

Measuring Sustainability Maturity Stages and Charitable Giving: Leveraging NLP-based Textual Analysis

Namchul Shin

Pace University
nshin@pace.edu

Abstract

This research investigates nonprofit organizations' sustainability maturity stages through a textual analysis of the annual reports using NLP techniques. This NLP-based approach helps evaluate the extent to which nonprofit organizations integrate sustainability (or ESG) strategies and practices into their reporting on community service activities. Additionally, this study provides insight into whether the sustainability maturity stages influence public giving. Overall, this study sheds light on the literature on organizational sustainability maturity by exploring its impact on charitable giving in the nonprofit sector.

Extended Abstract

This research investigates sustainability maturity stages of nonprofit organizations through a textual analysis of their annual reports using Natural Language Processing (NLP) techniques. This NLP-based approach helps evaluate the extent to which nonprofit organizations integrate sustainability (or ESG) strategies and practices into their reporting on community service activities. The dataset consists of annual reports from organizations included in Forbes America's Top 100 Charities. Additionally, the study empirically assesses whether there is a relationship between the sustainability maturity stages and the level of donations, providing insight into whether ESG reporting influences public giving.

Despite the growing trend of ESG reporting among businesses, this shift has not been mirrored in the nonprofit sector (Tartre 2024). Although nonprofits recognize the importance of transparently communicating how their activities support their missions, few report on ESG, and many have been slow to integrate ESG policies and practices into their community impact reporting (Stanley 2024; Vail 2024). A 2022 analysis by U.K.-based accounting firm RSM found that none of the 114 charities examined included an ESG section in their annual reports (Stanley 2024). Moreo-

ver, except for environmental organizations, most nonprofits do not view environmental concerns—such as climate change—as central to their missions. This indicates a siloed approach in addressing issues like social justice, environmental sustainability, and public health. Yet, as these issues are understood to be interconnected, donors are increasingly paying more attention to how nonprofits carry out their work in alignment with ESG principles, not just what they do in communities (McClimon 2021).

Organizations can perceive sustainability through diverse lenses, leading to varied interpretations of its meaning and significance. Consequently, they may occupy distinct stages of sustainability maturity, depending on the viewpoints through which they approach and engage with sustainability. For example, along the continuum from weak to strong sustainability, a weak sustainability perspective holds that natural capital loss could be offset by man-made capital. In contrast, a strong sustainability perspective views natural capital as non-substitutable, emphasizing the economy fundamentally depends on the environment (Getzner 1999; O'Riordan 1989; Pearce 1993; Pearce and Atkinson 1995; Pearce and Turner 1989; Solow 1986).

Landrom (2018) developed a classification model that consolidates various existing frameworks on organizational sustainability into five distinct maturity stages, each defined by core characteristics linked to organizational activities. Building on this model, we categorize sustainability maturity into five levels: 1) compliance (very weak sustainability, focused on meeting compliance requirements), 2) internally-focused (weak sustainability, aimed at mitigating negative impacts), 3) systemic (intermediate sustainability, emphasizing the enhancement of positive impacts and integration of ESG activities), 4) regenerative (strong sustainability, involving efforts to repair environmental and social damage), and 5) coevolutionary (very

strong sustainability, involving activities beneficial to nature). The first three stages (compliance, internally-focused, and systemic) correspond with an organizational sustainability logic characterized by regulatory compliance, operational efficiency, and stakeholder engagement, and the last two stages (regeneration and coevolutionary) represent an ecosystem sustainability logic characterized by ecosystem governance and institutional reshaping, reflecting a shift from managing organizational sustainability to transforming socio-ecological systems. Landrum (2018) suggested that organizations could be at multiple stages (or have multiple viewpoints) simultaneously and that progression—or regression—along these stages is possible, given the inherent uncertainties and evolving nature of sustainability challenges. The framework was originally developed within a corporate sustainability context; however, its underlying logic—progression from compliance-based approaches to systemic and regenerative orientations—is institutional rather than sector-specific. The framework’s higher-order stages align conceptually with mission-driven, stakeholder-oriented nonprofit governance structures.¹ Thus, we treat the framework as an institutional model applicable for nonprofit organizations rather than a corporate sustainability model.

