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WOODID AND THE LAUNCHPAD FOR VIET NAM'S TIMBER SECTOR IN THE DIGITAL ERA

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THÔNG TIN ẤN PHẨM

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Tác giả
Anja Barth
Lê Thị Lộc
Vũ Tá Vi Khanh
Công ty TNHH Truyền thông Wecommunicators

Chỉ đạo Nội dung
Anja Barth – Cố vấn trưởng Dự án, GIZ Việt Nam

Ảnh
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Authors
Anja Barth
Le Thi Loc
Vu Ta Vi Khanh
Wecommunicators Company Limited

Responsible
Anja Barth – Chief Technical Advisor, GIZ Viet Nam

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WoodID

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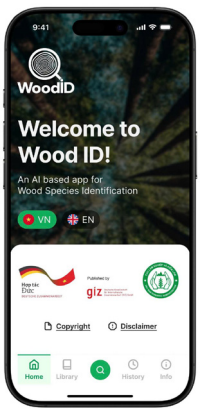
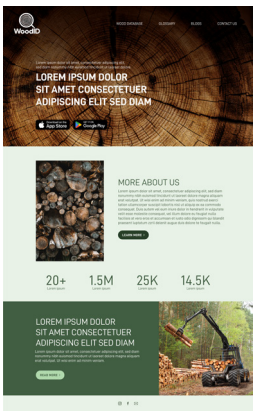




Motivation

FROM THE MARKET AND GLOBAL CONTEXT

Viet Nam's timber industry is affirming its role as one of the country's most dynamic economic drivers. From a sector once known only for exporting raw products, today "Made in Viet Nam" wood products have entered some of the world's most demanding markets such as the US, EU, and Japan, with exports to these destinations consistently reaching tens of billions of dollars. In 2024 alone, exports exceeded USD 16.25 billion, up 20.9% from the previous year. By the first half of 2025, the value had already surpassed USD 8.2 billion, with forecasts suggesting it could reach USD 18 billion for the year.

In parallel, Viet Nam has taken important policy steps to address these challenges. The signing of the **VPA/FLEGT Agreement** with the EU in June 2019, the promulgation of **Decree 102/2020** on the Viet Nam Timber Legality Assurance System (VNTLAS), and the 2024 update through Decree 120 have laid a solid foundation for the issuance of FLEGT licenses. These efforts not only help Viet Namese timber products meet the stringent standards of international markets but also enhance the sector's global credibility.

In reality, Viet Nam does not rely solely on domestic timber but also imports wood from many countries, including species originating from high-risk areas for illegal logging. Therefore, ensuring traceability, accurate species identification, and legality verification of imported timber has become an essential requirement, driving transformation in the management and monitoring of timber sources.

WOODID: APPLYING *Artificial intelligence* TO TIMBER IDENTIFICATION

Against this backdrop, the project "Support to the Implementation of the Voluntary Partnership Agreement (VPA/FLEGT) in Viet Nam"—implemented by the Viet Nam Administration of Forestry and Forest Protection Department in cooperation with GIZ, and with technical support from the Forest Industry Research Institute (RIFI) and AITC—developed WoodID, an AI-powered mobile application capable of identifying over **260 timber species** from Africa, Asia, and South America. These include many species that are visually similar, newly imported, or rare and often illegally harvested. The app was trained on nearly **100,000 cross-sectional wood images** (magnified 50 times) using advanced deep learning models, achieving a testing accuracy rate of **98.6%**. Beyond identification, it also provides scientific, commercial, and ecological information, supporting verification processes, decision-making, and transparency. Since the release of its first version in June 2024, WoodID has been downloaded more than 8,500 times on iOS and Android devices. In parallel, 371 officers, researchers, and potential users have been trained and provided feedback to refine the tool during pilot implementation. WoodID is not just a technological application but also a strategic solution to **enhance transparency**, **reduce costs**, and **support the digital transformation** of Viet Nam's forestry and timber management sector.

Thanks to a combination of innovations like WoodID, decisive policy action, and the dynamism of enterprises, Viet Nam's timber industry is not only aiming to "catch up" but is also moving toward building a transparent and sustainable forestry and timber trade—bringing long-term benefits to the economy, people, and the environment.

