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## **Blockchain-Enhanced Sustainability Certifications: Linking Financial Performance and Sustainable Development in the 21st Century.**

### **Abstract**

The aim of this research is to investigate a potential correlation between a company's financial performance and sustainability certifications. Additionally, it explores the application of blockchain technology to enhance the management and validation of these certifications, thereby bolstering the credibility of companies committed to sustainability. In an international context in which sustainability plays a key role in economic, social, and environmental development processes, the new challenge for businesses is to create value in a shared way for all stakeholders. Sustainability standards and certifications such as ISO, Fairtrade, or Organic have become important tools that support conscientious consumption, by providing consumers with a better understanding of the product life cycle and to mitigate greenwashing. In this scenario Blockchain could be a powerful tool that could gather certifications within it, so that companies and their actions toward sustainability can be distinguished.

### **Presentation**

According to a definition given by Schumpeter in 1942, when we talk about innovation, we define it as the invention of a new product, also considering a new process, a new production method, a new market, or new raw materials. In the past, sustainability and innovation have often been considered opposites, especially since many discoveries and innovations based on the latter have led to environmental degradation in the pursuit of profit. In fact, many technological and industrial innovations have been considered as the main drivers of the consumption of natural resources. The international community is encouraging us to re-evaluate our understanding of innovation, which is now seen as intrinsically linked to sustainability in its broadest sense, encompassing not only economic prosperity, but also the well-being of people and the health of our planet. In this changing landscape, eco-innovations are becoming increasingly important. Companies are now recognizing that sustainability certifications play a critical role in showcasing their commitment to environmentally responsible practices. Not only do these certifications provide transparency for consumers and stakeholders, but they also strengthen a company's competitiveness in the market. So, this research fitting into a global context in which sustainability and innovation are central themes. Corporate sustainability and the search for business models that create shared value for all stakeholders are crucial challenges in today's landscape. The main objectives are to study the potential correlation between companies' financial performance and sustainability certifications, as well as to explore the application of blockchain technology to improve the management and validation of these certifications. This research aims to advance scientific knowledge, offering an innovative contribution to the state-of-the-art in the fields of corporate sustainability and blockchain technology. Specifically, it seeks to understand how the implementation of sustainable certifications, supported by blockchain, can positively influence the financial success of companies, emphasizing the importance of integrating emerging technologies into business models to address the challenges of sustainability and innovation.

## Literature

Just over thirty years ago, sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). When reflecting on the evolution of the concept of innovation, applying it to modern society, it is necessary to consider its evolving forms. Among these forms is the concept of eco-innovation, which, as its name suggests, applies the idea of innovation to the environment, seeking to mitigate its negative impact (Veugelers, 2012). Eco-innovations, eco-efficiency and corporate social responsibility practices define a large part of the current industrial sustainability agenda. Environmental innovations, again in a Schumpeterian evolutionary perspective, are defined as: "the production, assimilation or exploitation of a product, a production process, a service or management or business methods that are new to the organization (developing or adopting it) and that translate, throughout its life cycle, into a reduction of environmental risk, pollution and other adverse impacts of resource use (including energy use) compared to relevant alternatives" (Kemp and Pearson, 2007, p. 7). The rapid spread of the internet and digital technologies has significantly transformed business operations, leading to a disruptive revolution in the global industrial value chain. Advanced digital tools enable manufacturers to reduce costs, increase productivity, accelerate product development, accelerate time-to-market, improve products with specialized services, and focus more on the customer at various stages of the value chain, thus opening new opportunities for innovation. In this new era, digital manufacturing, and advanced technologies, including autonomous robots and modular systems equipped with smart sensors, play a critical role. When objects can perceive their surroundings and communicate, they become tools for understanding complexity and reacting quickly to it (Somayya, Ramaswamy, Siddharth 2015). The Industrial Internet of Things (IIoT) represents the convergence of the physical world of industrial production with the digital world of information technology. Against this backdrop, the emerging change in industrial production brought about by digitalization is of considerable concern from a sustainable development perspective. In fact, the importance of sustainable development and innovation for countries emerges, as a driver of social and political development of the community and businesses, and their centrality is declared and supported within the United Nations 2030 Agenda for Sustainable Development, established in 2015. This agenda revolves around 17 Sustainable Development Goals (SDGs), with the aim of integrating sustainable development and environmental policies within member countries. To demonstrate their commitment to responsible environmental practices, companies are gradually recognizing the importance of certifications. Sustainability standards and certifications such as Fairtrade, Organic and ISO have become tools that support conscientious consumption and curb the problem of greenwashing (Abeyratne, S. A., & Monfared, R. P. 2016). In a study by González, Sarkis, & Adenso-Díaz, (2008) using survey data from automotive supplier organizations, a positive relationship was found between the possession of certified environmental management systems, in particular ISO 14001 and the eco-management and audit scheme, and the environmental demands that these organizations impose on their suppliers. This result implies that environmental concern spreads upstream in the supply chain. Environmental demands on suppliers increase with the size of the client organization, but the degree of internationalization, as measured by import and export rates, does not show a meaningful relationship with these pressures. Although there is an abundance of research papers investigating the ISO 14001 EMS standard and their association with improved environmental performance (King et al., 2005, Potoski and Prakash, 2005, Schaltegger and Synnestvedt, 2002), there are few papers examining the relationship between ISO 14001 and financial performance. There is also a paucity of literature regarding blockchain as a business certification tool. Blockchain, through its decentralized and immutable nature, makes traceability, openness, and transparency possible (Crosby et al., 2016). Although we often hear about it in connection with Cryptocurrencies, Blockchain is a decentralized database that applies cryptographic methods to the storage and management of data blocks and thus ensures transparency through consensus mechanisms, encryption algorithms and distributed storage (Nakamoto, 2008). It can also be used in areas unrelated to cryptocurrencies, such as for tracking orders, payments, accounts, production

