HOMEQUBE

# Whitepaper


https://www.homeqube.ai
homeqube.ai
homeqube_ai
HOMEQUBE Pte. Ltd.
Homeqube Pte Ltd, SG

# Contents

# 1. What is Homeqube?

Homeqube is a home-building application powered by artificial intelligence (AI) that empowers the user to take part in home-building. Through its built-in network of manufacturers, suppliers, design engineers, fabricators, the APP empowers the entire industry of home-building at scale.

The APP begins by plotting your lot area through optical character recognition (OCR) from where you can also design your home using our "user-centric-robust controls" that we call "knobs". These "knobs" are parametric functions that are tied up to real manufacturing/supplier data that are essential in building your pre-construction documents until full construction and move-in.

What makes our home design experience unique is that our Knobs dissolve all architectural and engineering issues empowering the user to install these suggested pre-engineered parts post-selection thereof. Information on costs, mobility, ergonomics, and other architectural precepts would be readily available in a design cockpit. This gives the user the power to make informed decisions when it comes to life-changing commitments such as having an ideal home that fits their requirements.

The Homeqube APP aims to supplant century-old home-building practices that is why it is at the crux of Web3.0 commerce. A decentralized online platform for home-building with deep design integrations has never been done before because it also comes at the heels of global problems that the world has never experienced before: the worsening and accelerating impacts of climate change, architectural and engineering process inefficiencies, and a sluggard home-building process that can only bring about more shortage in the longer term.

Homeqube is being developed by a team of experts from multiple disciplines with years of experience in architecture, engineering, manufacturing, and construction, and the emerging knowledge integration from decentralized communities, building, and design knowledge that can be demystified, leveraged, redistributed, for constant delivery for everyone. One of our main postulates is that the majority of built homes were built on top-down processes. We want to introduce a bottom-up approach which we see as the next legacy building process which is only possible by emerging technologies such as blockchain, and Machine Learning.

Our mission is to make the home-building processes accessible to all to serve humanity's aggregated requirements for long-term sustainability. Our vision is to provide a better Home-Building Industry through our decentralized 'socio-techno-economy" APP that will create more justice, liberty, creativity, for posterity.

Our Core Values:

1. Above Board & Corporate Transparency
2. Love for God and Neighbor.
3. Home-building For Everyone.

# 2. Home-building For All / Problems to be Solved

We believe that Homeqube solves many of the recurring problems confronting the home-building industry. These challenges include:

Long Lead Time

Lack of Knowledge Transparency in Architecture and Engineering

No direct connection to the manufacturer in the design process

No linkage between e-commerce and Home-Building


High Carbon Emissions from current Construction Materials

Inefficiencies of Skilled Labor and Design Process.

Low Resilience of Residential Structure against strong winds and Earthquake


Industrial Challenges in Industry 4.0 in Construction Industry

## 2.1 AI / ML for Generative Design

Before the popularization of machine learning, the computational design approach is used in making design models. This approach is based on running algorithms and codes to make a parametric family representation of shapes and sizes. With the introduction of machine learning and AI, optimization and exploration of different designs were added. This additional step in the design process gives users different possible design combinations and comes up with the most optimal design.

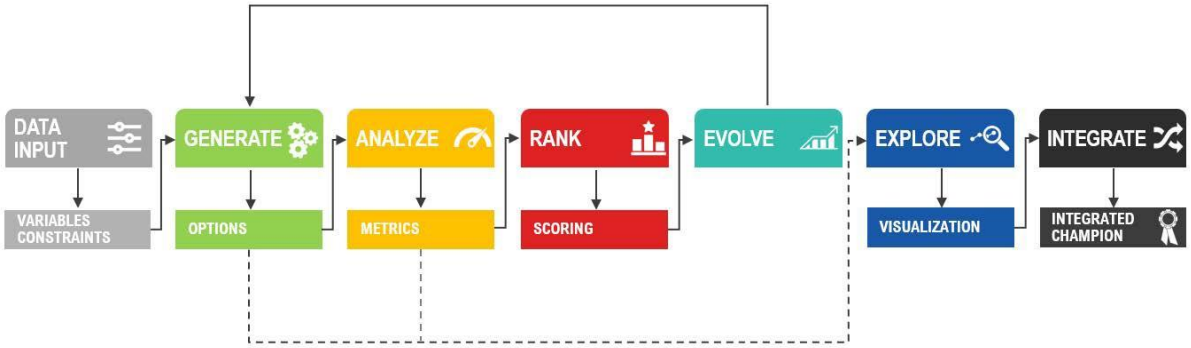



**Figure 1:** Generative Design Workflow

Here at Homeqube we'll harness the power of AI and ML to make different possible combinations of home designs, and provide the most optimal design based on the users' needs. Also, as the system generates more data, more home design styles will the unearthed. Our system will push both the human and machine capacity in generating creative ideas.

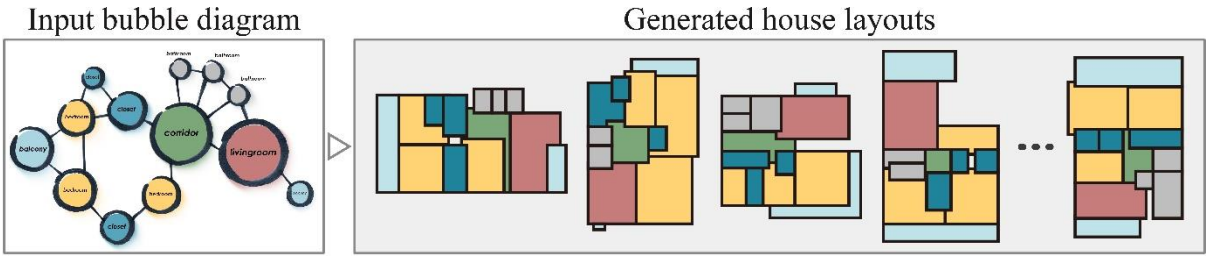



**Figure 2:** HouseGAN Concept: Image extract from: https://ennauata.github.io/

# 3. Stakeholder Ecosystem Development

## 3.1. Sphere of Web 2 and Web 3 Players

Homeqube offers an end-to-end building solution process in designing and building your homes using cloud computing, blockchain, and AI capabilities with stakeholder inclusion, hence the Building Environments (BE) shall be deployed on both web 2.0 and web 3.0 to capture process innovations at different types of contributory-participation. By combining the two ecosystems, the Built Environment will be synergized into the future creating a semantic web that can serve at an industrial-revolutionary scale.

