**Blockchain and IoT: Integrating digital technologies with identification**

*Millennials are increasingly relying on digital platforms to purchase their needs*

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The rapid pace of digitization in every [industry](https://www.financialexpress.com/business/industry/) sector, including healthcare, e-commerce, fintech, manufacturing, and [FMCG](https://financialexpress.com/about/fmcg/), has triggered a change in the way businesses operate. Today, entrepreneurs are adapting by integrating innovative technology across key areas of operations such as sales, marketing, management, and even customer experience. Even though

digital products and services are beneficial for businesses, companies should not ignore the fact that customers often have trust deficits in the digital world. Today’s tech-savvy consumers tend to search on the web for a product to know more about it before they make an actual purchase. While the availability of information helps make informed purchasing decisions, the copious volume of product reviews and information overload overwhelms customers. However, the problem arises when consumers struggle to differentiate between credible and unreliable information sources. This triggers skepticism about the authenticity of products and makes them susceptible to manipulative marketing tactics, eroding trust in the product or brand as a whole. The eroding trust calls for enterprises to take necessary steps to meet new standards of openness, transparency, and trust in this digital world.

Millennials are increasingly relying on digital platforms to purchase their needs. However, the lack of physical interaction between the customer and the seller can create trust issues. To address this, digital platforms must be equipped with tools for authentication to create, enhance, and maintain trust between the customer and the manufacturer/seller/brand owner. Standards and supply chain tracking are great means to enhance trust. GS1, a global standards organization, plays an important role in creating trust by ensuring data integrity, interoperability, and verifiable credentials. By providing accurate consistent product information for digital transactions, GS1 helps to build trust between customers and sellers in the digital world.

Building digital trust is a necessity, especially now when digital technologies support and mediate almost all economic and social connections, and there’s an increasing gap in terms of trust between consumers and businesses. To reverse this negative trend, businesses must provide assurance to customers that their interests and expectations are taken care of.

***Blockchain and IoT as a framework for integrating digital technologies with unique identification***

Blockchain is a decentralized ledger technology that is widely used for recording and verifying transactions in a transparent and tamper-proof manner. More businesses are embracing it to facilitate secure transactions while maintaining a permanent record. This helps to ensure data integrity through the value chain journey – from procurement of raw materials to final product delivery to end customers. By leveraging the traceability aspect, businesses can easily detect issues related to counterfeit raw materials, unethical manufacturing practices, and the involvement of unsanctioned suppliers and resolve them effectively in a timely manner. By enabling traceability into business strategies, enterprises can showcase their dedication to fostering consumer trust.

Similarly, integrating the Internet of Things (IoT), a network of devices, vehicles, and objects connected to the Internet, into operations helps communicate with the connected network. It helps collect and share data smoothly across different points. By combining IoT and blockchain, businesses can access a more decentralized framework to include digital technologies with unique identification. For example, by integrating automatic identification technologies (AIDC) such as QR codes or RFID tags, every product can be tagged, and their primary data can be registered on the blockchain. The end-users can quickly scan the QR codes, barcodes, or tags containing encoded product details to verify the product’s authenticity. This practice can help them eliminate the risk of purchasing counterfeit items in different sectors.

Similarly, an enterprise might record its carbon emissions in a year on the blockchain, confirming its compliance. In the medical industry, blockchain can help track and document the supply chain of pharmaceuticals to ensure [life](https://www.financialexpress.com/life/)-saving medications and devices are not forged. It would also prevent the movement of fake medicines in the [market](https://www.financialexpress.com/market/). In addition, hospitals can use the technology to store patient data securely, facilitating accurate diagnosis, treatment and improving patient outcomes.

***Role of traceability and standards in creating consumer trust***

In the digital world, barcodes, QR codes, IoT, and product labels have emerged as tools for consumer reassurance and keys to traceability.The identifiers can be the key to access all digital info related to a product, which can help build consumer’s confidence in the safety of their chosen items, like organic products and lifesaving medicines. Similarly, the codes empower manufacturers to identify and track unsafe products and recall them on a need basis. Since the information is recorded in the manufacturer’s databases, they can quickly find questionable products in the supply chain.

In the current scenario, to achieve traceability, businesses need to implement standards to help track their products in the supply chain in real-time. To ensure the same, manufacturers need to implement unique identifiers for their products (QR codes, barcodes etc.), ensure data standardization and collaboration with supply chain stakeholders. With traceability, businesses and their customers can easily track the source of products’ origin.

Standards play a critical role in enabling traceability through giving a common framework and guidelines for recording, sharing and interpretation of information that can help establish a benchmark for quality and safety. Today, standardization enables information access which is critical to building trust in the digital world, as more entrepreneurs who seek to integrate value-driven product decision-making and technology design are recognizing its role.

***Prospects of standardization through persistent digital identity***

Verifiable credentials (VCs) and decentralized identifiers (DIDs) are emerging technology enablers that are helping to build trust in the digital world. They allow individuals to manage their own identities and control the information they share with organizations. For instance, a digital loyalty card managed as a verifiable credential can let a customer decide what data a store can use. This way, a customer can verify their age for buying alcohol without revealing any other personal information. Not only do VCs and DIDs empower individuals to protect their personal data, but they also offer benefits for businesses and consumers alike, such as establishing and authenticating certification of a product, entire information of the product, its origin, supply chain history etc. These technologies are seen as crucial for increasing trust in identity and data associated with various entities. As ‘trust moves with data’, verifiable credentials and decentralized identifiers are critical technology enablers that offer future capabilities to increase trust in identity and in the data associated with things.

New regulations are coming up to enhance sustainability and circularity of products. The European Commission (EC) is advocating for the use of Digital Product Passports (DPPs) as a means to promote transparency and circularity. These DPPs are designed to provide comprehensive information about a product’s lifecycle, from raw material extraction to production, and recycling. This data can be accessed through mechanisms such as QR codes, which are created at any stage of the product’s lifecycle, or at the latest when the product enters the EU market.

***Conclusion***

The digital world is evolving and has become an integral part of our lives. It will be a world that is connected to the real world, and people will be able to interact with it. This will create a new [economy](https://www.financialexpress.com/policy/economy/) that is built on collaboration and integration. Standards will be established to ensure that this new world is interoperable and decentralized. Organizations like GS1 [India](https://www.financialexpress.com/india-news/) will play a crucial role in ensuring that this new world is trustworthy and secure.

Hence, by implementing traceability and adhering to accepted GS1 standards, Indian entrepreneurs can help build consumer trust in the digital world. Also, leveraging verifiable credentials along with standards and barcodes can help build trust in the products, paving the path for a more secure, transparent, and reliable supply chain ecosystem.