

The Lumo Industrial Complex

Lumo

Lumo is a web3 space where the creative community gather to build fashion brands in ways never possible before, this white paper specify how we enable this process. In "The Context", we speak to a general audience and situate the "crypto" industry within today's social trends. Lumo is a cultural product so those steeped in the subject may interpret this section as our generational cultural thesis. In "The Market", we position Lumo in the luxury commerce vertical and study the points of entry. Next, "The complex" presents the system at the transactional level. In particular, we rely on *proof-of-rendering*: a novel pipeline whereby select intellectual property (IP) may be enriched and Lumo tokens mined. In "The Policy", we examine the role of the Lumo token in this economy and discuss scenarios as appropriate. This white paper is not meant to be interpreted as guidance for an offering, or a prospectus of any kind. It is however, a fair reflection of our outlook and predisposition.

 Anga was founded more than twenty two years ago, and for the first time in history, the internet began filling with real people, sharing real interests. What began as a simple blogging website became the first in a series of creator-centric platforms. Today, there are more than 50 million creators in the U.S., many of whom are full-time [Constine \(2021\)](#). As professional creators grow in number, they are finding new ways to reach their audience and bottle the moment with exclusive merchandise. Presently, web2 is dominated by giants of the last decade. But if you listen carefully, the canaries are singing¹.

The Context

Recent years have witnessed the growth of decentralized autonomous organizations (DAOs) as a new type of community-owned institution. Unlike traditional corporations, these organizations are not incorporated in any jurisdiction of law, but arise primarily as on chain constructs. In this setting, a group of individuals commit to the long term viability of an organization by depositing ether (or an equivalent on chain currency) into the DAO treasury, in return they receive DAO tokens with associated privileges. Notably, token holders can submit project proposals and vote on them. In its current conception, the DAO is a light-weight corporate governance mechanism.

This promise of "decentralized institutions" run on a borderless currency has proven seductive for many. At the time of this writing, some 100B USD [Kudaliyanage and Azeez \(2021\)](#) have been locked in DAO treasuries. Instead of dismissing these nascent organizations as the wasteful pursuits of the foolish, let us examine select DAOs and investigate their merits:

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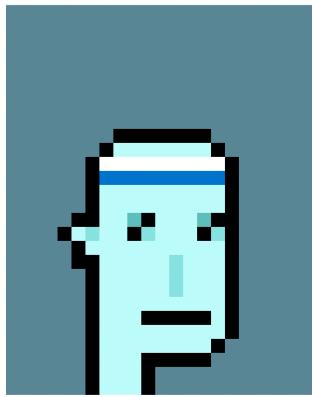
¹ Lumo

1. MakerDAO: a Defi stablecoin protocol with 12.5B USD in total value locked (TVL). Here DAO token holders can adjust policy for Dai Stablecoin, selecting collateral types, and governance protocols [MakerDAO \(2021\)](#).
2. IDEO founder collective on the Syndicate Protocol: an on-chain angel community where IDEO founders can invest in each other's companies [Syndicate \(2021\)](#).
3. PartyDAO: collective fund to bid for NFTs, processed over 1200 ETH to date [PartyDAO \(2021\)](#).

The common thread is that many of these projects would be considered unbankable in the eyes of traditional financial institutions. In recent months however, some in venture have picked up the scent. Amidst the coming frenzy let us reserve a word of caution, "the European state" was once considered a very poor investment as well, why would anyone finance a league of mercenaries who cannot sow the fields they salt? Alas, those who supported the right state profited so handsomely that they were later persecuted for its mismanagement [Arendt \(1973\)](#). Not all states are created equal.

Presently, one group of people still shoulder the burden of "uneven investment opportunity": artists. They wish to stand apart from social and economic norms, so as to endow consciousness and perspective to the "cows in the field" as Werner Herzog laments [Herzog \(1981\)](#). Not to be overshadowed, this superiority complex is returned in kind by studio execs, managers, and big tech alike, all of whom view creatives as a resource to be plundered and churned. "Creative talent is the life blood of our industry," or "all fly-wheels start with a content flywheel" are just some of the back-handed compliments frequented by those who profit from the arts (I will spare you the citations on this one).

