



1. OVERVIEW

Authentica is a blockchain based platform that aims to combat counterfeit medicines in India. With the mission to expunge substandard and fraudulent (SF) medicines from healthcare supply chains, Authentica operates by incorporating physical drugs units into the internet of things (IoT) with digital twins to enable traceability across supply-chains. Authentica insulates consumers from the risks of counterfeit medicines, decreases direct expenditure for medications, and instead promotes transparency in medicinal consumption.

2. PROBLEM STATEMENT

2.1 INTRODUCTION AND TARGET MARKET

Infiltration of healthcare supply chains with SF medicines significantly compromises a core right of humankind – access to quality healthcare – and is identified by the US Food and Drug Administration (FDA) as a public health concern¹. The World Health Organization (WHO) estimates that SF medicines cause over 1 million deaths worldwide, creating a US\$21 billion dent in global economies². The issue is particularly abrasive in Less Economically Developed Countries (LEDCs), such as India, for three main reasons:

1. They are statistically five times more likely to be plagued with epidemics compared to More Economically Developed Countries (MEDCs)³
2. It is not economically viable to operate regulated pharmacies distant from urban centers⁴
3. Informal drug marketplaces are more attractive due to their convenience, accessibility, and mobility⁵

Evidently, the WHO estimates that a staggering 10.5% of the medicine supply in low-income nations are SF⁶. Out of all LEDCs, Authentica intends on targeting India for the following reasons:

1. The percentage of SF drugs are nearly double the average of LEDCs, approaching 20%⁷
2. 73% of Indian population do not have access to basic healthcare products⁸
3. 30-35% of the global counterfeit medicine supply originates from the nation⁹
4. Since the COVID-19 pandemic, the domestic SF drug market is growing at 33% per annum¹⁰

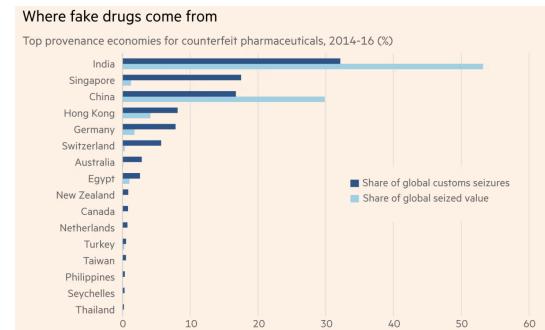


Figure 1
Chart comparing SF drug origins worldwide

2.2 IMPACT ON CORE STAKEHOLDERS

2.2.1 General Consumers

The team synthesized 21 user interviews and consumer research reports to derive the following conclusions. The costs inflicted by counterfeit medicines on the general consumer is stratified into 2 broad-categories:

1. Curative drugs contain Active Pharmaceutical Ingredients (APIs) bioengineered to cure diseases. The United Nations predicts that illicit manipulation of pneumonia drugs have resulted in the deaths of 169,000 children¹¹. An Indian interviewee lost their father due to SF curative prescriptions, where only 7% of his lungs functioned by the time knowledge of the fraud surfaced.
2. Preventive drugs contain APIs to protect against the development of a disease. SF preventive drugs have a greater effect on trust of governments and healthcare authorities.

Regardless of prevention or cure medicines, consumer interviews also provided the following insights:

1. They pay premiums for known brands when less-expensive alternatives exist due to efficacy concerns. According to the FDA, branded drugs are priced 80-85% more than generic alternatives¹².
2. Even when a drug is prescribed by doctors, they are unsure whether it is effective.

2.2.2 Regulatory Authorities

The team interviewed public-sector officials from India's drug regulatory agency – the Indian Central Drugs Standard Control Organization (CDSCO) – to obtain the following insights:

1. Enforcing regulation inflicts the greatest cost on regulatory resources. Specialized processes including spectroscopy, calorimetry, and chromatography range from US\$5,000 to 15,000 for one test¹³.
2. SF preventive medications have adversely impacted the population's perception of the CDSCO
3. Preventive treatment campaigns – such as COVID-19 vaccine drives – are administered by municipal authorities, so residents have begun relating general medication with the government. As such, illnesses due to SF drugs have resulted in condemnations against such regulatory bodies.
4. As demonstrated by the extent to which SF drugs impacted communities during the COVID-19 pandemic, SF drugs have recently been mass-proliferated in supply chains.
5. There is no current fool-proof solution to mitigate the effects catalyzed by the COVID-19 pandemic.