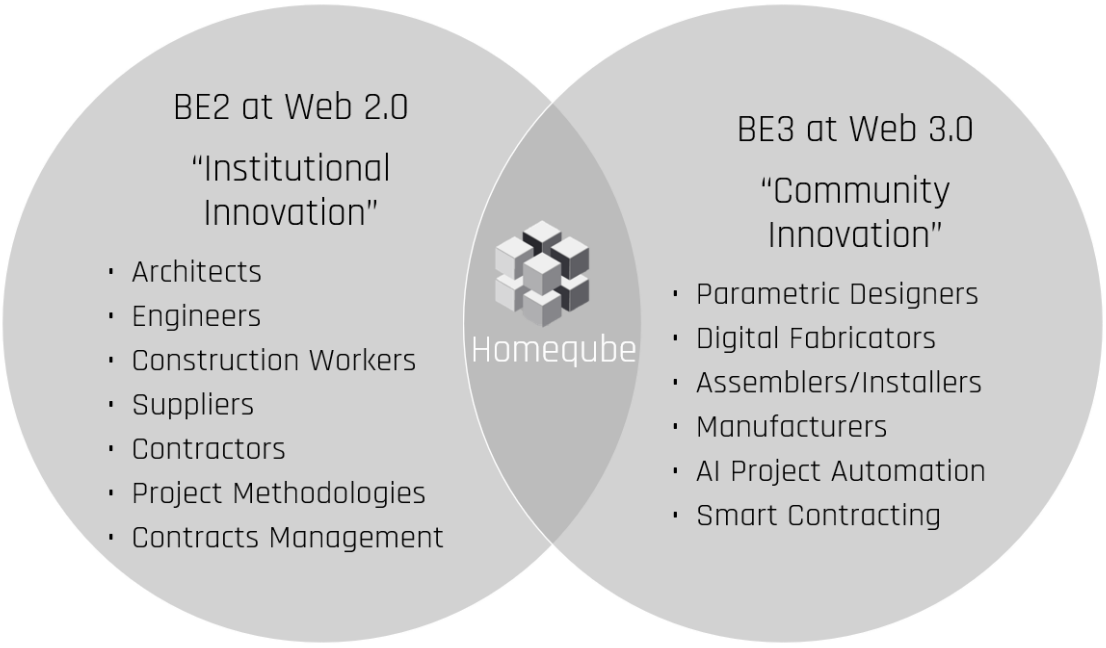



**Figure 3**: Homeqube is the intersection of BE2 and BE3

## 3.2. Call to Action Ecosystem Matrix by Being a DAO MEMBER

Homeqube offers options on how you could earn and use Tokens we call (QUBE) inside the ecosystem. These calls to action are the recommended paths to get the most out of our product:

- To Design Parts and Knobs
- To Produce Parts
- To Procure Parts
- To Play and Build

Stakeholder Action Matrix

| Lifecycle Process | Earn Tokens from | Use Tokens for |
|---|---|---|
| Initiation / Identification / Submission | Parts Membership / Generative Art for Possible Knob Creation / Manufacturing Membership<br>2. To produce parts | Advertising / DAO Design Membership<br>4. To play and Build |
| Evaluation / Acceptance / Building | 1. To design parts, knobs<br>Dapp Game / Manufacturing Matching | Knob Usage |
| Production / Distribution / Main Output | 2. To produce parts<br>New Knob from Generative Art New Sellers of Parts<br>3. To procure parts | 5. Admin Participation<br>Lease Knob earnings through NFTs / Building Docs for Building |

**Table 1**: Stakeholder Calls for Action Matrix

At the heart of the App is the "Knobs" to build the houses. These are based on deconstruction philosophies where different combinations of designs can be produced from the basic parts of the system. These Knobs are operated to modify the design of the house based on the users' preferences. As you turn the Knobs you will see real-time implications in the cost of your home, lifestyle metrics, mobility metrics, and other value-precepts to guide you in the design decisions. As the App's name implies, the massing of the home is based on cubes which represent a volumetric representation of a proposed system.

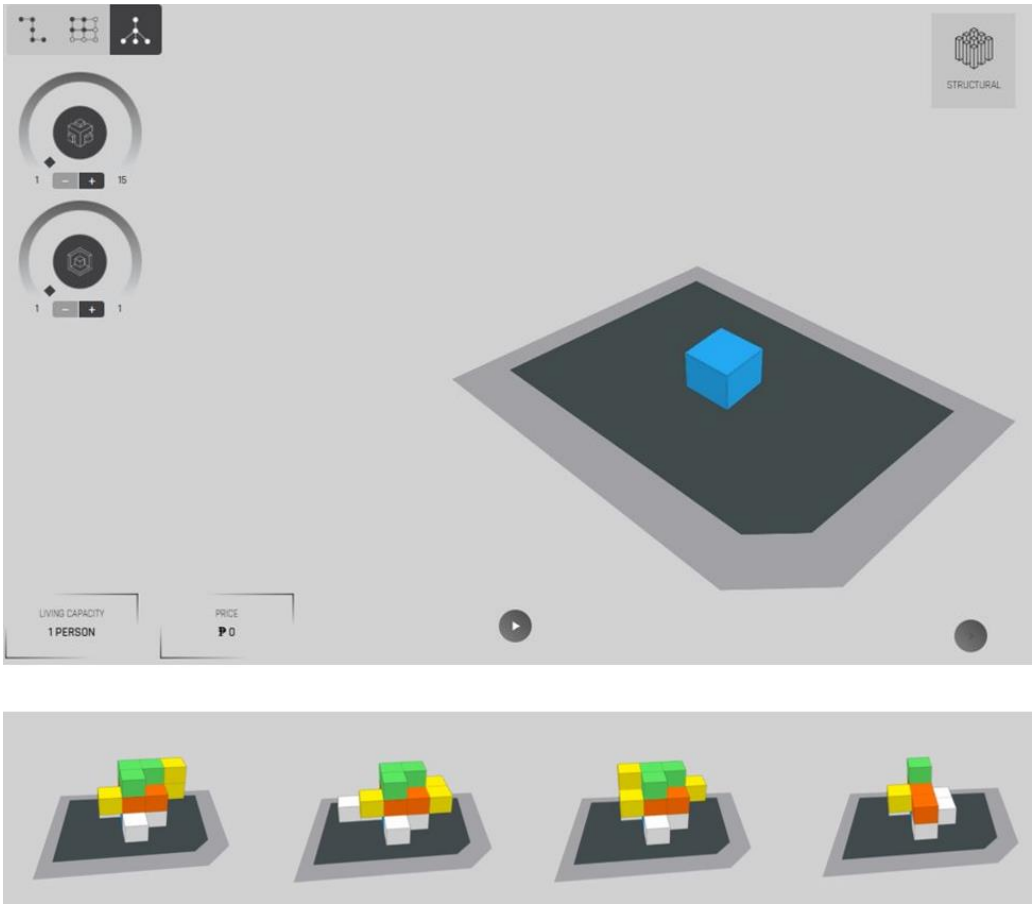



Figure 4: UI for Microsystem 1 – Cube Massing Knobs

We intend to develop CI/CD of Knobs which we coin as "System Products" for the BE's full optimization case uses which encompasses engineering, architecture, and construction multi stake-holder case uses. Our first Proof of Concept (POC) of the App, which will be available to the public, will have the first set of Knobs which can produce the first massing structure. The arrangement of the cubes will depend on these Knobs: namely the generation path Knob, Density Knob, and Complexity Knob. Users can have various arrangement combinations of the cubes which are constrained within the allowable buildable area and a maximum number of stories indicated in the input for your lot information.

