

**NFT, BLOCK CHAIN, AND ERP: A COMPARATIVE STUDY AND WAYS TO USE NFTS
AND BLOCK CHAIN INSTEAD OF ERPS****Jaimini Kulkarni**

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Abstract

This study suggests that the emerging technology of NFT can be applied to business enterprises also. It contains a comparative study on NFTs (Non-fungible Tokens) and ERP systems (Enterprise Resource Planning). It shows how NFTs can be better and more secure record managing and tracking system than ERPs and how we can implement the use of NFTs in companies for data security and transparency. ERPs are a helpful resource, but not all enterprises can implement this system as it has its limitations, which are discussed further in this paper, and how NFTs can cover them up. In an article on ERP statistics on Oracle NetSuite, [1] it states that “The top three places ERP systems fall short for users is **data accuracy, user experience** and **analytics**.” Whereas, a NFT system has much more data accuracy and data storing features.

The basis of this study started with research on the limitations of ERP systems, then, what NFTs are and their applications, and narrowing it down to specify how they can be used in business enterprises, due to their characteristics like decentralized database and data protection.

This study states that NFT systems should be implemented in business enterprises to manage, track and record their transactions as it is way more secure as well as transparent, as they are built on blockchain. As NFTs, being an emerging technology, have a wide range of applications in various fields, they can also be found useful in the field of business. An ERP system also provides features like transaction recording, and monitoring, resources verification, data security, and visibility; however, an NFT system has these features, along with many other features as well, at a much more improved and higher level. This study gives the readers a clear idea of the objective that NFTs can be beneficial in all those aspects to make business operations more effective.

Keywords: *Future of NFT (Non-Fungible Tokens), Limitations of ERP (Enterprise Resource Planning), Blockchain technology, Data Protection, and Decentralization, SME (Small-to-Medium Enterprise).*

Introduction

An ERP, Enterprise Resource Planning, system is software that is used to manage almost all business processes and accommodate resources required to carry out the tasks to be performed in those processes. It works like a database application that provides you with the information you need to make decisions, based on the analysis of data stored in the ERP system. One may refer an ERP to as accounting software. They do not only prove to be useful in increasing work performance in large-scale enterprises, but nowadays, also the Small to Medium-scale Enterprises (SMEs), are adapting to implement ERP systems to help in their business activities.

The ERP systems help the SMEs in many aspects, such as –Cost Reduction, Custom Reporting, and Scalable Production which are described in a blog by *SAP India* on the Importance of ERP Systems for Small and Medium-Sized Businesses. [2] They help in centralizing data in one place to make it easier to analyze.

The ERPs help mid-size businesses that used basic spreadsheets, manually entering data for accounting and communicating between different processes using simple and different kinds of applications, all in one system, which makes it much easier to analyze data altogether.

However, although, ERP systems are proven to be successful and helpful in developing many small and medium-scale businesses, they have their drawbacks. Adapting an ERP system into the business can take up a lot of *costs* and other such resources for its **implementation** and maintenance, **providing training** to the employees on how to operate the system, if they are new to the technology (mostly a case in small-scale companies). It costs a lot to setup the IT infrastructure for the system, and the success of it depends mainly on the skills and experience of the manpower.

Also, another limitation of ERP is **centralized** database software. That means, if the core of the system, supposedly a hardware component like a server loses some data, then you can't turn it back, as there is no backup for it.

As the aim of this study is to realize the *ways to use NFTs instead of an ERP system*, it is important to know what NFT is –

Non-Fungible Tokens (NFTs)

NFTs are blockchain-based tokens or digital assets that uniquely represent anything like digital media, gaming items, art, or even real estate. They are based on a blockchain technology, that makes records of transactions which are stored in different blocks all over the internet and are globally available. The NFTs cannot be copied or replaced or altered and can be owned exclusively and be kept stored for as long as possible.

Literature review

- 1) Khan and Bokhari, 2019 [3] Despite more than two decades of experience regarding the adoption and implementation of enterprise resource planning (ERP) systems in organizations, ERPs success is questionable. Though ERP success stories are published in past research studies, the failure rate of ERP systems is relatively high. The purpose of this study was to find issues and challenges and assess the degree of criticality of these issues/challenges faced by organizations during ERP implementation.