Figure 1
CryptoPunk 3100 that is marked at 35000ETH (Oct 2021). This is just one of 10,000 punks in existence
LarvarLabs (2021).



Needlessly to say, in this contest of will, the artists seldom have the capital and hence do not command the stick.

The astonishing growth of non-fungible tokens (NFTs) have changed the calculus for many. Media that would seldom circulate on Instagram, Youtube, or museums are selling for some millions monthly [Cascone \(2021\)](#). Once again, detractors dismiss NFTs as tulip mania howling from the depth of COVID austerity, and they would be right for many such projects. But let us pause and consider the successful *independent* ones, and interrogate why they grip the audience so:

1. CryptoPunk: inspired by London's punk scene. There are only 10,000 punks in existence (see example in figure 1). The collection is split into four character types with many additional attributes. It has become a status symbol amongst many crypto-anarchists [LarvarLabs \(2021\)](#).
2. Bored Ape: only 10,000 apes are in existence. Holders are granted entrance to the Bored Ape Yacht Club private discord, and other membership events. It began as a subtle satire of the NFT craze, now the top ape is fetching for some 3.4million USD [boredapeyachtclub \(2021\)](#).
3. CryptoKitties: breedable collection of virtual cats with defined attributes. It started as an little experiment inside a Canadian incubator, and grew so popular that it congested the Ethereum network. [cryptokitties \(2021\)](#)

The underlying theme is that the successful projects endow users with a novel identity evoking a new world. In our view, successful NFTs are not technical artifacts so much as a new content vertical, markedly distinct from the flavor of micro blogging popularized by Instagram and Twitter. The NFT content vertical centers on building a

great society ², or "the Metaverse" as many have coined. The Metaverse is not just a virtual reality (VR) construct, but also a literary macguffin: a place where all is good and equitable, and yet does not exist ³. It should not go unnoticed that seeking Eden is a primal human instinct that stirs vigorously for millennial and gen-z. Both emerge from shadows of the great recession, only to sink deeper into the rolling valley of the long term debt cycle [Dalio \(2021\)](#). If they cannot acquire true wealth here, then they will damn well build a fantasy world where they can be rich. ⁴ Appropriately, the drive to cultivate virgin lands is baked into many profitable game loops: from Minecraft to TikTok, to the very mythos of The New World herself. And now, the siren sings from beyond the Metaverse.

This brings us to Lumo and the market opportunity. Before we mark the target, understand the relationship between NFTs and DAOs in the cultural context: as a product category NFTs are social capital and scarcity quantified, and DAOs are privileged spaces where status may be witnessed and institutionalized. In this lens, we assert the DAO is more than a political construct, it could be a consumer experience ⁵. Not just running a corporation, but also the image of running one. A postmodern social entity, virtual reality in the naked sense of the word ⁶. Indeed governance and art need not be exclusionary, nobles throughout the ages have patronized the arts because they understand "art is politics' sweeter tongue." ⁷

The Market

"Web1 was about commerce, and on the internet shelf space is infinite. Web2 was about relationships, thus on social media the number of 'friends' is infinite. Web3 is about digital possession. On web3 your closet space is infinite."

The Total Addressable Market. The commercial analogue of the arts (or "high culture") is consumer culture, here culture is witnessed in choice of select merchandise. Global commerce is a 4T USD market [statista \(2021\)](#), a red ocean feeding whales such as Amazon, Alibaba, and now Facebook. And yet only 14 percent of such sales is happening online [US Census Bureau \(2021\)](#). When over 3.4T USD in sales occurring face-to-face 27 years after Amazon was founded, one begins to question whether there are categories that simply cannot be sold as boxes in an Amazon warehouse, or discovered as pictures on social media.

