The presentation for this analysis must be clear to all stakeholders, including the board, and explain how this valuation method leads to value creation for the company.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Data Availability Statement: No new data were created.

Acknowledgments: The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

 doi:10.20944/preprints202508.0124.v1

Abbreviations

The following abbreviations are used in this manuscript:

IASB	International Accounting Standards Board
ISSB	International Sustainability Standards Board
IASC	International Accounting Standards Committee
IFRS	International Financial Reporting Standards
IOSCO	International Organization of Securities Commissions
ROV	Real Option Valuation
GRI	Global Reporting Initiatives
DSJI	Dow Jones Sustainability Index
DFC	Discounted Cash Flows
NPV	Net Present Value
IRR	Interest Return Rate
ESG	Environmental, Social and Governance

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