As the app development progress, more knobs will be further developed. These knobs will represent algorithmic processes and design variables on different styles of massing, parts, mobility, design intent, enclosures, and other variables that affect home design. These knobs will expand the possibilities of home design by tweaking these variables that affect the design of homes. By cloud computing, it is possible to generate a Tradespace plot on the different pegs of houses in a few days.

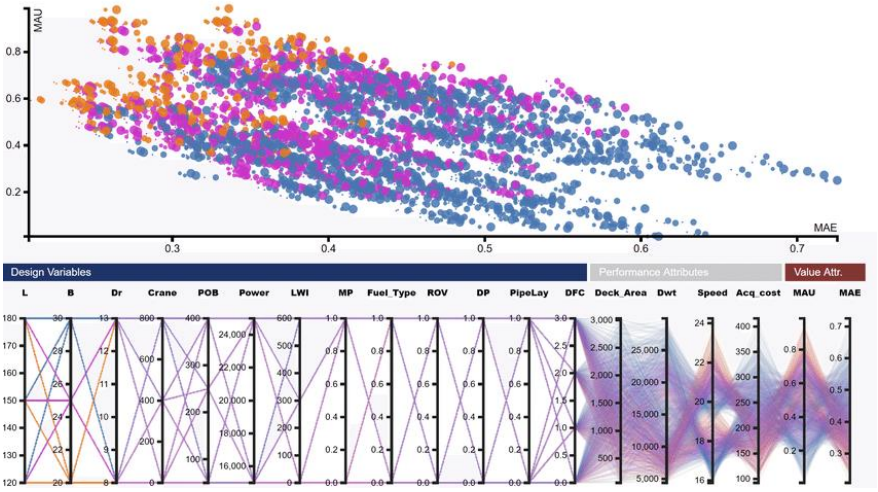


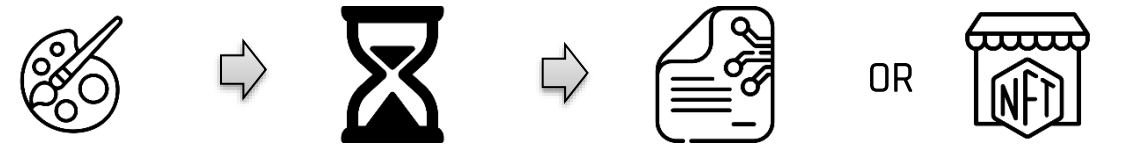

**Figure 5:** Tradespace Exploration For Offshore Design (Curry, Rehn, et. al. 2017)

## 3.3. Our Building Journey Experiences Calls for Actions

### 3.3.1. To Design and Earn

You can participate in our DAPP games by applying for our DAO community membership. Use your QUBE tokens to apply in our community and generate your arts and parts. In return, these arts and parts can be sold in NFT marketplaces to earn tokens or use in our Knob control using smart contracts.

A. **Generative Designers' Path** – A generative designer is a type of user that uses computational and algorithmic techniques in creating geometrical arts. Generative concepts are with time and motion and algorithm embeds that could directly be used for Home Building design-build processes. If you are a generative designer, the recommended path for you is:




Submit your Generative Art

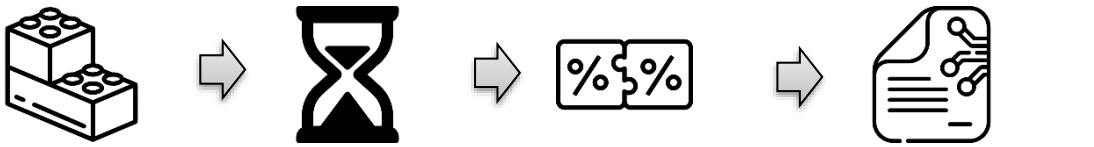
Wait for Knob Integration

Apply for Smart Contract Royalties for Generative Art Used

Sell your Generative Art to Marketplace

### B. Parts Designers' Path

A Parts designer is a type of designer that can build assembly parts of a house. If you have talents in creating furniture, home mechanisms, and innovative parts Kit-Of-Parts, this path is for you. As a parts designer, the recommended path for you is:



Submit your part design

Wait for Knob Integration

Wait for Manufacturing Match Ups

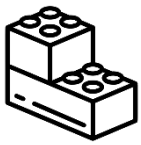
Apply for Smart Contract Royalties for Parts Sold through NFTs.

**Figure 6:** Chair Design Styles

The creation of Non Fungible Tokens, or NFTs, gives freedom to graphics artists, generative designers, to sell their digital work of Generative Art and protect their intellectual properties. By augmenting decentralized apps and blockchain you can earn Tokens every time your created part and design are recognized and accepted by the Homeqube system. In addition, you will have ownership of that part thru NFT. In this way, you can create your digital intellectual property for other designers.

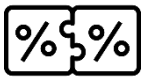
### 3.3.2. Print Parts

Being an additive manufacturer to us doesn't require you to have a factory. You can create your ecosystem of parts through our DAO community and have an E- shopfront in your backyard. You can also 3D print parts and designs available in the App, and start making your business. The suggested path for it would be:

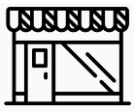


Submit your part geometry you intend to Print

Wait for Knob Integration



Wait for Manufacturing Match Ups



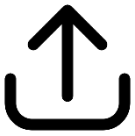
Get Ready to Sell from your E-Shopfront

### 3.3.3. Enlist Your Factory

You can contribute to the growth of our Ecosystem under our formal Manufacturing community. Our MSA (Master Service Agreement) program will be open to manufacturers, suppliers, and distributors who would want to include their products inside the App. These products include architectural, structural, electrical, mechanical, plumbing, and interior design parts, among other things to say the lease. Products entered inside the App will give more options for users in designing their homes to decide optimally. Our approach will remove the strenuous process of canvassing and searching for the right product the user need in their home building design, and most of all, all products that will be showcased are for sure to be Knob integrated.