processes, and much more. In Estonia, a leading European country in digitalization, blockchain forms the backbone of the famous e-Estonia<sup>51</sup> program, which integrates all public services into a single digital platform. The project includes a large amount of sensitive data, health, judicial, legislative, security and commercial code records, which are stored on a ledger to preserve them from corruption and misuse. IBM has developed a private blockchain platform for businesses that allows them to create and manage custom blockchain applications. The platform has been used by numerous companies in industries such as finance, logistics, and healthcare. (Bocken, Short, Rana, & Evans, 2014)

## **Objectives and hypotheses of the research project**

The proposed research project aims to examine the possible relationship between a company's financial performance and sustainability certifications. The research also aims to explore how blockchain technology can be used to improve the management and validation of such certifications, to strengthen their credibility.

Research hypotheses underpinning this project include:

1. If there is a positive correlation between the possession of sustainability certifications and the financial performance of companies. This correlation could suggest that companies with sustainability certifications show better financial results than those without certifications.
2. If the application of blockchain technology in the management of sustainability certifications improves the quality and reliability of information regarding corporate sustainability, helping to promote greater trust from stakeholders and consolidate companies' position in the market.

To conduct this research, relevant variables will be identified and analyzed, including companies' financials, information on the possession and application of sustainability certifications, and the possible use of blockchain technology for certification management. The research will be based on a statistical analysis of the collected data to verify the proposed hypotheses. The filling of the research "gap" identified during the analysis of the scientific literature will be possible through the acquisition of empirical data and statistical analysis, to confirm or refute the research hypotheses.

## **Hypotheses of the project: methodologies, intermediate phases, tools to be used.**

Methodologies:

1. Financial Data Collection: The first phase of this research project involves the collection of financial data from a sample of selected companies. This data will include key indicators, such as turnover, profit margin, cash flow, and other significant metrics to assess financial performance.
2. Statistical Analysis: Subsequently, the financial data collected will be subjected to a statistical analysis using methods such as regression and multivariate analysis. The objective of this phase is to identify any correlations between financial performance and the possession of sustainability certifications.
3. Expert Interviews: Another key element of our methodology is interviews conducted with experts in the field. These qualitative interviews will allow us to gain specialist perspectives on business strategies related to sustainability and the use of blockchain technology.
4. Textual Analysis: Interview transcripts will be subject to targeted textual analysis. This process will allow us to identify patterns and recurring themes related to the use of blockchain technology and the sustainability strategies adopted by companies.
5. Study of Blockchain Implementations: Finally, we will spend time on a detailed study of blockchain implementations within some of the companies included in the research. This

analysis will allow us to assess how blockchain technology affects the management of sustainability certifications and corporate credibility.

#### Types of Empirical Verifications:

- Empirical validation of the correlation between the possession of sustainability certifications and financial performance through the statistical analysis of financial data.
- Verify the impact of blockchain technology adoption on business credibility through analysis of blockchain implementations and interviews with industry experts.

#### Data Types and Sources:

- Sample companies' financials from public sources and company documents.
- Interviews conducted with industry experts.
- Documentation regarding the implementations of blockchain technology in the companies involved in the study.

#### Intermediate Stages of Development:

- Collection and subsequent analysis of financial data.
- Conducting interviews with experts.
- Statistical analysis of financial data.
- Analysis of interview transcripts.
- Detailed study of blockchain implementations.

#### Research Tools:

- Use of statistical software for the analysis of financial data.
- Adoption of specific software for the analysis of textual content.
- Recording and transcription of interviews.
- Examination of documentation and analysis of blockchain implementations.

### **Expected scientific results.**

The proposed research offers an innovative contribution to scientific reflection by exploring the correlations between the possession of sustainability certifications, the financial performance of companies and the application of blockchain technology. Its originality lies in connecting three key elements in an international context: sustainability, finance, and technological innovation. Such a connection is crucial, as it offers an in-depth understanding of how sustainable practices affect the financial aspect of companies and how blockchain technology can be leveraged to solidify the integrity of sustainability certifications. The distinctive aspect of the research is its investigation into the possible relationships between the possession of sustainability certifications and the financial performance of companies. If confirmed, this correlation can offer a new perspective on business management, emphasizing the importance of sustainability not only from an ethical point of view, but also from an economic one. In addition, the analysis of the application of blockchain technology to improve certification management offers an innovative solution to address credibility challenges in the sustainability industry. On a practical level, the results could directly influence business decisions. Companies committed to sustainability might see empirical confirmation of the importance of their initiatives in the company's financial health. At the same time, the adoption of blockchain technology for certification management could provide a more reliable and efficient method of

demonstrating commitment to sustainability, potentially improving consumer and investor confidence.

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