



## Final Year Project Showcase Batch-2018 Year 2022

<b>Department: Telecommunications Engineering</b> Programme: Telecommunications Engineering		
<b>1</b>	<b>Project Idea</b>	Adaptation of Smart Contract in Supply Chain Management Using IoT
<b>2</b>	<b>Process</b>	IoT devices are fetching real time data and sending it to blockchain where data is stored in a decentralized storage. This is temperature data of the vaccine or medicine. This temperature is monitored throughout the shipment. If at any point during the shipment, temperature goes out of the required range, the amount of shipment is refunded else if the temperature conditions are met, the shipment will be approved. The hardware of the project i.e. NodeMCU ESP8266 microcontroller and DHT11 sensor is used to fetch humidity and temperature data, whereas the softwares of the project includes Arduino IDE to program MCU and DHT11, Remix IDE for deployment and debugging of smart contract, Metamask as crypto wallet, Etherscan to keep a track of balance and transactions, Rinkeby testnet to test the network before actual deployment, FireBase cloud server for realtime database and blockchain decentralized database are used, the languages and libraries used are such as Web3.js library to integrate smart contract, hardware and frontend, React Js is used to develop frontend and Solidity programming language to write the smart contract of the project
<b>3</b>	<b>Outcome</b>	Smart contracts have been built to track vaccination of supply distribution by the use of IoT systems. The proposed approach will aid in the creation of a tamper-proof and secure environment for viruses and disease immunization via distribution. The proposed solution uses proof of delivery as a consensus mechanism. We constructed and evaluated the suggested solution on the Ethereum test network. The suggested framework has promising performance and scalability. In this project, we have done Implementation of blockchain feature in IoT devices to establish a smart contract enabling supply chain management.
<b>4</b>	<b>Evidence (Theoretical Basis)</b>	A block chain-enabled infrastructure has been presented in this study to promote openness throughout the supply and distribution of temperature sensitive vaccines, medicines and chemicals. Smart contracts are being developed to track vaccine production and delivery. Self-reporting, self-monitoring, immutability, temperproofing, accuracy, and transparency are among the features offered by the proposed solutions. The producer will use smart contracts to define some rules for the distribution of product. After a verification process by a healthcare provider, only registered recipients can receive the vaccine. The suggested solution's simulation results show that it is feasible in terms of GAS computation and transaction throughput. After analyzing the simulation results, the consumption of gas, mining process, difficulty, and transaction cost are all dependent on the input type or block size for block chain deployment. The solution provides: • A framework for data transparency, immutability, and efficiency of registration for the vaccine campaign to avoid counterfeit and identity theft, • A smart contract

		<p>enabled framework for self-administering the vaccine distribution constraints in the cold chain about the fulfillment of vaccine • A framework for vaccine supply chain management that will enable the features of tamper-proof, person identification, and avoid counterfeit. In the future, an analysis of the acquired data on feedback and data storage can be performed to determine the efficiency of vaccination vials as well as to determine the best environment in which to store the vaccine vials. The suggested model keeps all transaction data in the block chain.</p>
<b>5</b>	<p><b>Competitive Advantage or Unique Selling Proposition :</b> A smart contract is a two- or more-party self-executing agreement. It enables transactions to be completed faster and more securely than traditional methods, while simultaneously reducing the expenses of third-party enforcement. While smart contracts are decentralized on the block chain, there is no single point of failure or vulnerability to attack or hacking. All parties have complete control over their cash at all times, reducing fraud and protecting both buyers and sellers in the event of a dispute. Smart contracts may be used to develop effective supply chain management in the fields of finance and banking, healthcare, public management, insurance, real estate, energy, and even gaming goods.No such solution has been proposed in the market to a lot of the security problems in the market. Not only is our project provides security but it is also cost effective.</p>	
<b>a</b>	<p><b>Attainment of any SDG</b> (e.g. How it is achieved and why it is necessary for the region)</p>	<p><b>SDG#3 Good Health and Well being</b> <b>SDG#11: Sustainable Cities and Communities</b> <b>SDG#12: Responsible Consumption and Production</b> <b>SDG#15: Life on Land</b></p>
<b>b</b>	<p><b>Any Environmental Aspect</b> (e.g. carbon reduction, energy-efficient, etc.)</p>	N/A
<b>c</b>	<p><b>Cost Reduction of Existing Product</b></p>	<p>Low cost sensor could be used, otherwise it's a very cost effective product and we have made sure to not use equipment with high purchase or maintenance cost.</p>
<b>d</b>	<p><b>Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process</b> (e.g. What is the issue is current process and what improvement you suggests)</p>	<p>Different tracking parameters like GPS, Air Quality, motion sensor etc can be added using different modules and sensors in the shipment container.</p> <ul style="list-style-type: none"> <li>• The whole shipment mechanism can further be automated by adding more backend functionalities.</li> <li>• Further research efforts should also be made for scalability and security that effects both technologies and their integration.</li> <li>• The adoption of this dual technology in government infrastructure can effects the import/export quality and can speed up the interaction between companies and government</li> </ul>
<b>e</b>	<p><b>Expanding of Market share</b> (e.g. how it expand and what is the problem with the current market</p>	<p>The adoption of this dual technology in government infrastructure can effects the import/export quality and can speed up the interaction between companies and government.</p> <p>Different tracking parameters like GPS, Air Quality, motion sensor etc can be added using different modules and sensors in the shipment container.</p> <p>It will attract all industries to make their companies more transparent and will increase customer trust.</p>
<b>f</b>	<p><b>Capture New Market</b> (e.g. Niche market or unaddressed segment)</p>	<p>Safety and health, security, Transaction, Medicine, chemicals</p>



6	<b>Target Market</b> (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service	Buyer and sellers of medicines, vaccines and chemicals. It can also attract government for supply of products that require safety and security. Banks for safer transaction. Airlines for booking of tickets.
7	<b>Team Members</b> (Names along with email address)	Fatima Haider Naqvi, <a href="mailto:naqvi4105572@cloud.neduet.edu.pk">naqvi4105572@cloud.neduet.edu.pk</a> Binish Haseeb, <a href="mailto:haseeb4102235@cloud.neduet.edu.pk">haseeb4102235@cloud.neduet.edu.pk</a> Soomal Qureshi, <a href="mailto:Soomal4102751@cloud.neduet.edu.pk">Soomal4102751@cloud.neduet.edu.pk</a> Namra Khan, <a href="mailto:khan4130114@cloud.neduet.edu.pk">khan4130114@cloud.neduet.edu.pk</a>
8	<b>Supervisor Name</b>	Dr. Sundus Ali, <a href="mailto:sundus@neduet.edu.pk">sundus@neduet.edu.pk</a>
10	<b>Pictures (If any)</b>	<a href="https://drive.google.com/drive/folders/1Jl2A6gmi8fPjB9K4r8AqNTpca0ow_N5r">https://drive.google.com/drive/folders/1Jl2A6gmi8fPjB9K4r8AqNTpca0ow_N5r</a>
11	<b>Video (If any)</b>	<a href="https://drive.google.com/drive/folders/1Jl2A6gmi8fPjB9K4r8AqNTpca0ow_N5r">https://drive.google.com/drive/folders/1Jl2A6gmi8fPjB9K4r8AqNTpca0ow_N5r</a>