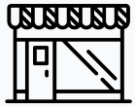
This is the recommended path for selling your parts under the MSA program:

Join our Basic MSA Program



Load your products inside the APP

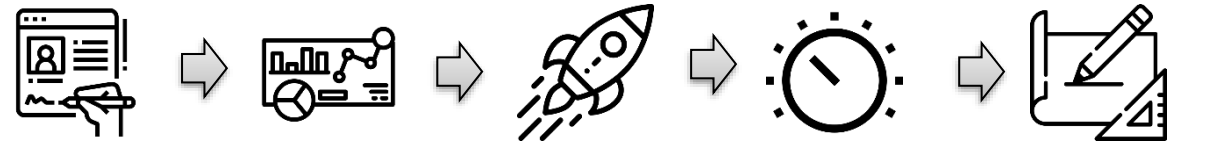
Wait for Knob Integration



Get Ready to Sell from your E-Shopfront

### 3.3.4.Play and Build: For Home-Builders

The mixture of the game environment and AEC (Architectural, Engineering, Construction) logics of the App is a viable solution in designing and building your homes. For users who want to build their homes in the Homeqube App, this is the recommended path.



Register to Homeqube as User

Explore the Dashboard

Input your Minimum Launching Data (MLD)

Design with microsystem Knobs

Get your documents and Collect your Parts > DIY Assemblies

### 3.3.5.Just Play and Earn: For Gamers

The decentralized ecosystem makes it possible for gamers to contribute to the power of the APP. Gamers can earn Tokens by participating in the games provided by the App to develop more interesting Knobs.


Join game challenges

Show your house in a VR environment

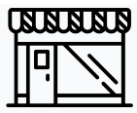
Sell your house design as NFT

Earn Tokens by selling your parts design

# 4. Corporate Agenda: Design for Manufacturing Franchise (DFM Franchise)

By investing in franchise manufacturing with us, you will be able to manufacture Homeqube's main parts, which are economically friendly, cheaper, but still has the same structural integrity compared to traditional materials like steel and concrete. In addition, the parts that you will be produced will be certified thru our authentication system via QR codes. In this way, you are sure that the products produced will be viable to users. Our franchise includes Equipment Supply and Training, Supply Agreements, and Manufacturing Technology Transfer. We have service options available for different volumes. The path would be:

Product Loading



E-Shop Front to Sell Products

Knob Integration with Product Authentication

Promotion and Advertisement

## 5. Qube Transaction and Value Exchange

The standard token currency of Homeqube is QUBE. The QUBE can be in a variety of ways, depending on the user's goal. Each of the stakeholder network communities will be handled by decentralized autonomous organizations or DAO. This DAO will make the community transparent, controlled by the organization members' transactions within the ecosystem framework.

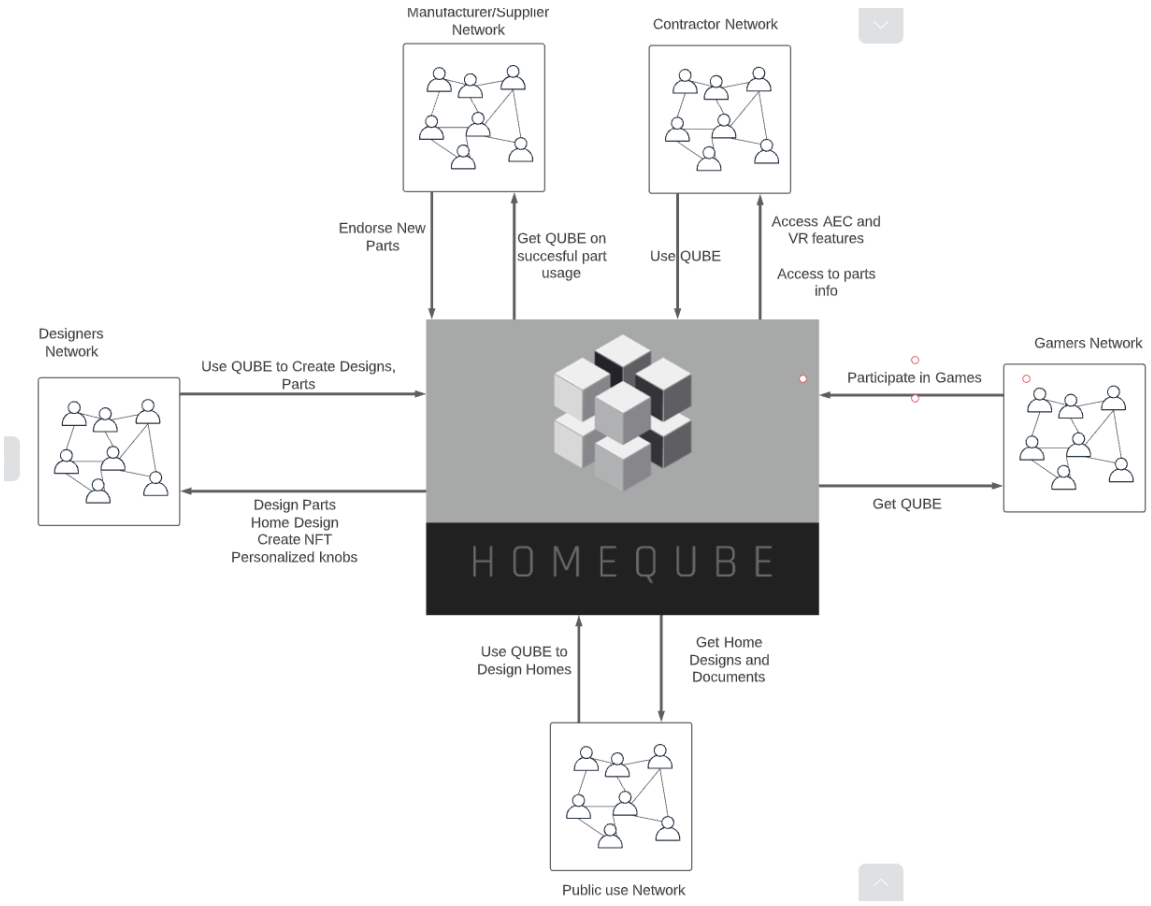



**Figure 7:** Homeqube Value Exchange Map

# 6. Qube Tokenomics

This section talks about the allocation of the tokens, the initial coin offering (ICO), and the platform that will be used in the exchanges of tokens.

## 6.1. Token Distribution

| Type | Token Amount | % of total supply |
|---|---|---|
| Technology Development Seed - 7 year plan | 15,000,000 | 1.5% |
| (Launchpad) Strategic Sale | 50,000,000 | 5.0% |
| Private Sale | 120,000,000 | 12.0% |
| Ecosystem Activities (Deep Public Architecture Games, NFT and Metaverse Economies User Cases) | 320,000,000 | 32.0% |
| ESG Initiatives | 5,000,000 | 0.5% |
| Ecosystem Support Reserve | 320,000,000 | 32.0% |
| Public Sale | 160,000,000 | 16.0% |
| Partners / Advisors | 5,000,000 | 0.5% |
| Marketing/Listing | 5,000,000 | 0.5% |
| Total | 1,000,000,000 | 100% |

**Table 2:** Qube Token Finance Model

You may see the tabulation in the excel file by clicking here.

