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Environmental, social, and governance and corporate efficiency: mediating role of R&D in achieving sustainable development goals

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ABSTRACT

We examine whether and how research and development (R&D) mediates the association between environmental, social, and governance (ESG) pillars and corporate efficiency among companies within the supply chain of Microsoft Corporation from 2012 to 2020. An estimation of corporate efficiency using data envelopment analysis (DEA) indicates that companies should first improve their innovational efficiency (mean DEA score = 0.371), then operational efficiency (mean DEA score = 0.659), and finally profitability efficiency (mean DEA score = 0.695). Moreover, a mediation analysis confirms the mediating role of R&D intensity. Overall, R&D should be one of the spotlights in the supply chain amidst the highlights on ESG in this dynamic and challenging business world for companies to achieve sustainable development goals.

KEYWORDS

Environmental, social, and governance (ESG); data envelopment analysis; R&D intensity; corporate efficiency; Microsoft Corporation

JEL CLASSIFICATION

L1; M14; L14

I. Introduction

Environmental, social, and governance (ESG) is becoming one of the top priorities for corporations (MSCI 2022). Thus, prior studies (Aydoğmuş, Gülay, and Ergun 2022; Landi and Sciarelli 2018; Velte 2017; Zhao et al. 2018) examined the impacts of ESG on corporate performance. However, whether or not ESG increases corporate performance is an ongoing subject of debate because their measures of corporate performance, such as return on asset, are unidimensional. Notably, business operations are a collection of process-oriented work. Differences in the efficiency of the various stages of business operations may constrain the overall efficiency, with the combined efficiency of the different segments being reflective of the effectiveness of business processes. Recent studies (e.g. Lu, Kweh, Ting, & Ren; Ren et al. 2022) have paid attention to the relationship between ESG and corporate efficiency, which is a multidimensional measure of corporate performance. However, they overlooked innovation and operation activities.

Moreover, they focused only on the direct association between ESG and corporate efficiency. Large companies' counterparts, including suppliers, partners, and customers, consume substantial resources, which is contrary to sustainability goals (IRP 2020). Research and development (R&D) centres of suppliers and partners need to have excellent technology management to maximize the value of their resources and reduce resource waste and greenhouse gas emissions (Lizarralde, Ganzarain, and Zubizarreta 2020). Although R&D is not a key factor influencing environmental output (Hojnik, Prokop, and Stejskal 2022), it is positively influenced by environmental orientation. Hence, firms implementing environmentally oriented ESG activities may incentivize R&D. The likely reason is that the cause and effect of R&D and environmental outputs are reversed, suggesting that firms implementing environmentally oriented ESG activities may incentivize R&D. Would R&D then make an effective way for ESG activities to act on corporate efficiency? That is, the literature has a gap regarding the mediating role of R&D on the relationship between ESG and corporate efficiency.

This study aims to achieve two research objectives. First, we intend to investigate the relationship between ESG activities and the efficiency of

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