WHEN TECHNOLOGY MEETS PRACTICE

Stories from the frontline

STORY OF MS. PHẠM LAN TRANG

SPECIALIST, CUSTOMS SUPERVISION AND MANAGEMENT DEPARTMEN

"WoodID enables customs officers to quickly check timber species information right at the border, instead of sending samples to multiple agencies—making verification faster and more transparent."

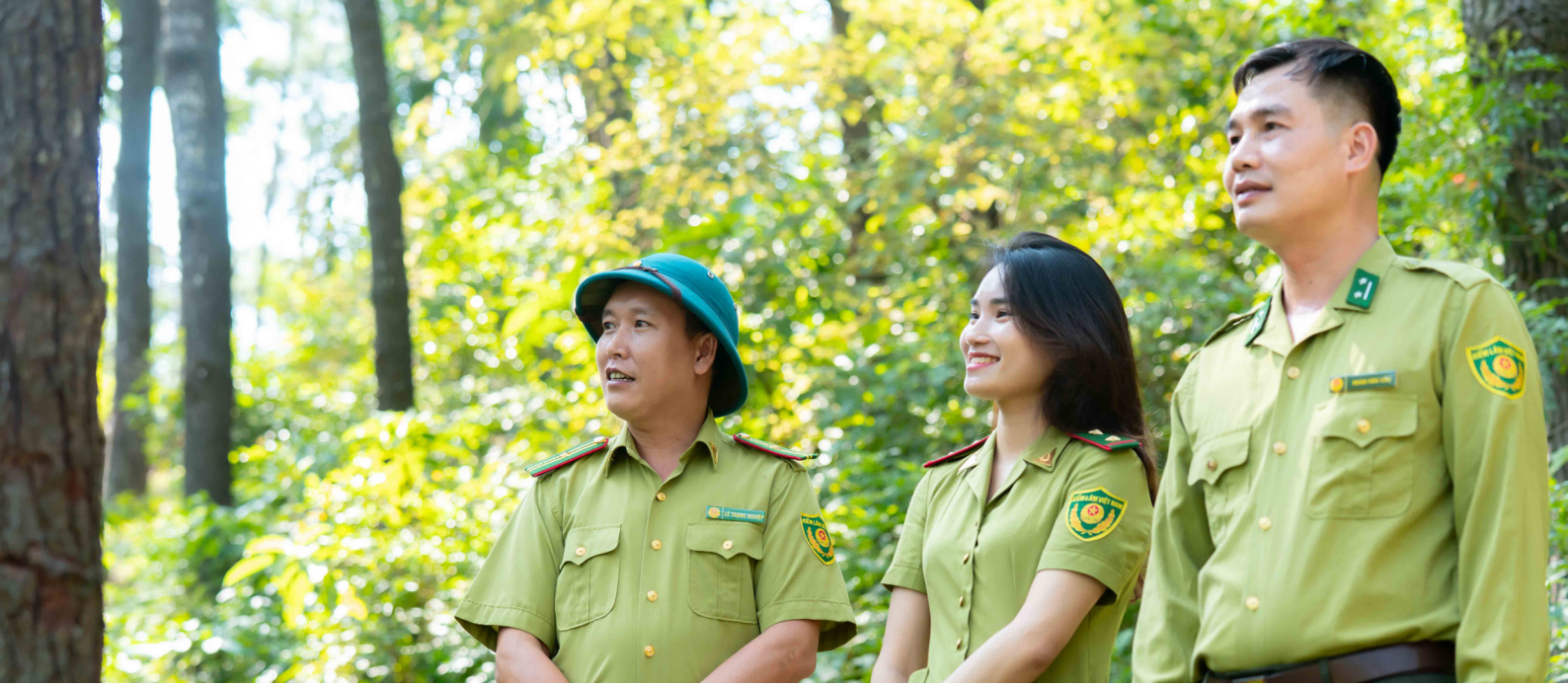
From daily pressures at the border

With the enormous volume of goods passing through customs every day, officers face constant pressure. For timber products, the challenge is even greater, as they must verify species, origin, and legality within tight timeframes.