## 6.2. Initial Coin Offering and First Batch of Minting

The ICO token offer rate will start with 3 dollars per Carbon Credit (CC) which will be equivalent to the rate of 1 Qube and is expected to reach 100 dollars per CC in the longer-term mirroring the (CC) Carbon Credit Exchange Market. We will be releasing 250,000 Homes of estimated CC at this ICO stage at a rate of 3 dollars per credit based on our 7 year Plan (Philippines, India, Indonesia, Nigeria, Brazil) which will start with the Philippines. The estimated CC worth of 250,000 Homes would be 1,250,000 Tons., hence 1,250,000 Qube Tokens will be first released. The cumulative number of tokens that will be minted will be pegged at one billion (1,000,000,000) tokens which represents the total potential of 200,000,000 Homes worth of CC. A home is pegged at an average of 100 sq. m. plot at a single story. We will not anymore mint after one billion coins has been released, for this will be our queue for complete DAO system governance

## 6.3. The Solana Platform

We have chosen Solana as the most efficient and low-energy blockchain technology by far. Solana is a web-scale blockchain that provides fast, secure, scalable, decentralized Apps. This blockchain platform is considered a top contender because of its lower costs and higher transaction speed. Its TPS (transaction per second) is at 50,000, compared to Ethereum at 13TPS, and Bitcoin at 5TPS. Solana has also prioritized smart contracts and this move allows it to take advantage of the emerging NFT markets.

# 7. Carbon Credit Issuance for Building Homes

The Qube Token price is based on the Apps' accumulated carbon credit (CC) Tonnage from parts purchased compared to Reinforced Concrete and Steel counterparts. The more home parts purchased through the App, the higher will be the value of Qube over time. Homeqube will be registered to a CER body to document the amount of carbon emission savings by using the App's parts inventory. In this way, users will be more confident that their home-building efforts result in a more environmentally friendly world scenario.

## 7.1. The Carbon Credit Exchange Market

Carbon trade dates back to the Kyoto Protocol in 1997, which was replaced by the Paris Climate Agreement of 2015, to reduce greenhouse gas emissions. Each nation is allocated a certain number of permits to emit defined carbon dioxide levels. Any unused permits can be sold to other nations that want to emit more carbon dioxide than its allocated permits. Carbon credits are required by the government to permit a company to emit a regulated amount of carbon dioxide. There is no fixed price of carbon credit worldwide, as it depends on the jurisdiction and by market supply and demand. The weighted average price per ton for credits from forestry and land-use projects rise from $4.33 per credit to $5.60 in 2020. As per EU ETS (European Union Emission Trading Systems), there is a steady increase in the price of carbon. As of January 10, 2022, the benchmark EUA futures price is at €80.09, per tonnes, or US$90.73 On a long term (EU ETS)