2.2.3 Pharmaceutical Companies

The team conducted user interviews with over 15 executives from pharmaceutical companies including Johnson & Johnson, Abbott, GSK, Novartis, and Roche to detect the following pain-points:

1. Counterfeit products imperil Big Pharma companies with reputational, financial, and litigation costs. In India, legitimate manufacturers lose sales worth almost \$4.3 billion per year due to SF drugs¹⁴.
2. Big Pharma is legally held accountable for compensation by general consumers who unknowingly consume SF drugs and go on to take legal action.
3. Manufacturers of SF drugs (and thereby entry points into the supply chain) are extremely difficult to pinpoint and eradicate since their operations are "on wheels". They alter operating locations.
4. Reputation, trust, and credibility are of utmost significance in the industry: generic producers suffer disproportionately to other industries, and *any* negative media stimulates customer migration.
5. SF drugs deter R&D, since firms are compelled to divert resources towards shielding current medicine formulas, rather than investing in the incubation of novel solutions.

3. EXISTING SOLUTIONS & DEFICIENCIES

The team implemented a dichotic approach to evaluate existing solutions for drug-counterfeiting. Through interactions with healthcare executives and examining research reports, the first segment comprised current technical security measures applied in industry; the second comprised innovative operations of external service providers and companies, evaluated through interactions with authorities and conducting competitor research.

3. 1 TECHNICAL SECURITY MECHANISMS

Mechanism	Implementation	Deficiency
Unit-Serialization	Serialization assigns each medicinal product a unique identification code. Codes are attached as a unique 2-D matrix barcode on individual drug units. Such codes contain information on drug origin, supply chain intermediaries, and drug expiration.	Serialization is susceptible to data manipulation and corruption ¹⁵ . Through blockchain services, prior data is immutable, which eradicates the possibility of manipulation and corruption. Further, serialization does not provide any encoded data to the end user.
Physical-Chemical Identifiers (PCID)	PCIDs are non-reactive substances – like inks and pigments – incorporated in trace amounts to unique units. Detecting the presence of such PCIDs in drugs serves as a token of authenticity.	PCIDs can be replicated easily. Also, PCIDs are typically implemented in liquid medications transported in vials, not in Solid Oral Dosage Forms (SODFs), therefore are not applied industry wide.

3. 2 EXTERNAL SERVICE PROVIDERS

Company	Innovation	Deficiency
Authena	Authena is a platform providing security to multiple industries, including healthcare. Authena uses a tamper proof seal for liquid medicines linked with a smart contract containing information about the vial.	Authena's solution is only applicable for vials, curtailing suitability for the majority of medications. Since Authena provides data for only the manufacturer and retailer, they overlook the likely point of entry (PoE) for SF drugs.
Acumen LLC	Acumen is an informatics institution providing authorities and insurance bodies insight into the industry's stakeholders. Its solution implements data-analysis on the safety and efficacy of specific drugs.	Acumen's solution is research based and tracks only major stakeholders. The solution fails to provide end-to-end tracking. SF infiltrations are deemed random and unforeseeable, so past data cannot extrapolate future occurrences.
OPTEL Intelligent Supply Chain	OPTEL implements AI-based traceability by attaching QR Codes products with digital identities hosted on cloud databases. Data is updated onto the website as it travels through intermediaries within a chain.	OPTEL's solution is susceptible to risk since QR codes may be linked to fraudulent websites with falsified data. Its AI algorithm is a projection that is occasionally inaccurate. All data is hosted within the company, which may pose a corruption threat.
FDA Drug Supply Chain Security Act (DSCSA) Pilot	The pilot is a blockchain based solution for drug traceability. The solution consists of a shared ledger between pharmaceutical companies containing package-level data of a drug movement within a supply-chain.	This program is limited to the US and does not include cross-border trades involving counterfeit medicines. This leaves a significant infiltration PoE for counterfeit drugs unaddressed as most fraudulent drugs are import-induced.

