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Harvey Mpoto Bombaka

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# Coltan Traceability in the Democratic Republic of the Congo: Between Governance Imperatives, Technological Challenges, and Geopolitical Tensions : What Solutions for Ethical and Sustainable Mining?

Harvey Mpotu Bombaka\*

The Democratic Republic of Congo (DRC) is the world's largest producer of coltan, a mineral indispensable to the manufacturing of electronic parts for modern technologies. However, the exploitation of this strategic mineral still faces severe problems of inadequate traceability mechanisms, illegal transfers to neighbouring countries and failure to respect the human rights of local citizens. The collapse of international certification programmes and the persistence of armed violence exacerbate these problems, underlining the need for a radical transformation of Congolese mining management.

The control of coltan trade relies on diverse international, regional, and even national mechanisms intended to provide a responsible supply chain. For example, section 1502 of the **Dodd-Frank Act** mandates American companies to disclose the origin of the so-called '**conflict**' minerals used in their products (Pub. L. No. 111-203, 124 Stat. 1376, 2010). Nevertheless, as J. Cuvelier mentions in *The complexity of resource governance in a context of state fragility* (Routledge, 2021, p. 214), the enforcement of this control is confronted with serious obstacles, in particular due to corruption and the control structures' lack of means on the ground. Furthermore, certification programs, like the **International Tin Supply Chain Initiative (ITSCI)**, intended to guarantee the traceability of Congolese coltan, are criticized for their ineffectiveness. 'Le Monde' newspaper's article of 29 August 2024, titled «*Certification minière en RDC : un système à bout de souffle*», mentions that numerous actors in the sector circumvent these mechanisms through fraudulent channels, including the illegal re-export of the mineral ore via Rwanda.

The exploitation of coltan is also linked to the armed conflicts that rock the eastern DRC. The Rubaya mine, one of the country's main sources of coltan, is currently under the control of the **Mouvement du 23 Mars (M23)**, reports Le Monde of 4 February 2025 in its article «**Coltan et conflits en RDC : la mine de Rubaya sous le joug du M23**». This is how exploiting natural resources fuels the violence and further undermines the Congolese institutions, unable to secure the mining sites. The *case Social and Economic Rights Action Center c. Nigeria* of the **African Court on human and peoples' rights (2001)** reminds that the State has the duty to protect its citizens from abuses committed by economic actors exploiting natural resources (Communication n°155/96, AHRLR 60). Yet in the DRC, the inability to effectively control all its territory, facilitates the hijacking of mining revenues by armed groups and perpetuates cycles of violence in the region.

The initiatives to improve the traceability of Congolese coltan also confront technological limitations of existing systems. Corruption and opacity undermine the effectiveness of existing instruments. This justifies the need for a solution based on more robust tools. In this vein, technological

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advances can help to improve traceability. As an illustration, **Blockchain technology**, with its unfalsifiable and transparent tracking of transactions, would be a viable option. As G. Böhme explains in *Blockchain for sustainable supply chains* (Springer, 2022, p. 129), the technology would make each stage of the exploitation, from the mine to the end product, registrable and thereby minimize the risks of fraud. Likewise, **chemical tagging**, already tested on certain supply chains, would make it possible to insert unique tracers into the minerals extracted, facilitating their traceability. L. Heinrich's research in **Chemical tagging for conflict mineral traceability** (Elsevier, 2021, p. 85) highlights that this process ensures a greater degree of precision than the conventional administrative approaches. Finally, **X-ray fluorescence analysis**, enabling the determination of the geogenic signature of minerals, would strengthen the credibility of certificates of origin.

Yet, the implementation of such technologies implies huge investments and increased collaboration between the States, industries, and civil society organizations. The International Labour Organization recalls, in its report «*Child labour in mining and global supply chains*» (ILO, 2023, p. 47), that any transformation of the mining sector in DRC should have a social component, with the aim of enhancing the working conditions of artisanal miners, usually exploited and subjected to inhuman treatment. In the case of *Armed Activities on the Territory of the Congo* (Democratic Republic of the Congo v. Uganda - ICJ Reports 2005, p. 168), the ICJ pronounced on Uganda's responsibility for violations of international law, in particular the illegal exploitation of natural resources in the Democratic Republic of the Congo. The Court emphasized that the **plundering of mineral wealth is a serious violation of international law** and referred to the duty of neighboring states to prevent such violations. (para. 242 – 246)

Improving the traceability of coltan in the DRC therefore requires a multi-faceted strategy, combining the strengthening of certification mechanisms, the adoption of innovative technical tools and the fight against corruption. The involvement of international stakeholders and the accountability of companies consuming this mineral are also required to favour more ethical and sustainable trade. As P. Sands has already argued in *Principles of International Environmental Law* (Cambridge University Press, 2018, p. 302), **'the equitable management of natural resources cannot be effective**

**without a robust legal framework and the collective commitment of stakeholders'**. In sum, the future of the coltan trade in the DRC will depend on the ability of governments and economic stakeholders to reconcile economic exploitation with respect for fundamental rights.

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