In practice, timber identification is a major challenge: more than 800 species are regularly imported into Viet Nam, many of them visually similar and hard to distinguish. Traditionally, samples must be sent to specialised laboratories for verification. Yet the country has only about five qualified institutions, resulting in delays, extra costs for businesses, and mounting pressure on authorities.

A practical solution through digital transformation

Since WoodID was piloted at Customs Sub-departments No. 2 and No. 3, the benefits have become clear. The tool allows species verification quickly and effectively, with an accuracy rate of about 80%. Compact and mobile, it runs directly on smartphones without the need for bulky servers. This makes extraction and verification of timber origin faster, saving significant time, human resources, and costs. More importantly, WoodID's adoption aligns perfectly with customs' digitisation and modernisation agenda, bringing information technology into specialised inspections in a practical and effective way.



STORY OF MR. ĐOÀN VĂN CẨN

FOREST RANGER, HAI PHONG FOREST PROTECTION DEPARTMENT

“A major advantage of WoodID is that it works offline, without internet access. This is especially useful in difficult conditions—such as deep in the forest or in areas with poor or no connectivity.”

Challenges in the field

Previously, identifying and classifying timber relied mainly on formal training combined with field experience. This often involved consulting manuals, scientific literature, or expert opinions. But such traditional methods showed many limitations. Processed or semi-processed wood, or the same species grown under different ecological conditions, often looks different in structure—making visual identification unreliable, sometimes impossible. Adding to the challenge, rangers lacked direct field equipment, forcing verification processes to drag on and consume considerable resources.

A compact assistant ready to work offline

WoodID has brought real benefits to frontline enforcement. With only a smartphone, officers can determine timber species on the spot, instead of relying on experts or waiting for lab assessments. Its offline functionality makes it especially practical in remote forests or areas without signal.

This not only saves time and effort but also increases the credibility of reports and case handling. For rangers, WoodID promises to become an indispensable tool, integrating into patrols, inspections, record keeping, and even national forest product databases. I personally hope that WoodID will soon be scaled up so every ranger nationwide can use it daily, improving forest protection and enforcement capacity.

STORY OF MR. CAO XUÂN THANH

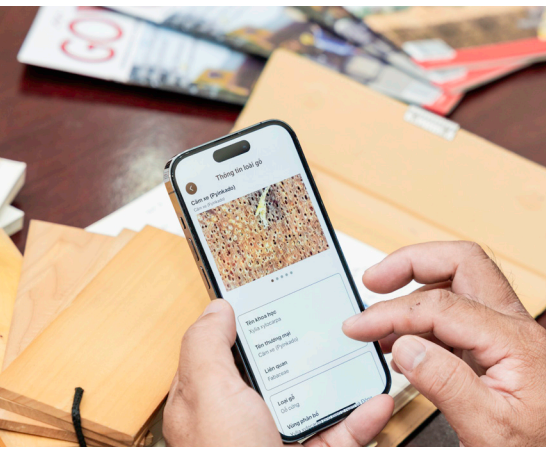
CHIEF OF OFFICE, VIET NAM TIMBER AND FOREST PRODUCT ASSOCIATION

“WoodID helps businesses reduce reliance on external verification, save costs, and enhance the reputation of Viet Namese timber.”

Enterprises facing cost and credibility challenges

Like many imports, timber requires businesses to find trusted suppliers, negotiate contracts, and meet documentation requirements. However, timber has unique challenges. Under Decree 120, if a company imports a new species—one not yet listed in Viet Nam’s records—they must verify its name. Typically, samples are sent to official institutes such as the Forest Science Institute for confirmation before customs clearance.

This process is costly and time-consuming, leaving companies dependent on third parties. Many species are visually similar, especially new imports, making it hard for buyers themselves to identify them correctly—adding risks to transactions and compliance.



A flexible solution for cost savings and global trust

WoodID offers businesses a highly flexible tool: with just a smartphone app, they can check timber species anytime, anywhere, without waiting for third-party results. This saves time and inspection costs, while helping companies better comply with legality requirements.