4. PROPOSED SOLUTION AND VALUE PROPOSITION

4. 1 GOALS AND OBJECTIVES

Authentica provides a blockchain-based service that connects digital identities to physical drug units through embedding such drugs into the IoT. Putting a digital layer on the supply chain increases transparency, allowing traceability for consumables that have significant health implications while decreasing costs. The solution mitigates the oligopoly in the market, distributing market share to generic and new producers who do not may not possess the same brand equity. Additionally, the solution has a multipronged value addition, catering to each one of the three major stakeholders encompassed within the problem.

Stemming from disadvantages of competitors explicated in the previous section, the value proposition additionally:

1. tracks every drug unit, regardless of the packaging, ingredients, or other physical factors
2. tracks the entirety of the supply chain, including cross-border trades and intermediaries
3. is based on discrete data, not projections based on probability
4. level the playing field of all products by nullifying pricing premiums derived from brand equity
5. have a high barrier to replicability such that counterfeiting becomes economically infeasible

4. 2 METHOD OF DEVELOPMENT

Authentica's technical development is greatly supported by affiliated parties, including UC Berkeley professors in the Haas Business School, Electrical Engineering & Computer Science (EECS) department, and the Center for Responsible, Decentralized Intelligence (RDI); the BNB Chain; Ripple and the XRP Ledger; Web3 at Berkeley; and FinTech at Berkeley. These affiliated parties are expected to subsidize development costs, aiding with constructing avante-garde cryptography and encryption algorithms, and providing iterative feedback in the alpha testing stages.

4. 3 TECHNICALITIES OF THE SOLUTION (ITERATION 1)

Authentica's technical innovation can be divided into two segments: the digital and the metaphysical. The ultimate aim is to provide a metaphysical state of physical drugs through exploiting digital innovation, thereby incorporating every medicinal unit into the interconnected IoT. The means whereby this is accomplished is demonstrated below.

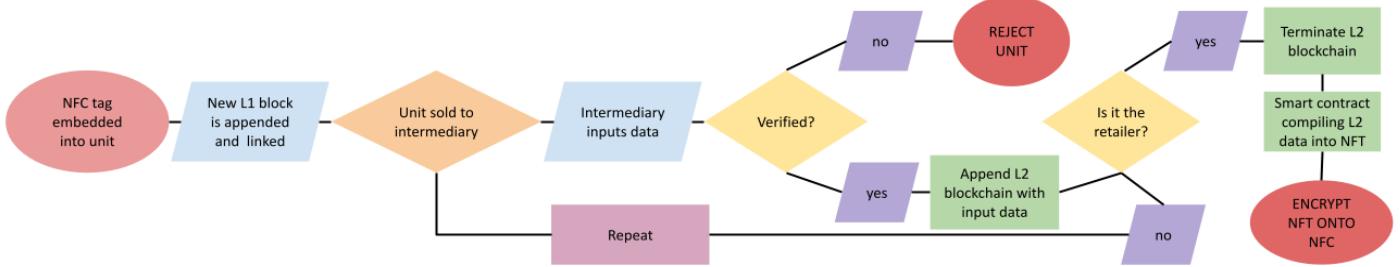


Figure 2
Flowchart of the technical innovation

4.3.1 Digital Innovation

Authentica develops the first orthogonal dual layer blockchain system, with the first layer – the backbone – functioning as a regular permissioned (private) blockchain, while the orthogonal layer operates similar to a roll-up, in that it is a finite chain that is proprietary to a unique layer 1 (L1) block.