**Figure 8:** Price of CO2 from EU ETS from February 2008 to July 2021

# 8. Technology and Country Roadmap

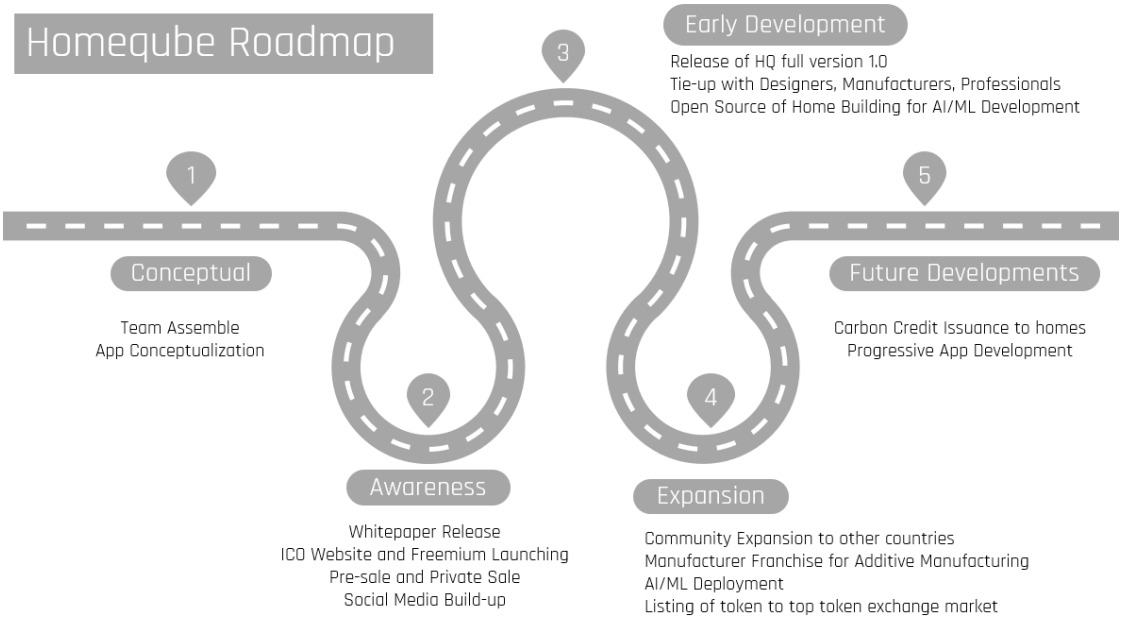



**Figure 9:** Homeqube Technology Roadmap

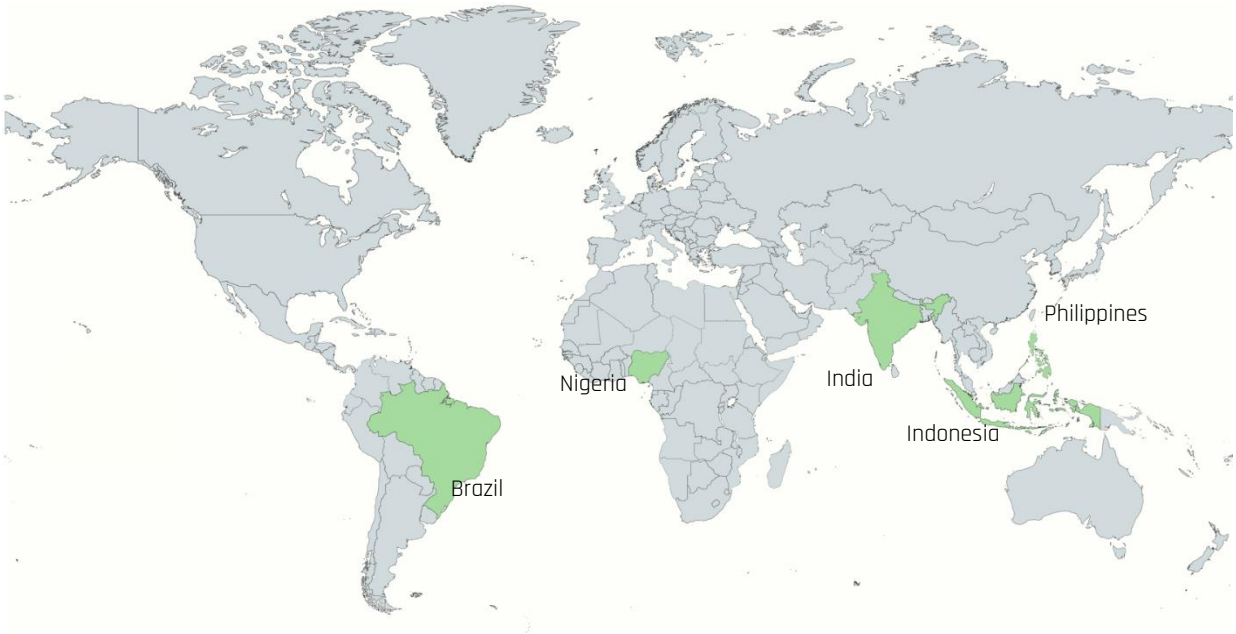
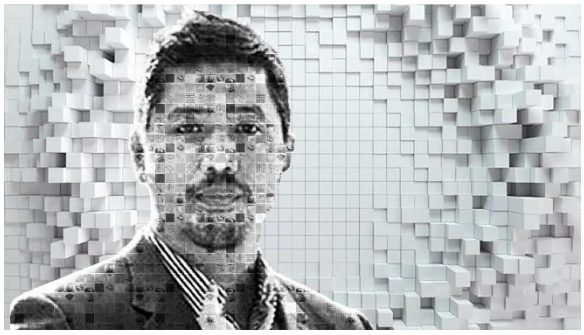



**Figure 10:** Homeqube Country Roadmap

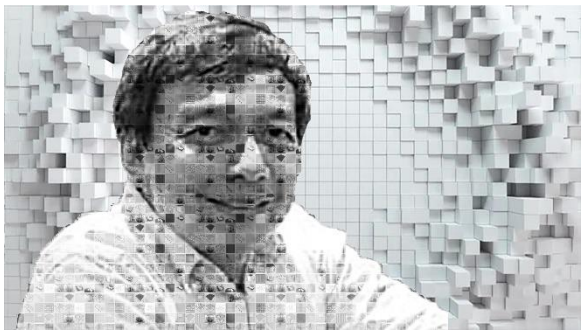
# 9. The People Bio

Director of Business & Enterprise Architect / Founder / CEO



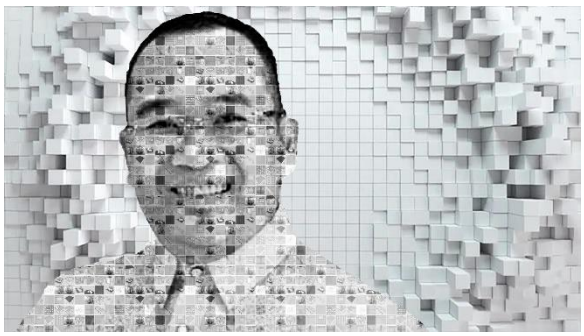
**JP Calma** is responsible for setting the overall technical direction and execution of the product/service strategy for the company. He was the CEO of MDCC, the pioneer and founder of Interior Construction in the Philippines since 1975. He resigned himself from the position to pursue this startup. He finished finance, entrepreneurial, and construction engineering research studies at the De La Salle University Philippines 2002, Asian Institute of Management Philippines 2004, and MIT Cambridge USA 2006 respectively.

Director of Service & Logistics / Partner



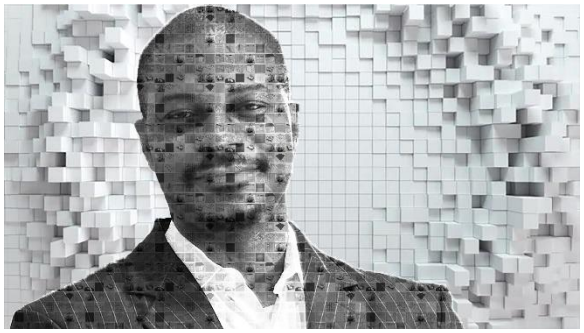
**Max Aton, Jr.** is a project construction management professional with 28 years of experience. He was involved in several projects from residential & commercial buildings to huge engineering projects like hydropower plants. He graduated Bachelor of Science in Civil Engineering from the University of San Carlos, the Philippines in 1989 and a Master of Construction Management from the University of New South Wales, Sydney last 1992. Long years of troubleshooting projects involving multi-disciplines have enhanced further his knowledge in management. He effectively synthesized theories in project implementation to proactively manage issues related to quality, cost, and time.

Director of Commercial & Legal Affairs / Partner



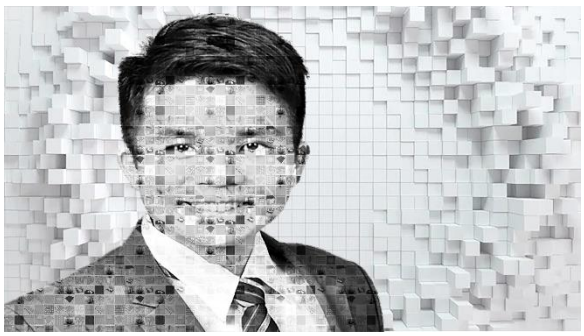
**Alex Christopher Subijano** is a practicing lawyer and a civil engineering graduate who hailed from San Beda University-Manila and Mapua University respectively. His growing professional passions are focused on the disruption of traditional operative models on the Built Environment and synergize the spheres of Legal industry, Engineering Education, and management through emerging technologies of today. With his legal and technical background all rolled into one, Alex's 15 year-experience in both fields will surely make him a pillar in commercializing this industry into a new category of project delivery.

