

連結自然與財務風險：以 AI 產業為案例的 風險分析和評估試驗

From Nature to Financial Risks: Risk Assessment in the AI Industry

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摘要

隨著自然相關財務風險 (TNFD) 逐漸受到重視，企業開始辨識並評估自身價值鏈中對於自然資源的依賴性，以及對於環境造成的危害。而在了解與自然資本關聯的過程中，進一步分析實際受到的財務影響狀況，則變成企業關注的重點之一。

本研究以近年來發展快速且帶給社會深遠影響的 AI 產業作為示範案例，討論表面上看似不需要過多自然資源的產業，在實際進行細部分析後，是否與初步預想有所落差。

首先本研究將透過 S&P 提出的各行業重大性地圖 (Materiality Maps) 辨識出 AI 產業主要的重大性議題種類，並輔以 ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) 資料庫，以辨識企業對自然的依賴性和影響，進一步篩選出 AI 產業最關鍵的自然資本需求和對環境衝擊。

接著，本研究將選擇其中一項具有代表性的自然資本 (例如稀有金屬或水資源等)，探討在自然狀態改變 (例如氣候變遷、汙染排放等) 狀況下，AI 產業將面臨哪些實體風險、轉型風險和潛在機會。最後基於真實成本會計 (TCA) 和自然成本會計 (NCA) 的應用潛力，將初步討論辨識出的風險和機會可能帶來的財務衝擊和優勢，幫助產業提升其財務風險的管理能力。

本研究預計建構一張「自然資源-風險/機會-財務衝擊/優勢」關聯圖，並初步估算產業在不同自然情境下可能受到的財務影響，期望此研究能作為企業進行 TNFD 揭露和財務風險管理的依據。

關鍵詞：TNFD，自然資本，風險管理

Abstract

As nature-related financial risks (TNFD) receive growing attention, companies have begun to identify and assess their dependencies on natural resources throughout their value chains, as well as the environmental harm they may cause. In this process of understanding the relationship with natural capital, further analyzing the actual financial impacts has become one of the key areas of corporate concern.

This study takes the rapidly growing and socially influential AI industry as a demonstration case to examine whether an industry that appears to rely minimally on natural resources may, upon closer analysis, show a different picture from initial assumptions.

First, the study identifies the key material issues of the AI industry using the Materiality Maps developed by S&P, and further integrates data from the ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) database to assess the industry's nature dependencies and impacts. Through this approach, the most critical natural capital dependencies and environmental impacts for the AI industry are identified.

Subsequently, the study focuses on one representative natural capital (e.g., rare metals or water resources) to explore the physical risks, transition risks, and potential opportunities the industry may face under changes in natural conditions, such as climate change or pollution. Based on the applicability of True Cost Accounting (TCA) and Natural Capital Accounting (NCA), the study will then conduct a preliminary discussion of the financial impacts and advantages associated with the identified risks and opportunities, in order to support improved financial risk management within the industry.

The study aims to construct a conceptual framework linking “natural capital – risks/opportunities – financial impacts/benefits,” and provide a preliminary estimate of potential financial effects under different nature-related scenarios. It is expected that the findings will serve as a valuable reference for companies conducting TNFD-aligned disclosures and managing nature-related financial risks.

Keywords: TNFD, Natural capital, Risk management