The Immediate Addressable Market. We believe luxury fashion items is one such category. There are many factors of this immediate addressable market that we find appealing [deloitte \(2020\)](#):

1. Size: 281B USD in aggregate luxury goods sales in 2019 (pre-pandemic numbers).
2. Growth: consistent 8% – 12% growth pre-COVID.

3. Fragmentation: 49.8% of the luxury goods are sold by boutiques, while the top 10 vertically integrated companies only command half of the annual sales. Such fragmentation may strike you as odd for an industry that is so mature, but it makes sense if we realize selling luxury merchandise is about selling **scarcity**. In other words, one cannot necessarily grow by selling more.
4. Fixed consumer shelf size: luxury items are status symbols whose value can only be perceived when worn. But in the physical world there is a fixed upper bound on the amount of display space on the body. For example with jewelry, we all have at most ten fingers and one neck.
5. COVID headwinds: sales are down across the industry as people travel less and opt for comfort over "flex". Currently, some factories have remain closed as well.

This is an industry in distress in the near term. But the fixed shelf space and inherent limitations of selling "scarcity" are reliable invariants that will not change any time soon. Moreover, the most appealing characteristic that make luxury fashion unpalatable for Amazon is the long discovery process that stretches far beyond the moment a shopper steps onto the floor. In fact, 20 to 30 percent of luxury retail purchase is done by those who travel to a foreign country Achille and Zipser (2021), in a way the discovery process begins when one books an airplane ticket. That is to say traveling to a fantasy location prompts one to adopt an alter-ego, draped in the "new", and so manifest a new person-hood. The product intuition is to capture this implicit process of "self rediscovery via curation" into a loose governance framework, whereby we prompt people to travel to web3 and build fashion lines of their imagination, then curate other buyers whom they deem worthy of such a house.

The beach front. This scenario presents an immediate challenge as most people simply have no skills regarding the design of clothes, jewelry, or construction of the complimentary mise-en-scène. Thus our point of entry will be fashion designers themselves. Similar to the rest of the arts, the top fashion designers command respectable market power over their employers and their peers Rossi (2018). This is perfectly natural: fashion designers do not just design clothes, they design new worlds, they design games. The out sized returns of successful lines is not only a testimony to the depth of their appeal, but also the limited number of fabricated settings a clique can assimilate. The wisdom of working with designers with some traction is that they have demonstrated an ability to envision desired settings with appealing looks. This reduces the problem of searching for "mystical" places to reify what was once

implicit, arbitraging what is abundant in real life against its scarcity on web3.

The Gap. However this is far from sufficient if the goal is to open source the entire brand launching process. There are significant organizational hurdles that must be addressed from selecting what goes into a line, how it is marketed, the media assets required, the eventual manufacturing process, and all the necessary quality assurance (QA) along the way. In the next section, we propose an industrial complex mediated by Lumo token that may fill a broad range of said tasks. The posture is to bridge existing islands of markets, not speculating on what people "might do" given new tools.

Finally, observe our positioning differs from existing players such as OpenSea in that they are horizontal store fronts, or chain vendors which we view as a potential partner. Lumo is an industry-specific animal that inhabits a chain as is, and attempt to vertically integrate relevant aspects of the nascent production-consumption pipe.

Remark (The role of up and coming fashion designers). *One visit to the Parsons building or the surrounding photo studios, and you will notice the number of students walking around with their "book": a fashion line of their making. These student designers are immensely talented and scrappy, making clothes on a shoe-string budget and inviting friends to pose as models. But such eager endeavors at playing house soon give way to reality, and reality is cruel: most gifted designers disappear into corporate jobs and won't even see the chance to stamp their name on a shoelace. We hope Lumo can provide an alternate outlet for their eye, giving designers the requisite wind to enact their creativity in ways unsupported before.*

The Complex

This section details the various spheres of economic activities mediated by the Lumo token, and narrates how the token contributes to growth, retention, vertical integration, and value capture. In short, Our token subsidizes the production of IP whereby consumers purchase Lumo tokens as part of the "front-office" brand-building experience, so as to pay for the production of high quality IP in the "back office" mining complex. We call this process of bidding for the production of quality media "proof-of-rendering". First, let use clarify some terminology:

1. **d**: raw design file, possibly in 2D. For example, it could be from Illustrator in .ai file format.
2. **P(d)**: post processed design file with higher production value. Most likely in 3D, usually from Unity, in .fbx file format.
3. **Q, M**: other post processing functions that consumes a file and output an objects of a different

Table 1
Domain Specific Terminology

DAO Terms	Lumo Terms
DAO	Fashion House
Proposal	Script
Amended Proposal	Story board
DAO Members	House members
DAO Token	(Lumo, Genesis NFT)
Treasury	Treasury
Vault	Vault

Lumo DAOs are task specific. We do not build for the general use case, only the use cases that would provide a meaningful user experience for our targets.

- format. For the sake of convention, **M** stands for manufacturing.
4. GPU: Graphic processing unit. A rather expensive piece of hardware that is used to render 3D objects for display. Recently, it has been co-opted to train neural networks and mine bitcoin.
 5. $(d, USD_j, Lumo_j)$ triple: one bid submitted by the j th DAO member. USD refer to an arbitrary amount of dollar paid to the miner, and likewise for Lumo. The cumulative amount of value bid here is $USD_j + Lumo_j$.
 6. $\{(d, USD_j, Lumo_j)\}^m$ set of triples: the set of bids submitted by m DAO members for design file d to be rendered. Specifically, member j has contributed USD_j and $Lumo_j$ to mint the design. This set is one item in the bid queue. The total amount bid to render d is then: $\sum^m USD_j + Lumo_j$
 7. Bid queue: a priority queue of rendering tasks to be consumed by miners, ranked by the amount of value bid.
 8. $(d, \mathbf{P}(d))$ tuple: output from the miner is the original design file, plus the rendered 3D version of it. Note the bid value is not returned because it is used to pay the miners.
 9. $\{(d, \mathbf{P}_k(d))\}^n$: a set of aforementioned n tuples. In this case, n miners output n unique tuples with the same original design file, but different 3D interpretation $P_k(d)$.
 10. $\mathbf{P}^*(d)$: processed design that has been selected by house members for minting. Once minted, it becomes IP with attached provisions of ownership and royalty entitlements.
 11. Non-Fungible Tokens (NFT): on-chain serial number denoting the identity of a unique item of media. In our context, we use NFT and intellectual property (IP) interchangeably.
 12. Script: a proposal for a new fashion line
 13. Storyboard: a script and IP pinned to it. A storyboard with m IP pinned is denoted by $(script, \{NFT\}^m)$

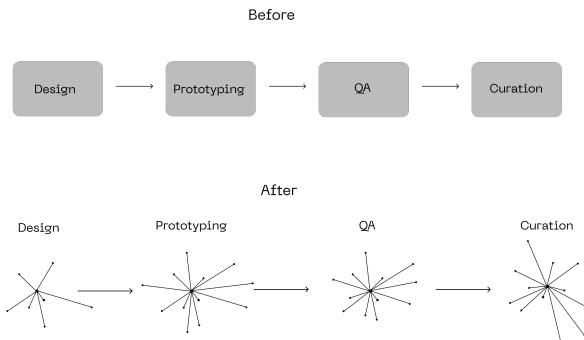


Figure 2

Lumo is a staging ground for discovering new brands. Instead of discrete function verticals in a single corporation, we coordinate production amongst distributed stakeholders and leverage the buyers for quality assurance.