- 2) MoutazHaddara and Ondrej Zach, 2011[4]This review summarizes research on enterprise resource planning (ERP) systems in small and medium-sized enterprises (SMEs). Due to the close-to-saturation of ERP adoptions in large enterprises (LEs), ERP vendors now focus more on SMEs. Moreover, because of globalization, partnerships, value networks, and the huge information flow across and within SMEs nowadays, more and more SMEs are adopting ERP systems. Risks of adoption rely on the fact that SMEs have limited resources and specific characteristics that make their case different from LEs. The main focus of this article is to shed light on the areas that lack sufficient research within the ERP in the SMEs domain, suggest future research avenues, as well as, present the current research findings that could aid practitioners, suppliers, and SMEs when embarking on ERP projects.
- 3) PraseethaGogulladass, 2020[5]There are many SMEs (Small and medium-sized enterprises) that implement or adopt Enterprise resource planning (ERP) systems in their organization. ERP is a business process management software to handle an organization's business activities. There are a lot of benefits to implementing an ERP system such as improving productivity, eliminating duplicate processes, and many more. However, there are challenges faced by SMEs to implement and manage the ERP project. The few challenges faced by SMEs are expensive and insufficient technology to implement the project. Although ERP provides benefits, it is very challenging to implement and manage it accordingly. This paper aims to focus on the challenges faced by SMEs in implementing and managing an ERP project.
- 4) Xiao Lin,2021[6] Data management and NFT have high composability. Any unique data-calling program has scarcity and uniqueness. Both blocks and data sets can be transmitted for exchange, transfers, and verification. And the management of these data vs. the processing of NFTs can also be called on the marketplace Dapps. One of our statements: Note that data management and data storage are different here. We refer to data management based on the NFT form, but the content will not deep dive into decentralized storage.

Problem statements

Implementation and installation of an ERP system into your business can be quite a task as it is a multi-phase activity. It requires proper planning and the necessary IT infrastructure to completely implement the system. Along with this, many other limitations to it aren't quite beneficiary for SMEs in general.

4.1) *Cost*: ERP installation is a complex process it takes a lot of time to start working with the system. The costs in this include the actual expenses as well as the time and resources used in the process. Bringing the hardware and software for the system itself costs a lot. Also, it requires training the employees for them to learn how to operate the system. The system won't be a success if the employees don't know how to make use of the technology.

4.2) *Data migration*: Replacing an old system with a new system requires transferring all the data to the new system from the previously used system, which is a crucial task. Data migration should be done with extreme care and knowledge. If the company previously used to enter the records manually, then it becomes really difficult to enter those records again on the new system. And what if the data gets lost in between or some error takes place in between the process, then the records won't match and it will lose the quality of the data and essential information won't be able to be retracted from that incomplete data.

4.3) *Data accuracy and integrity*: While ERP implementation or Data migration the data quality will be

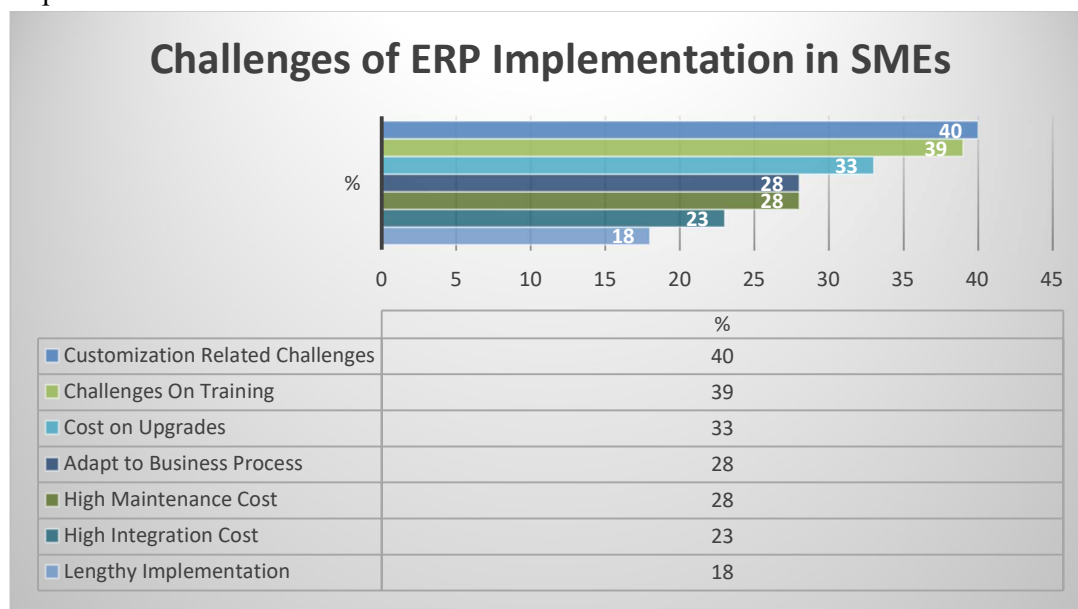
reduced and problems regarding the data accuracy and integrity may arise. Data accuracy and integrity are important characteristics that any system must have. The user should be able to trust the data presented by the system to take important decisions for its particular business activity. If the data is not accurate or reliable, then the whole purpose of the new system will be wasted, as the new system is supposed to ease their work by providing the necessary information they need.