More thoroughly, the first layer will be a blockchain where each block pertains to a physical unit produced by a drug manufacturer. The manufacturer and intermediaries alike create unique on-chain identifiers (ID) This layer is made to ensure that each authentic drug relates to one-another through the manufacturer's ID. Since no other ID can be the same, each product linked to this chain is intrinsically proven to have been produced by the intended manufacturer.

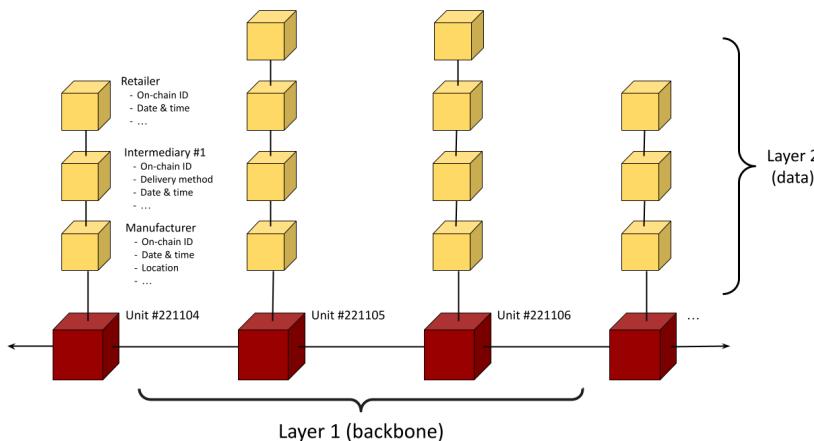


Figure 3
Diagram illustrating the orthogonal dual-layer blockchain Structure permitting drug verification

The secondary chain serves as a medium to trigger a smart contract that mints a non-fungible token (NFT) wherein supply chain and ancillary data are presented to the end user. Each L1 block – the digital representation of a physical drug – is orthogonally appended with one layer 2 (L2) block that includes idiosyncratic data. This orthogonal chain is updated as the product moves hands within the supply chain; each new block corresponds to an intermediary. Once the retailer possesses the product, the blockchain is terminated and is no longer mutable. A roll-up is the best analogy to visualize this secondary chain, since a finite number of blocks peculiar to a main-chain block is “rolled-up” into the same block.

4.3.2 Metaphysical Innovation

The manufacturer adds infrastructure to their operations to embed near-field communication (NFC) tags to each produced drug unit. A drug unit, here, refers to any medium whereby a drug is obtained by the end consumer, such as a bottle of tablets or a blister pack; and an NFC tag is akin to a QR code, in that it can store information, but differs in that the internal information stored itself can be dynamic. The NFC tag, which is available in sizes as small as 3 mm, should be embedded in a location which is difficult to reach without tampering the product's sealing mechanism. This tag will connect the physical drug unit to the IoT through encrypting one unique block onto one unique drug unit.

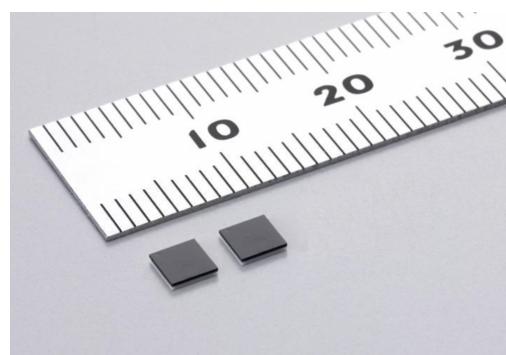


Figure 4
Illustration of an NFC tag



Figure 5
Automated production lines to append intermediary's unique data

By creating on-chain IDs, manufacturers and intermediaries receive unique on-chain keys, similar to passphrases. Using this confidential key, they update information on L2 through a process similar to automated serialization in existing inventory lines. Once data is received, it is hashed using standard SHA-256 hashing algorithms, and if verified, appended onto L2 as a new block. The process continues for each intermediary until the last intermediary, who terminates the chain – making it immutable – once their block is appended. Once immutable, a smart contract algorithm compiles the data encrypted in each block into an NFT that will be used as the proof of authenticity. This NFT is what is ultimately linked to the NFC tag.