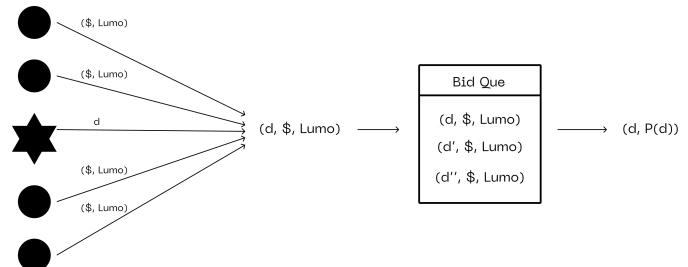


Figure 3

The first front-office game loop take a raw design file and Lumo tokens as input, and outputs the triple $(design, Lumo, USD)$ that will enter the bidding queue, the queue is consumed by game loop two (see figure 5). House members spend Lumo and dollars to subsidize the creation of IP for minting.

The front office. The front office is the consumer-facing social commerce experience, whereby shoppers collaborate with designers to build productive fashion houses (see table 1). Specifically, fashion house members may:

1. Select concept designs to be produced as minted IP
2. Pitch scripts for new fashion lines
3. Collaborate with designers and IP holders to enrich the script into a storyboard, filled with minted media.
4. Propose which story board should go into production.

Figures 3 and 4 outline the consumer facing game cycles. Tokens flow in and out of the front office such that:

1. Formation: A fixed amount of Lumo tokens is given to or purchased by each house treasury at the time of

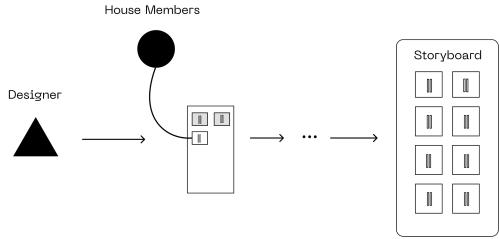


Figure 4

The second front-office game loop consumes scripts and outputs candidate brands. Lumo token must be held to partake in this process, although voters do not need spend the token. House members can propose new scripts or scenes where a candidate fashion line would inhabit, and IP holders may "enrich" the script into a storyboard of designs. Users can only pin IP they own onto the storyboard. Should the brand go into production, underlying IP holders are entitled to sales commissions.

formation. Houses must have some Lumo tokens locked up in order to continue operating.

2. Membership growth: A fraction of one Lumo token is given to or purchased by each house member upon acceptance. The house member have the option of putting the token into the house treasury, or keeping it in their own wallet.
3. Consumer game loops: Members spend Lumo token to subsidize the production of high quality IP. Members must hold Lumo tokens to vote for scripts. Members can only pin IP assets they own onto storyboard.

Now permit us to provide some commentary on the user experience. From the perspective of house members, this is an evolution of social commerce, the script is a communal mood board with definite financial consequences. From the perspective of the designers, we are "studio space" for discovering new brands. The differentiation here is the immense operational leverage provided by the back office render complex, and the liquidity afforded by on-chain IP on the marketplace. Content leverage enlarges the search space, while liquidity allows possible brands to be discovered and valued with minimal additional designer risk. The desired outcome is lucrative fashion lines will be launched that previously elude consideration. We also offer a better risk-adjusted return profile: in Kickstarter all proceeds are returned to the backers should the project fail to launch, in Lumo all sides receive something in so far as high quality IP can be produced and sold. In a way, the non-fungible tokens are pre-inventory whereby success need not be defined by whether there is a physical analogue delivered. Additionally, the brand IP curation process itself may

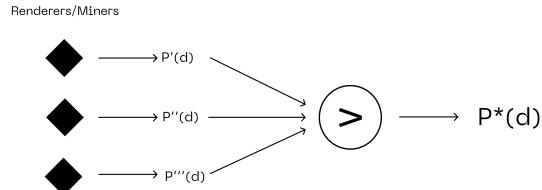


Figure 5

The back-office game loop consumes the bid queue constructed by the houses, and outputs minted IP. Here, n miners stake Lumo to do the rendering job. The miners consume the top item in the bid queue, and outputs n candidate renderings of the original design file. The candidates are then displayed to the front office, whereby the top $P(d)$ is minted. In the case of even votes, the designer breaks the tie. In the back office, the winning miner receives the entirety of the bid value. All losing miners who have submitted files receive their staking Lumo, in addition to earned interest in proportion to the amount staked. The interest rate is determined dynamically as a function of the spot supply in the system. This system ensures that all players receive something in return for their meaningful effort .

unfold over months, and serve both as premarket research and the basis of a future marketing campaign. Recall people may tell you what they like, but the buy-signal is a far stronger indication of 1) their implied preference, and/or 2) their belief in the preference of others. Indeed, both sets of information are valuable.