4.4) *Centralized*: The data in an ERP system is stored in a centralized manner at a single place (virtual or physical), which makes it easier to access the data but also proves to be a limitation for it as there won't be a secondary option in case the data is lost.

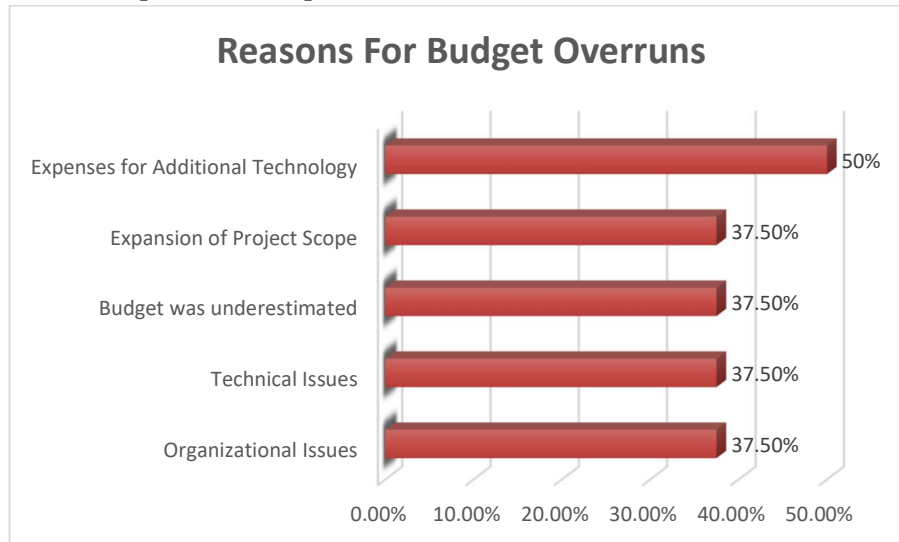
There were many failures in ERP implementations in several businesses from various industries. Some examples of such failures are given below –

1. *MillerCoors failed to implement the unified SAP ERP system into the company due to many minor issues during the rollout.*
2. *Nike lost \$100 million due to upgrading their ERP system without adequate testing before implementation.*
3. *Lidl had to drop their 500 million euros project of installing the ERP system due to a lack of funding and failure to fulfill system requirements.*
4. *Revlon suffered a loss of more than \$70 million in its sales because the newly installed ERP system had many errors in its functionality.*
5. *A car-as-a-service company, LeasePlan installed an SAP ERP system in 2006, but after a decade when the company's top management decided to upgrade the system and centralize 35 existing systems into one, also rushing up the process, it led to the crash of the system.*
6. *Cover Oregon attempted to replace its relative transaction processing systems into one single insurance application, Obamacare, but failed to do so because the scope of the project was a lot bigger than they might have expected and they couldn't meet deadlines.*