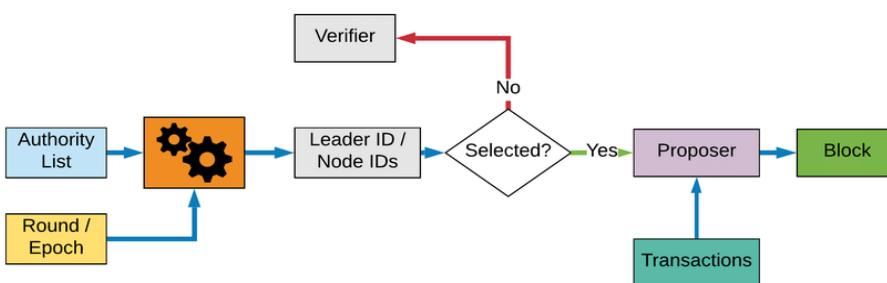


Figure 6
Flow-chart of the PoA consensus algorithm

Since the blockchain is private and there are centralized controls for determining authenticity, the most appropriate consensus algorithm is Proof of Authority (PoA), where only authorized entities have the authority to validate. Such entities are likely to be regulatory bodies, drug manufacturers, and authorized pharmacies (retailers).

With the ubiquity of NFC readers (virtually every smartphone produced after 2010 has an in-built NFC reader) – used in technologies such as tap-to-pay, key fobs, and credit cards – almost everyone with connectivity can read the information presented on the NFC reader. By 2026, 1 billion people living in India are expected to own smartphones, with a CAGR of 6%¹⁶. The user simply needs to bring their smartphone within 4 cm of the product, and the authenticated NFT will pop-up on their screen, similar to how an “Airdrop” prompt appears on the iPhone or “Android Nearby Share” on Android devices. The everyday consumer can thus verify the authenticity of a drug on the shelf of the pharmacy before they purchase it, allowing them to make appropriate consuming decisions.

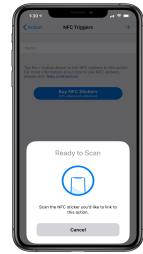


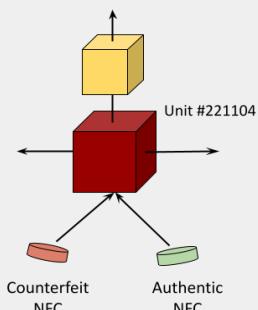
Figure 7
NFC pop-up illustration

4. 4 CHALLENGES & FURTHER ITERATIONS

4.4.1 Iteration 2

Challenge	Modification
If decrypted, counterfeiters can copy one specific private key embedded onto a unique NFC tag and paste it onto a duplicate counterfeit NFC tag. As such, both the real and the counterfeit drug will have different physical tags, but will correspond to the same authentic NFT.	<p>Each L1 block will have a relay of public and private keys in order to encrypt the associated L2 blockchain and NFT on the NFC tag. Only the first interaction will be hashed (in the block's origin) to ensure that the intended NFT is linked to the NFC.</p> <p>Zero-knowledge-proof (ZKP) algorithms, specifically the zero-knowledge succinct non-interactive argument of knowledge (ZKSNARK), will be used to determine whether the public and private keys match. ZKP algorithms allow the verification to occur without conveying any data.</p> <p>Such algorithms are valuable in this context particularly because revealing information regarding the supply chain before the blockchain is immutable may imperil imitation of the entire supply chain. ZKSNARKs are widely considered fool-proof, which, per se, delineates that ‘double spending’ NFTs on different NFCs through decryption of individual private keys becomes virtually impossible.</p>

Figure 8
Illustration of the challenge



4.4.2 Iteration 3

Challenge	Modification
Even after a NFT is minted, if a systematic cyberattack allows counterfeiters to gain access to private keys on the L1 blockchain, they can gain access to every NFT of verification. This entails that they may counterfeit as many drug units as the number of authenticated drugs units, which could count in the millions for mainstream OTC medicines.	The smart contract that compiles L2 data into an NFT is modified with a function which assumes the relay key of the NFC tag as the only possible authentic key for the specific unit. Since this key is obtainable only on the physical tag itself, it cannot be extricated from cyber attacks. Essentially, even if counterfeiters duplicate keys, they need to sell the unit to the last intermediary – to trigger the smart contract and assume the counterfeit NFC as authentic – <i>before</i> the real drug is received. If the retailer's L2 block has been appended, the unit cannot be counterfeited. While this iteration does not remove the possibility of counterfeiters, temporal binding greatly mitigates its impact.