The back office Mining complex. The necessity of the back office mining complex is summarized in this quote:

"Content is king"

Twenty five years after these words have been spoken, the market clearing price of media may finally be reflected on web3. Of course, the value of media to drive high fashion has never been in dispute, and we must help the houses match the production value if they are to compete with the expected quality. The first part of this solution involves liquidating the deluge of unused files on a designer's computer. This latent asset is currently generating no income, and similar to parked cars in the pre-Uber era, we look to market this overlooked category.

However, naively minting raw design files will prove insufficient in many cases on account of the production value of NFTs on the market today. A post production step is required whereby a design file (typically 2D) has to be translated to a desirable stylized NFT (often in 3D). The hurdle here is the human effort required to interpret 2D files as 3D renderings, in addition to the compute cycles



Figure 6
An example of a high production value computer generated 3D rendering of fabric draped over human form. This 45 second clip was rendered over 24 hours VAHID3D.COM (2014).

required to render such a file. It is well known amongst the FX world that cloth simulation is amongst the most challenging of special effect tasks Harisova (2020). Gaming and movie studio devote significant resources (hardware, QA, hiring, training, retention) to their rendering farms and FX studios Pizzello (2012). The average fashion designer cannot hope to compete with such a machine⁸. This is the value of integrating a distributed rendering complex into the Lumo system. Moreover, said rendering complex further position the designers away from user-generated-content creators from the likes of Instagram and TikTok, whose followers expect to see the flavor of videos that can be captured and post-processed on a phone.

Remark (The role of 3D artists). *In reality, interpreting 2D renderings into 3D realizations is not commodified work. The bid queue is meant to streamline collaboration, not to insulate houses from the broader creative sphere. In fact, creators proposed this idea to us, dubbing it "single-player" mode. Such as it is, we will formalize a process whereby committed 3D artists can join houses on non-exclusive basis. The exact mechanism is beyond the scope of this paper. Suffice it to say we are keen on enabling sensitive artistic environments, which is a necessary pre-condition for good work to be produced.*

Discussion . The Lumo industrial complex is a production studio for launching brands. The journey begins when designers upload design files and coordinate with house members to pay for added production value, which is procured in the back office mining complex. Members then select the top candidate to stake as house IP, and subsequently propose scripts along side designers. The community then pool IP assets to enrich the script into story boards. The three game loops correspond to three production modules of design, prototyping, and curation. They

work in concert to launch candidate brands. It is important to note that three-sided marketplaces are significantly more difficult to unravel than two sided ones.

Moreover, there are ample opportunity to enrich network effect within each production module. In minted design, designers may attach provisions that outline the attractiveness parameter of certain items relative to others. Recall we are working with fashion lines, where most items do not complement most items. Metadata is a natural place to build content network effects amongst the houses, and hopefully teach people how to dress⁹. In 3D prototyping, it is natural to assign reputation points to miners per their work history, such reputation points can have subtle financial consequences. For example, those with higher points can expect to see their renderings $\mathbf{P}(d)$ to be placed higher on the evaluation queue. In storyboard curation, it is possible to assign royalty payout schedule or liquidation preferences to the various contributors. So long as the brand is in production, the storyboard will be relevant to all financial stakeholders.