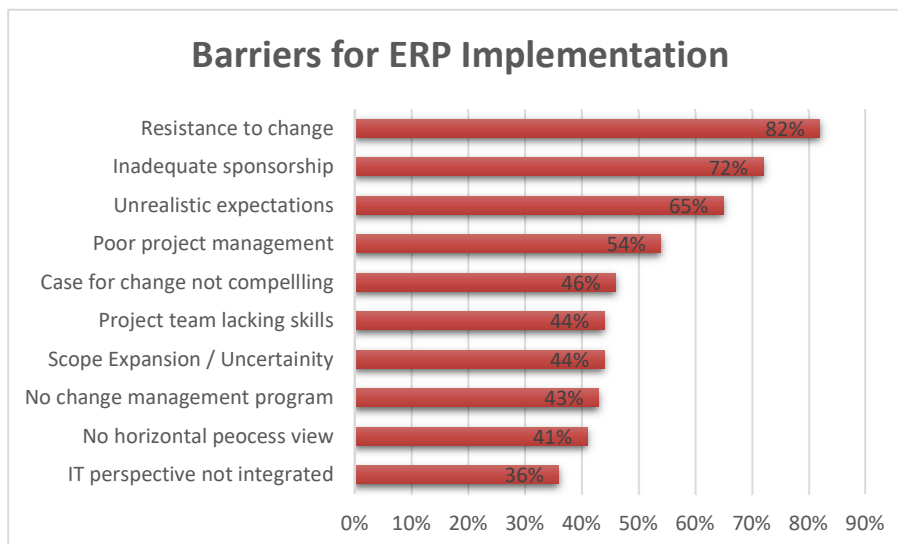
A graph from an article by [Cybrosys](#), [7] shows the challenges and risks faced by SMEs during their ERP implementation.



One of the main reasons why an ERP implementation fails is over budget. The following graph shows the result of a survey by Panorama consulting group, on the reasons why the budget exceeds the limit in an ERP implementation process.



According to an expert survey by [Deloitte](#)[8] on barriers to the implementation of an ERP system, shown below -



Findings

NFTs are buzzworthy in the blockchain industry. With the growing need and importance of data security and decentralized data, NFTs are garnering quite an attention in the market. Although the mainstream of the NFT market is about storing and trading digital art, it also has been used in several various other fields. Although, being at their early stages NFTs can be used for – identification, certification and documentation, supply chain and logistics, real estate, etc. Such use cases of NFT can be viewed on [TechTarget](#). [9]

As the use of ERP systems in businesses has quite some limitations, it is found that NFT blockchain technology can cover those limitations in a much more profound way. It makes use of cryptographic tokens to store every piece of data uniquely.

The basis for the above statement can be defined in the following aspects:

5.1) *Data accuracy and integrity*: The data stored in the NFT system are always accurate as it stores data by using cryptographic tokens and assigned unique identification codes and metadata. These tokens cannot be replaced or duplicated. Hence, the data accuracy and integrity are very high in an NFT system. Everything stored in the system can be trusted. Hacking or stealing data from the system is extremely difficult since they are stored using blockchain technology. The data cannot be altered or damaged and remains the same way as long as possible.

5.2) *Data migration*: The ownership of data stored in the NFT network can be easily transferred to any other entity registered on the network. The ownership of NFT is based on Smart contracts which are written on the blockchain. The ownership here doesn't mean exactly owning the digital asset (say, digital art, information, legal documents, etc.) but owning the blockchain NFT token. So, when the user wants to trade the NFT or transfer it to some other entity, the **smart contract** is transferred.

5.3) *Data Transparency*: As these NFTs are stored on the blockchain, the data is transparent. The entire transaction of NFT is available everywhere, publicly and globally. This also helps build trust among related entities and increases the integrity of the data.

5.4) *Decentralized Data*: The main advantage of the NFT system is that it has a decentralized database. The data in the form of tokens is not stored in just only one place but many different locations in a blockchain. However, this doesn't mean the copies of the data are stored, but the tokens are stored in different locations with their unique identification codes. This helps to provide a backup for every data, which is linked together in a chain and hence, the data never actually gets lost or damaged. Any user, who has the identification code, can access the data very easily.

5.5) *Trackability and accountability*: Every transaction performed in the NFT ecosystem is stored on the blockchain. This gives the users ability to track every record of the particular transaction using the identification codes. One can easily track down the original piece of digital media/asset. Also, the NFT platform is accountable for smart contracts made for verifying the ownership of each NFT.