Regional Advisory for Africa Region



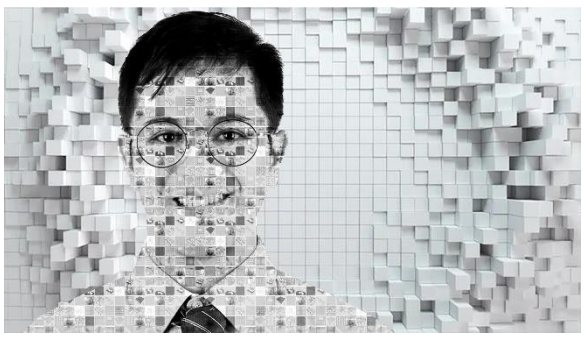
**Gbadebo P. Rhodes-Vivour** is the creative director at Spatial Tectonics, Nigeria. His specialty includes alternative design and construction systems that increase affordability and access to "affordable luxury". To this end, he has designed and worked with state governments on policy for modular buildings using repurposed containers and alternative construction materials. He is also the design lead for commercial and large-scale urban projects such as the Delta International commercial city. Before founding Spatial Tectonics, he worked in Nigeria's top architecture firms and Franklin Ellis architects in the United Kingdom. He also worked with the Chinese government on affordable housing design in anticipation of the Beijing Olympics as well as the American government in rebuilding New Orleans after Hurricane Katrina. He has a master's in Architecture from the Massachusetts Institute of Technology, USA, and a Bachelor's from the University of Nottingham, UK.

Chief Revenue & Compliance Officer (CRO & CFO)



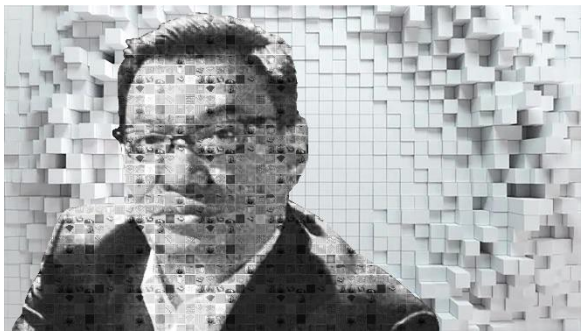
**Donald Onghanseng** is a Certified Public Accountant and a practicing lawyer in the Philippines. He graduated cum laude from the University of the Philippines (Diliman). Thereafter, he pursued his Juris Doctor degree in Ateneo Law School where he graduated 3rd in the batch and garnered the Dean's Award for Best Thesis. He is also a Chartered Financial Analyst ("CFA") charter holder. Donald's practice and interests are focused on corporate, commercial, regulatory, data protection, and technology law with exposure to business finance management and structuring. He has worked with companies that have cross-border operations in several jurisdictions where his responsibility covers directly working with executive directors and officers to advise on financially sound business strategy decisions while mitigating risk in adherence to regulations. He's also had the opportunity to primarily handle investment funding negotiations, review investment definitive agreements, and manage due diligence matters in completing investment funding transactions.

Director of Operating Systems (COS) / Partner



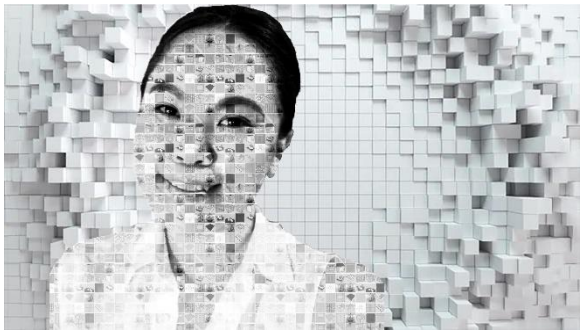
**Luis S. Silvestre Jr., Ph.D.** obtained his Bachelor of Science 2015, Master of Science 2017, and Doctor of Philosophy in Mathematics 2021, from Ateneo de Manila University, Philippines. His research interests include mathematical physics and graph theories, Information Technology and Machine Learning.

Advisory on Information Technologies



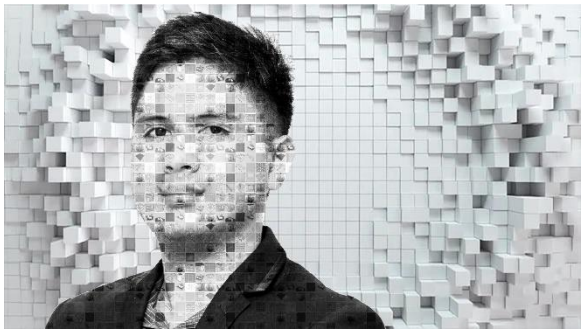
**Sappy Saplala** is the Solution Engineering Director of the Philippine subsidiary of Oracle Corporation, a global leader of enterprise software that spans a portfolio of cloud, applications, software, and hardware. Before being part of Oracle, his career has spanned the telecommunications and financial services industries. This gives him the credentials to be the trusted advisor of various C-level executives both from the line of business and technology. His engagements with organizations of various industries and sizes have allowed him to design several technology solutions that provide the benefits of digital transformation. Sappy takes pleasure in realizing visions into reality with the power of data and technology.

Interim Deputy for Communications



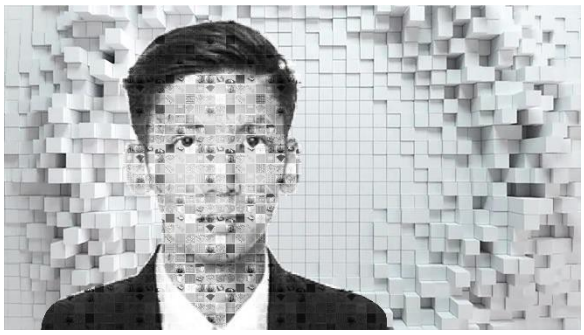
**Katt Pascual** is a content and communications manager with at least 15 years of experience in strategy, ideation, and creating compelling copy from print to digital. Her experience translates to dozens of websites copywritten or strategically planned, corporate annual reports for the financial services sector, and thought leadership for chief executives and startups in the US, Canada, and Australia. Most recently, she wrote for a tier 1 technology and business alliance at Big Four firm Ernst & Young (EY). She obtained a journalism degree from the University of the Philippines Diliman.

Director of Data Systems (CDO) / Partner



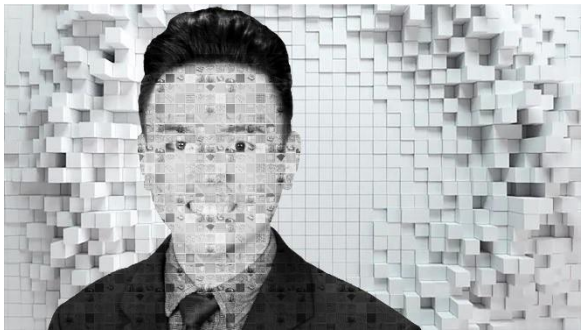
**Kristoffer Dave Tabong** is the Construction Systems Director of Multi-Development & Construction Corporation (MDCC). His eight years of experience in the civil engineering industry involves structural engineering design, BIM coordination, and project management. Kris is a Magna Cum Laude graduate of the University of Santo Tomas, and a board top notcher in Civil Engineering and Master Plumber, with a Master's of Science in Data Science at the Asian Institute of Management, Philippines.