4. 5 NULLIFIED & CONCEDED CHALLENGES

Challenges	Nullification/Concession
Changes to physical operations may be a barrier to entry and induce a single point of failure.	Most supply chains are very short: producer → wholesaler → pharmacy → user. Authentica is working with the Indian government to add this to legislation, so intermediaries will need to adapt to the innovation.
Counterfeiters can simply extract the authentic NFC tag and place it on their counterfeit product.	Possible, but it does not make economic sense for the counterfeiter. They need to purchase the authentic drug and tamper the seal such that the unit cannot be resold. The only path to economic feasibility is if the counterfeit is valued significantly more than the authentic, which is highly unlikely.
The solution does not eradicate SF drugs from the market completely.	The threshold for the work required to decrypt and duplicate is significant enough such that it is not economically viable, as demonstrated in iteration 3. Further, there is no systematic scalable counterfeiting mechanism: every individual drug needs to be decrypted uniquely, exponentially reducing the quantity counterfeited.

4. 6 MULTIPRONGED VALUE ADDITION

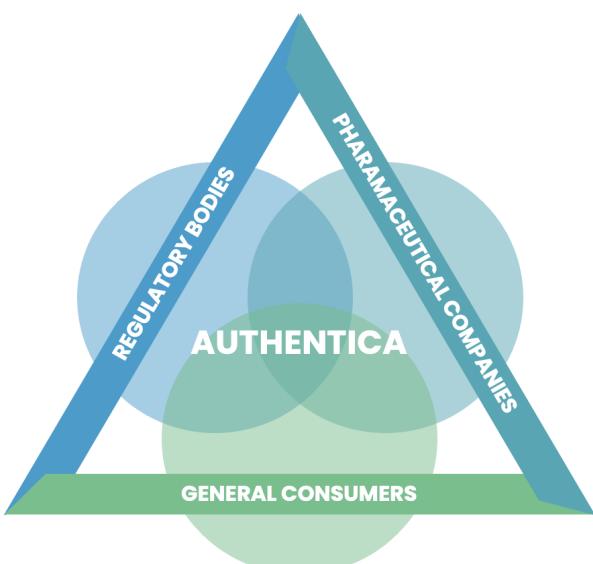


Figure 9
Illustration of Authentica's value-add Venn diagram

For the general consumer, Authentica provides vendor neutral unfalsifiable verification for lifesaving and lifestyle drugs, allowing consumers to certify their safety. Since generic and branded drugs are verified, consumers have the choice to select the 80-85% less-expensive generic versions of drugs without compromising on efficacy.

For regulatory bodies, the blockchain provides tamper-proof insight to practices of firms in a high risk, high trust industry, permitting law enforcement to ensure their compliance with stringent protocols without having to conduct expensive testing. Further, the public's ease of determining industrial stakeholders pertaining to their medication shields the CDSCO from misunderstandings that erode trust.

Lastly, pharmaceutical companies increase their reputation by having "no room to hide"; they operate under the media perception that they only produce high efficacy products. Hence, they save on financial, reputational, and litigation costs while increasing sales; permitting them to invest in developing new lifesaving and lifestyle products, ameliorating the status quo for the broader global community.