Indian blockchain enterprises are also looking for ways to enter this NFT ecosystem.

According to Economic Times, [10] a Bangalore-based blockchain company, Koinearth's marketsN platform, launched an NFT service for enterprises to convert their enterprise assets into tradeable NFTs. Koinearth helped MG become the first carmaker in India to launch its NFTs.

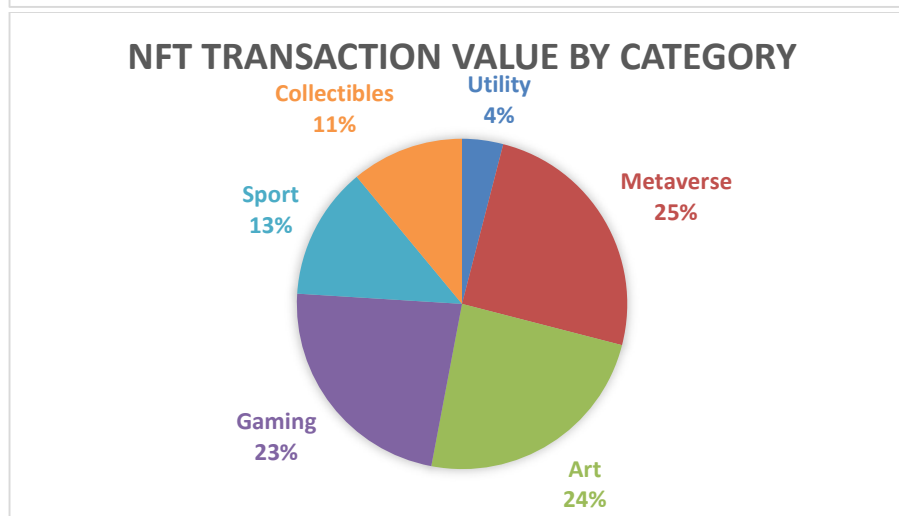
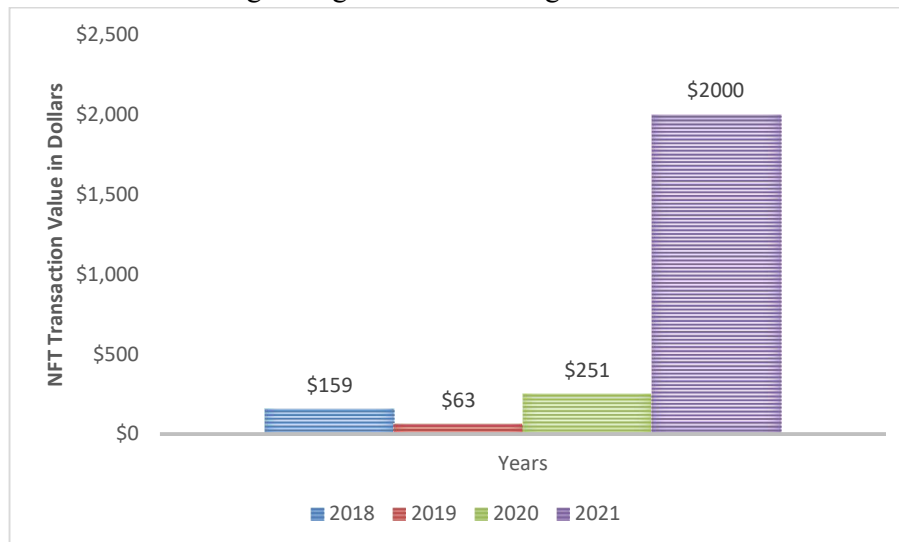
Koinearth states that –“Convert physical products, material & documents to NFTs to track them across your supply chain. As a ready-to-use ERP-compatible SaaS marketsN enables the on-demand creation of digital supply chains using a hybrid permissioned-public blockchain. With just a few clicks, enable real-time cross-enterprise collaboration with your suppliers, customers, banks, insurance companies, etc. Enterprises which achieve deeper supply chain integration achieve lower operating costs, higher resilience & more agile supply chains. In the automotive sector alone, \$77 Billion could be created by deeper supply chain integration. Let's digitize your supply chain ecosystem.”