Deputy Cloud Ops



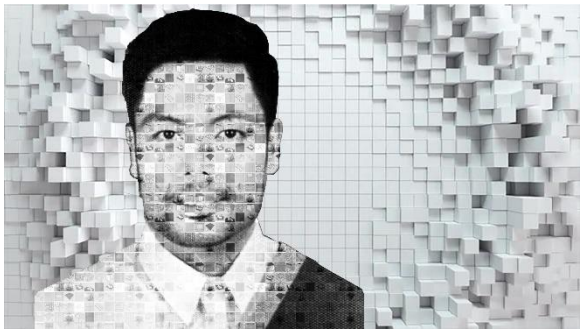
**Kyle Emir Dela Torre** is the Management Information Systems Manager of Multi-Development & Construction Corporation (MDCC). His experience in the 7+ years of experience in a global technology industry. Certified ISO/IEC 27001 Information Security Associate, Six Sigma Yellow Belt Certification (SSYBC), Cybersecurity Analyst Professional, leading a digital transformation

Research Advisory on Global Sustainability



**Kristopher Ray S. Pamintuan, Ph.D.** is a licensed Chemical Engineer currently working as a full-time Associate Professor at Mapua University. He teaches undergraduate courses and graduated in Chemical Engineering programs. Ray has specialized in renewable bioenergy research, particularly in applications of Plant-Microbial Fuel Cell technology to concurrently generate green electricity and produce food in integrated agricultural systems while lowering methane emissions at the same time. He also dabbles in other fields of research such as 3D-printing electrochemistry applications, water, and wastewater treatment, insect biomass production for waste-to-FFF (food, feed, fuel), aquaculture, and preparation of Life Cycle Assessments.

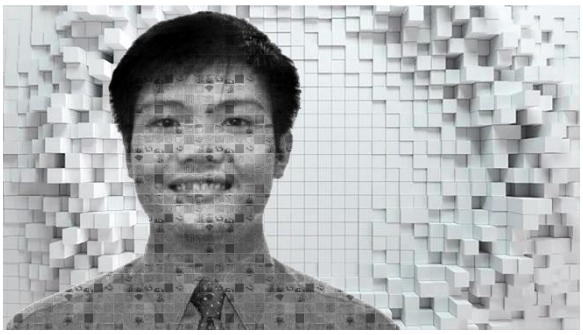
Advisory on Technology Development



**Anthony Seumal** is an IT professional throughout most of his career, He has always been passionate about building relationships and adopting new concepts that better himself, his team, organization, and the IT community.

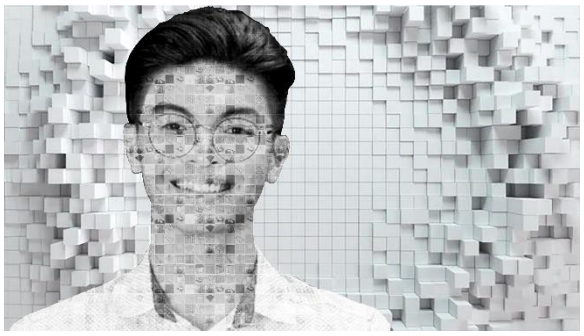
He has had the experience of working as a Software Developer, Software Tester, Business Analyst, and Agile and Project Management. He was involved in different projects and underwent Digital, Agile, CX/UX, Data Science, and Design Thinking certification training to build his capabilities in the changing business landscape. He is also an Executive MBA graduate at Asian Institute Management with a specialization in Digital Transformation (awarded in IE Business School in Madrid, Spain), Management Development Progam graduate in the same institution with Superior Performance award, and a recent Cambridge University Judge Business School – Grand Winner in Venture Creation Program in the UK. Presently, he works for Cambridge University Press as Head for Software Quality. Cambridge University Press's mission is to unlock people's potential with the best learning and research solutions.

Composite Design Engineer / Partner



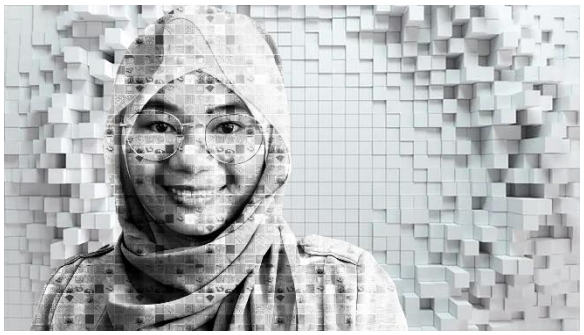
**Jazneil Bello** is a licensed Civil Engineer currently working as a full-time Composite Design Engineer and researcher at Multidevelopment Construction & Corporation. Jaz has specialized in Structural Design & Analysis of structures such as buildings & towers. Jaz has also specialized in Steel Connection Design that focusing on how to connect the steel assemblies using steel connectors, bolts, and welds. Using his Knowledge in Composite, Jaz is also doing Boat Design Calculation, Assessment, and Fabrication Process planning.

Generative Designer/ Parametric Modeler



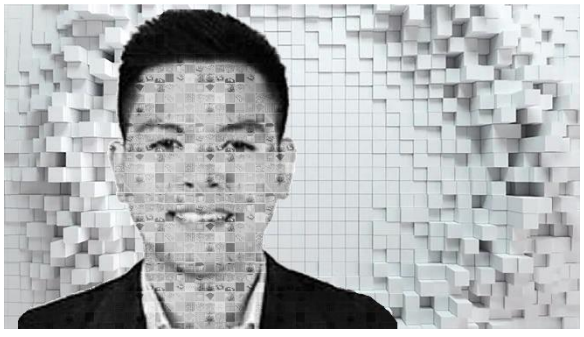
**John Rey Lingad** is currently working as a full-time parametric programmer in MDCC. Specializes in digital modeling and parametric modeling, primarily using grasshopper with some experience using C# and python. Also dabbles in other fields of research such as generative design, computational design, 3d printing for generic fabrication, woodworking, digital sculpting, and animation.

Design Architect



**Nasuha Hyrene Ranain** is a graduate of Architectural Technology and BS in Architecture. She is currently working as BIM CUM Project Architect at Multi-Development Construction and Corporation. She focuses on the production and coordination of FCD Drawings (2D and 3D drawings and references) among the internal and on-site team, Virtual Design and Construction Department's BIM Team, and Domain Specialists. She also is committed to the developments of other design and planning schemes of other projects including Pre-Engineered Buildings (PEB), Engineering-Production and Construction (EPC), Trailer Truck Designs, and other design innovations. She also helps in the research for building and construction materials.

Deputy DevOps Engineer



**Daven Earl Bellen** is a licensed Mechanical Engineer and interdisciplinarity who worked for industries in data storage technology, petrochemical sales, and high-rise building management. He is now studying for a post-graduate degree in Computer Science, eyeing cloud computing's solution for urban living challenges such as housing and mobility.