6. IMPLEMENTATION TIMELINE

Task	2023												2024					
	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June		
Phase 1: Stakeholder Outreach																		
1.1 Engage Pharmaceutical firms																		
1.2 Outreach to Indian CDSCO																		
1.3 Curate data on impacted consumers																		
Phase 2: Development																		
2.1 Optimize physical innovation																		
2.2 Software MVP Development																		
2.4 Iterate MVP on affiliates' feedback																		
2.5 Begin solution development																		
2.6 Run quality-control on final solution																		
Phase 3: Implementation																		
3.1 Present MVP to regulatory bodies																		
3.2 Present MVP to Big Pharma firms																		
3.3 Present MVP to generic pharma firms																		
3.3 Finalize healthcare firms for pilot																		
3.4 Work with authorities to legislate																		
3.5 Implement solution and run pilot																		
3.6 Monitor Performance of Solution																		
Phase 4: Evaluation																		
4.1 Evaluate performance through KPIs																		
4.2 Conduct user interviews for feedback																		

PHASE 1: Stakeholder outreach involves creating points-of-contact (POCs) within all key stakeholder organizations. Outreach and interaction with all stakeholders, including regulatory authorities, healthcare firms, and end-consumers has been ongoing since March 2023. Authorities' outreach takes longer since the quantity of interviews is greater.

PHASE 2: Development will be conducted in-house, commencing with the creation of a minimum viable product (MVP). The MVP will be presented to pharmaceutical firms to demonstrate Authentica's value-proposition and seek feedback. Full-fledged development with quality oversight will subsequently be conducted alongside affiliates.

PHASE 3: Implementation involves securing pharmaceutical partners and embedding Authentica's blockchain solution within products with highest susceptibility to counterfeiting. Due to the intricacy of the issue, regulatory and industrial organizations will likely test the solution extensively. Producers of generic drugs, or producers with lower brand value will be Authentica initial target, as they derive maximum benefit.

PHASE 4: Evaluation involves self-assessment and external feedback. Within self-assessment, performance of Authentica's solution will be assessed against the predetermined success criteria. To obtain external feedback, the team will conduct interviews with stakeholders. Consequently, Authentica's solution and strategy will be refined.

PHASE 5 – Monetization (Post-Pilot, Est. June 2024 onward): As alluded to, Authentica hypothesizes that generic and new manufacturers are likely its primary customers. The team aims then will solicit consumers from the pharmaceutical oligopoly. For pricing, Authentica will use a fixed-revenue model for each unique drug name (not unit) traced, based on insights from industry interviews.

7. MEASURING SUCCESS:

Success for Authentica will be assessed through impact across all major stakeholders. Qualitative and quantitative metrics are evaluated on a yearly basis (YoY) or a quarterly basis (QoQ), depending on the immediacy of impact.

7. 1 GENERAL CONSUMER

Key Outcomes	Indicators	Measures
Reduced counterfeit medication consumption	15% YoY reduction in illnesses from counterfeit medicine consumption	Analyzing hospital databases to affirm reduction in counterfeit medicine cases
Less expenditure on healthcare products	30% YoY reduction in percent of disposable income spent on medication	Monitoring court documents for reduction in SF drugs-related lawsuits

7. 2 REGULATORY AGENCIES

Key Outcomes	Indicators	Measures
Reduced counterfeiting complaints	40% YoY reduction in complaints by pharmaceutical firms about counterfeiting	Consulting with regulatory agencies to affirm reduction in counterfeiting
Reduced findings of counterfeit medicines	25% YoY reduction in proportion of random samples containing SF drugs	Evaluating open-source regulatory databases on counterfeit findings
Decreased centralization of market share	10% increase in number of firms with more than 5% market share	Analyzing trade-data, annual reports, and industry reports

7. 3 PHARMACEUTICAL FIRMS

Key Outcomes	Indicators	How?
Improved reputation	5% QoQ addition in sales of products previously subject to counterfeiting	Evaluating increase in sales through financial data solution implementation
Lower litigation issues	40% higher win-rate for pharmaceutical firms involving counterfeit medicines	Assessing company lawsuit and settlement database