Also, many companies in India are using NFTs as a marketing tool to improve their image in the metaverse. Companies like Tanishq, M&M, CEAT, MakeMyTrip, and MG Motors have launched their NFTs to exclusive users (through methods like auctions or first-come, first-served basis).

NFTs can be used in supply chain management (SCM) as it provides important features required in the SCM (as defined above). Managing a database in SCM is very complex and may have many issues. But, by using blockchain-based solutions like NFTs, the enterprise can gain benefits like – traceability,

recallability, and counterfeiting. [AppDupe](#)[11] explained how NFTs and Supply Chain Management can be combined for better performance.

The NFT market is growing in different categories.



Enterprise NFTs can help in business processes in many ways, such as –

- Using Smart Contracts for proofing important documents.
- Supply Chain Management, as in tracking the transactions.
- As a huge marketing tool.
- Improving or making the brand's image.
- Assets (like real products, virtual or physical real estate, goodies, etc.) for fundraising, when in need.
- Making your own NFT collections to sell for crypto-currency or advertising as well.
- For charitable campaigns for social welfare as well as for advertising purposes.

In the following table, 70 well-known companies all over the world have been categorized based on their NFT use cases. Also, out of them, are a few companies that use NFTs as more than one use case.

Reputation/ Charity	Market ing	Identific ation & Data Security	NFT Art Sales	Supp ly Chai n	Assets:Di gital & Physical	Gamific ation	DataB ase	Financ ing
Norwegian Cruise Line	Coca- Cola	Nike	Budweis er	Cartie r	Adidas	Nike	South China Mornin g Post	Jiayin Group
Clinique	Mid- Day Squares	WISeKey	NFL & Ticketm aster	Louis Vitto n	Liquid Death	Formula 1	SalesF orce	Autom ated Market -Maker
Charmin	McDon ald's	PFPID	Taco Bell	Prada	Team GB	Atari		OneOf
Coca-Cola	Origina l Penguin	Prada	NBA	Wal Mart	ASICs	Bratz Dolls		Master card
Gucci	Tanishq	Louis Vitton	WWE		Funko	Warner Music Group		Visa
Apocalyptic Apes		Cartier	Liquid Media (YVR)		ISM Toys	Sky Mavis		Forbes
Typical Tigers		Adobe	Mattel's Hot Wheels		M&M	Yield Guild		Pizza Hut
Ethos Water of StarBucks		Mango	Ray-Ban		MakeMy Trip	Immutab le		
ChangeDAO		Burger King	MG Motors		CEAT	The SandBox		
Nivea			Yuga Labs		Samsung	Forte Labs		
			Prada		Air Europa	Citroen		
			TIME Magazin e		PinkFong			
			Pepsi Co.		Mercedes			
10	5	9	13	4	13	11	2	7

From the above table, we can say that the majority of organizations have adopted the NFT system for making and selling their NFTs, by gamification of their products and by the distribution of physical as well as virtual/digital assets. However, other use cases are also being explored and the scope of NFTs will expand even more in the future.

Results

According to the World Bank, SMEs cover the majority of global businesses, of approx. 50% and 90% of employment around the globe. Still, they don't get much recognition and growth opportunities due to various reasons like – lack of finance, lack of database, inadequate IT infrastructure, etc.

NFTs are great tools for marketing, enhancing brand image, and creating funds in different ways. Big companies like MG Motors or Coca-Cola and the NBA have been using NFTs for benefiting the business. So, SMEs should also take leverage this technology to grow and promote their business.

NFTs can help the SMEs in many ways, such as –

- Providing funds: NFTs can be used as collateral for loans in DeFi (Decentralized Finance) applications to ensure safety and prevent counterfeiting of the records of financial transactions. The SMEs can also put their real-world assets, like real estate, in the NFT marketplace to trade. As NFTs are considered rare items, their bidding prices are a lot higher. And when global faces and celebrities purchase them, (some of them even make a collection of their NFTs) their fan base also tries to buy those NFTs by paying huge amounts. For example, Amitabh Bachchan sold his NFT collection (5000 NFTs) at USD 966,000 (approx. 7.15 crore).
- Brand reputation: Since NFTs are recognized uniquely and globally, small businesses will surely benefit from them by making their NFTs and selling them exclusively to the public.
- IT infrastructure: Having a well-developed IT infrastructure is very crucial for any business to grow. NFTs can help SMEs in managing their supply chain with the authentication of data. Also, the profit from the sale of NFTs will help the businesses to develop their IT infrastructure and R&D too. Through NFTs, SMEs will get a digital marketplace by displaying and advertising their products.
- Customer attraction: NFTs allow global customers to know about the business. The NFT ecosystem is transparent and publicly available, which is what intrigues the consumers to get them surrounding the business. They also help SMEs to get into the sight of global investors.