To conduct the NLP-based textual analysis, this research operationalizes the five sustainability maturity stages as five distinct variables by using word lists corresponding to each stage, derived from the dictionary developed by Landrum and Ohsowski (2018).² Each variable is quantified by calculating the total frequency (word count) of all terms associated with a given maturity stage. By applying this approach to the annual reports of nonprofit organizations, we identify and assess their sustainability maturity stages based on the aggregated word counts for each category.

Once the five sustainability maturity stages are operationalized as variables, we estimate the following regression model to examine the extent to which these maturity stages influence donation levels:

$$\text{Donation} = \beta_0 + \sum_{\beta_1}^{\beta_5} \text{sustainability maturity stages} + \beta_6 \text{ price} + \beta_7 \text{ fundraising expense} + \beta_8 \text{ firm size} + \beta_9 \text{ industry} + \text{error}$$

¹ This research is still in progress. We plan to address certain elements of the internally-focused stage, which require reinterpretation in nonprofit settings, for example, energy efficiency and waste reduction, compared to profits and market share in corporate settings.

The five sustainability maturity stages—compliance, internally-focused, systemic, regenerative, and coevolutionary—serve as the main independent variables in the regression model. The model is grounded in the economic model of charitable giving proposed by Weisbrod and Domingues (1986), which suggests that donation levels are influenced by price, quality, and the availability of information regarding both (Shin 2024). Firm size is measured by total assets, and industry is a dummy variable for the industry sector. This expanded model allows us to assess whether and how varying levels of sustainability maturity, as reflected in annual reports, contribute to explaining differences in donation levels across nonprofit organizations.

This study sheds light on the literature on organizational sustainability maturity by exploring its impact on charitable giving in the nonprofit sector. Its contributions are twofold: First, it uses an NLP-based textual analysis to assess the sustainability maturity stages of nonprofit organizations—an area that has received limited attention in prior research. Second, it provides valuable insights into how the adoption and communication of sustainability strategies and practices in annual reports may enhance nonprofit organizations' ability to attract donations and strengthen fundraising outcomes.

References

- Getzner, M. 1999. Weak and strong sustainability indicators and regional environmental resources. *Environmental Management and Health*, 10(3), 170-176.
- Landrum, N. E. 2018. Stages of corporate sustainability: Integrating the strong sustainability worldview. *Organization & Environment*, 31(4), 287-313.
- Landrum, N. E. and Ohsowski, B. 2018. Identifying worldviews on corporate sustainability: A content analysis of corporate sustainability reports. *Business Strategy and the Environment*, 27(1), 128-151.
- McClimon, T. J. 2021. “ESG is Good for Nonprofits Too,” *Forbes*.
- O’Riordan, T. 1989. The challenge for environmentalism. In R. Peet & N. Thrift (Eds.), *New models in geography* 77-102. London, England: Unwin Hyman.

² The complete list of words used for each stage is available upon request.

Pearce, D. 1993. *Blueprint 3: Measuring sustainable development*. London, England: Earthscan.

Pearce, D.W. and Atkinson, G.D. 1995. Measuring sustainable development. In: D. Bromley (Editor), *Handbook of Environmental Economics*. Basil Blackwell, London.

Pearce, D. and Turner, R. 1989. *Economics of natural resources and the environment*. Baltimore, MD: The Johns Hopkins University Press.

Shin, N. 2024. "The Impact of Social Media on Charitable Giving for Nonprofit Organization," *Journal of International Technology and Information Management*, 32(1), 122-140.

Solow, R. 1986. On the intergenerational allocation of natural resources. *Scandinavian Journal of Economics*, 88, 141-149.

Stanley, L. 2024. "Understanding ESG for Charities," *Charity Digital*.

Tarte, A. 2024. "ESG Reporting in the Nonprofit Sector."

Vail, K. 2024. "Why Transparency on ESG Matters for Nonprofits."

Weisbrod, B. A. and Dominguez, N. D. 1986 "Demand for Collective Goods in Private Nonprofit Markets: Can Fundraising Expenditures Help Overcome Free-Rider Behavior?" *Journal of Public Economics*, Vol. 30, No. 1, pp. 83-96.