10. APPENDICES

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10. 2 INTERVIEW QUESTIONS

10.2.1 Interview Questions for General Consumers

Duration (in minutes)	Questions
5	<u>General Interviewee Information</u>
2	2 Please provide a brief introduction about yourself.
	3 Are you currently suffering from any health illness for which you are prescribed medication?
25	<u>Drug Counterfeiting as a personal issue</u>
5	5 Are you under curative or preventive care?
	5 Before consuming your medication, were there any doubts about its authenticity?
	5 Were all tablets/dosages counterfeited?
	5 How did consumption of the counterfeit medicine impact your health?
	5 Are you compelled to pay higher pricing for quality medication?
15	<u>Solutions to Drug Counterfeiting</u>
5	5 How useful has the guidance issued by pharmaceutical firms on medicine authenticity been?
	5 Do regulatory authorities provide any guidance or support to mitigate this issue?
	5 Have you come across any external solutions to resolve this issue?

10.2.2 Interview Questions for Regulatory Authorities:

Duration (in minutes)	Questions
5	<u>General Interviewee Information</u>
2	2 What is your role at the Indian Central Drugs Standard Control Organization (CDSCO)?
	3 What are your areas of focus or specialization within the CDSCO?
25	<u>Drug Counterfeiting in India</u>
5	5 How prevalent are drug counterfeiting cases in India, and what are the consequences?
	5 Are counterfeit medicines concentrated within certain demographics or regions in India?
	5 How did covid-19 accentuate the drug-counterfeiting issue in India?
	5 What are the cost implications of counterfeit medications on regulatory authorities?
	5 How have counterfeit medications impaired trust in CDSCO?
25	<u>Solutions to Drug Counterfeiting in India</u>
5	5 How does CDSCO work with regulatory authorities to combat counterfeit medicines?
	5 What solutions are currently in place?
	5 Has there been a full-proof solution released for this issue?
	5 How are regulatory responses changing to address this issue?
	5 How receptive would regulatory bodies in India be to new solutions?

10.2.3 Interview Questions for Executives of Pharmaceutical Firms:

Duration (in minutes)	Questions
5	<u>General Interviewee Information</u>
2	2 What is your role at your firm?
	3 What are your areas of focus or specialization within your firm?
25	<u>Drug Counterfeiting as an issue for the organization</u>
5	5 Has your firm been subject to counterfeit healthcare products?
	5 Are there any products in particular that have been susceptible to counterfeiting?
	5 Has your firm identified any supply chain infiltration points in particular?
	5 What are the revenue implications of counterfeit medications on your firm?
	5 How have counterfeit medications impaired your firm's credibility and reputation?
25	<u>Solutions to Drug Counterfeiting</u>
5	5 What are some current internal mechanisms in place to combat counterfeit medicines?
	5 Is addressing counterfeiting medicines a priority or urgency for your firm?
	5 Are you currently working with any external organizations to address this issue?
	5 How are regulatory responses assisting your firm to address this issue?
	5 How receptive would your firm be to new solutions for this issue?

10. 3 MOCK INTERFACE FOR MANUFACTURERS AND INTERMEDIARIES



Product Inventory



TENOFOVIR



ANTI-MALARIAL DRUGS



VACCINES



BETA-LACTAMS



BEVACIZUMAB



DIABETES DRUGS



OTHER PRODUCTS DIRECTORY



THE PRODUCT IS SEALED

This certifies that the product has been manufactured by the official producer and is proven to be authentic.

PROOF OF AUTHENTICATION

PRODUCT CATEGORY - ANTI-MALARIAL DRUGS

PRODUCT NAME - PRIMAQUINE

MANUFACTURER - ADVACARE

SERIAL NO. - XXXX-XXXX-4893

MANUFACTURE DATE - 04/25/2022

EXPIRATION DATE - 04/24/2028

BATCH NUMBER - MCT-4593

COUNTRY OF ORIGIN - USA

(+)

TRACK PRODUCT

Your NFTs

(+)

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Primaquine	S.No - XXXX-XXXX-4893	Country of Origin : USA
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Smart Contract Protocol #1		
McKesson Corporation		
Smart Contract Protocol #2		
Apollo Pharmacies		

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