As discussed above both the ERP system's limitations and NFT's ways of covering up those limitations, and *NFTs being a part of the Ethereum Blockchain*, it can be said that the businesses might use a combined blockchain-based solution of both ERP and NFT systems.

Above mentioned benefits of NFT are all relative to the blockchain. The integration of blockchain and enterprise resource planning systems is quite beneficial for expanding businesses to get better functionality and security of the ERP system.

The following statements help in justifying that an integrated Blockchain-ERP is better than the traditional ERP system.

ERP System

Blockchain-ERP System

• A traditional ERP system uses a centralized database that stores a single modification of data.	• Whereas, a blockchain-based ERP system stores the data which is shared by a number of people on the web.
• The data in the system can be accessed or altered by only the authorized person.	• On a blockchain, although a vast no. of people shares the data simultaneously, no one can update or alter the data.
• Data Security in ERP systems is handled by permitting only authorized persons.	• The data is secured by using smart contracts.
• Supply chain system has great complexities which ERP systems might not handle or a separate system might be required for the supply chain only, which is a more difficult option.	• Data traceability is very important in the supply chain. In a blockchain, data can be tracked easily using identification codes. For instance, the codes we get with NFTs.
• The authenticity of data and accounts becomes difficult to identify, in case of malpractice or corruption within the organization.	• In the blockchain, the data is stored at multiple accounts (tokens) even outside the organization, so any malpractice can be easily audited.
• Any damage to the system (or any part of the system) will lead to the whole ERP system's failure and data loss.	• Although ERP systems also have their backups, not as enough as a Blockchain ERP can have, as multiple copies of data are stored all over the internet.
• The expansion of an ERP system costs a lot and sometimes becomes very complex to migrate or merge the data.	• The blockchain provides a real-time scalable database, so there won't be any issues as in 'ERP expansion'.
• The ERP system itself cannot verify whether the signatories are fraud or not even if access is given to authorized people. For example, the person accessing the system might make some mistake in signatures or update data to the wrong division.	• In a Blockchain ERP system, the documents cannot be forged or faulted information, and documents are verified before updating their data.

Conclusion

ERP systems are really helpful software to help in the smooth working of various business operations. From inventory management to making future development plans and strategies, an ERP system helps in analysing and maintaining databases. The main use of an ERP system is to tell how to use a company's resources more efficiently and reduce costs. However, they are also complex systems to implement

successfully, so that they can help in those business activities. The majority of ERP systems fail during the initial implementation phase itself. If a system doesn't work properly, then what is the use of having a high-profile, good analytical, all-in-one-place, and expensive software? So, changing the use of the traditional ERP systems into new modernized ones is truly significant.

The business does not only require centralized and sorted data but also secure, protected, and backed-up data. Especially for SMEs, data security is very important as they don't have many funds to store data very profoundly. As this is the main feature of an NFT's blockchain-based system, to provide data security, accuracy, provability, transparency, and trackability.

Using the integrated Blockchain and NFT-based ERP system will surely help to improve the system performance and business operations and functionality.

NFT is an emerging trend that will create more and more use cases in the future. Although the use of NFTs in the business world is just in its beginning stage, it still has the potential to be able to have many use cases in the future. NFTs are a great option to invest in, to help small companies scale and grow. With much less to lose, they will surely prove to be of great use and helpful, with a wide scope of development. Both NFT and Blockchain are new technologies that need to be explored further a lot, but still, they are worth enough to be implemented into business to get the best out of them and help the industries. For further enhancements in this research, it can be discovered in detail how implementing this Blockchain-ERP system will help SMEs in India to grow and how its implementation will work.

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