In practice, WoodID can be used at two critical points in timber imports. First, staff abroad can verify species before shipment. Second, upon arrival in Viet Nam, the tool can be used again to confirm and report to clients, ensuring deliveries match contracts. By cross-checking results with packing lists or timber inventories, companies can guarantee accuracy and transparency across the process. I believe WoodID will help Viet Namese timber enterprises build stronger international credibility, enhancing the industry's reputation globally. I also hope the GIZ-supported project will soon expand so more domestic businesses can access and adopt this tool.

FROM EXPERTISE TO *Artificial intelligence*

STORY OF MR. NGUYỄN BẢO NGỌC
DEPUTY DIRECTOR, FOREST INDUSTRY RESEARCH INSTITUTE (RIFI)

"WoodID turns expert knowledge into pocket-sised AI, enabling officers to identify timber species quickly with just a smartphone."

Limitations of traditional identification methods

In the past, identifying wood species required samples to be taken into a laboratory and put through multiple complex steps: from sample processing, slicing into thin sections, and examining under a microscope to comparing wood anatomical images with reference materials and standard specimens. This process was not only time-consuming—sometimes taking several hours or even days depending on the complexity of the sample—but also demanded in-depth knowledge and experience from wood identification experts. Meanwhile, the human resources in this field are extremely limited: not only at the Forest Science Institute but across the entire country there are only a handful of formally trained specialists, despite the growing demand for identification to meet legal timber requirements and comply with international agreements such as VPA-FLEGT or CITES. Challenges also arise from the lack of infrastructure, as many institutions do not have microscopes, specialised tools, or wood reference collections for comparison. As a result, wood identification work is currently concentrated mainly in research institutes and universities, which makes it difficult to meet practical needs in a timely manner.

Building the WoodID database

Compiling WoodID's dataset was a challenging journey. RIFI staff collected samples directly from ports and timber enterprises across Viet Nam, building a database of 260 species—200 sourced domestically and 60 additional species from Ghana.

The dataset built on RIFI's existing reference collection, enhanced with microscopic methods and scientific literature. Most importantly, expert experience was digitised and embedded into AI models, merging deep expertise with machine vision. The result: a scientific yet user-friendly tool that transforms specialised knowledge into an accessible mobile solution.

A breakthrough in applying AI to practice

With WoodID, rangers, customs officers, and researchers can now photograph wood cross-sections in the field and receive results within seconds. This reduces reliance on experts, saves time and costs, and—most importantly—extends identification capacity to the local level, which was previously impossible.

The tool also supports training for young specialists and students, enabling accurate identification without years of experience. It opens opportunities for collaboration among research institutes, law enforcement, and businesses, enhancing both management capacity and international compliance.

With these benefits, WoodID reduces pressure on experts, strengthens state management, and fosters a fairer, more transparent timber market. Its development is also closely aligned with Viet Nam's national digital transformation agenda—proving how AI and big data can drive sustainable forestry management and international integration.

PROSPECTS AND FUTURE VISION

The launch of WoodID marks a breakthrough in timber governance and trade in Viet Nam, especially amid deepening international integration. The tool enhances transparency and standardisation by basing species identification on data and technology rather than personal expertise.

For state management, it supports digital transformation strategies and strengthens VPA/FLEGT implementation. For customs and rangers, it offers a lightweight, field-ready solution for faster, more accurate decisions. For businesses, it improves autonomy, reduces costs, and enhances credibility. For researchers, it extends identification capacity to grassroots levels and supports the training of future experts.

Looking ahead, WoodID could expand to cover more species, integrate with national and international databases, and link with e-commerce control systems. Wider adoption will strengthen Viet Nam's timber governance, meet global market demands, and promote sustainable, transparent, and responsible growth..

WoodID—bridging expert knowledge and artificial intelligence—serves as a vital connector between science, technology, and practice, reaffirming the role of innovation in protecting forest resources and elevating Viet Nam's timber sector on the global stage.

Project "Support to the Implementation of VPA FLEGT in Vietnam"

Unit 032, 3rd Floor, CoCo International Building,

14 Thuy Khue, Tay Ho, Hanoi

T +84 24 39 34 49 51

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