Notably missing in this picture is how we integrate the manufacture process, the glib answer is that presently we do not. However, the same system design for the production and quality-assurance of 3D renderings can be co-opted for the production of physical goods, and indeed any number of ancillary media such as videos and music that may associate a brand launch. In general, we view production of physical merchandise as another form of "post-processing" \mathbf{P} . One can introduce arbitrarily many post-processing state changes, each exposing a bid queue as interface, and incentivized with a mixture of dollar and Lumo token subsidies. Note the processing pipeline of $d \rightarrow \mathbf{P}(d) \rightarrow \mathbf{Q}(\mathbf{P}(d)) \rightarrow \mathbf{M}(\mathbf{Q}(\mathbf{P}(d)))$ is an analogue to the concept of "evolution" in Crypto-Kitties and similar games. In Lumo, evolving designs and attaching attributes will be rich grounds to explore additional game mechanics.

This modular production system would make the Lumo industrial complex more valuable by giving additional production leverage for each house. Naturally there is strong network effect amongst the many production modules that work conjointly to promote buy and sell-side retention. If we can integrate the point of sale of the physical merchandise, then it becomes possible to payout sales commission (read: royalties) to the holder of the original IP. Looking even farther ahead: if we are able to work with manufacturers to ship products with select QR codes, such that scanning said code would entitle the buyer with a design drop, then the circle is complete and the game restart anew.

Remark (What is proved in proof-of-rendering). *Recall in proof of work, the data structure undergoing state change is the transaction log (represented by a Merkel Tree, but that is incidental). The miner solve a puzzle to prove they*

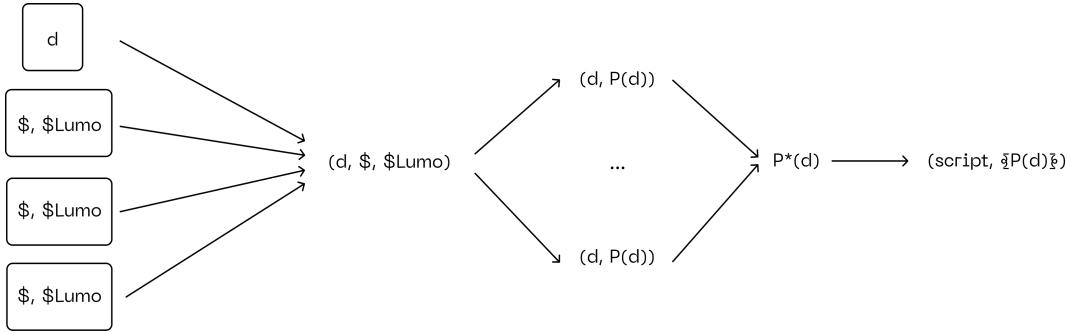


Figure 7

The inventory enrichment lifecycle. This figure backgrounds the players and focus on the lifecycle of inventory. Raw design files are selected and paid for their 3D enrichment, then the best render is minted into IP with attached provisions. It is subsequently sold and pinned onto a storyboard in support of potential brand launch.

have the computational resource required to audit a block of transactions. In a simplified setting the miners do not step the system state forward at the transactional level, they merely approve proposed transactions. Our situation is inverted, and we took liberty with the words "proof" and "miner" for optic reasons. In Lumo, the underlying state is the set of designs and their high production value realizations, the elementary state transition is of form $d \rightarrow P(d)$. It follows then that the 3D artists are actually the network users proposing state transitions, while the houses are the miners that is selecting the best transition to proxy consumer preference. The true "mining reward" is the rendered IP, while the good-faith proof is demonstrated in Lumo tokens or dollar. Strictly speaking, proof-of-rendering is a form of "proof-of-stake": the houses are the miners proving they have the community wealth to launch fashion brands. It is admittedly confusing because in our setting, state transition is only possible with GPUs and human effort. But GPU-use is incidental to the task at hand, not essential to the incentive structure.

The Policy

"Although the inventory we engage with is of the fashion world, at the software level Lumo is not just a fashion studio anymore than Amazon is just a website. We are a production logistics company with a native monetary policy."

This section outlines the token allocation schedule and describe how it subsidizes our various markets. We understand that there is no end to the number of convoluted token incentives in the crypto-sphere. Suffice it to say our goal is quite modest: Lumo tokens subsidize the production of high quality media in our production complex. In our view, tokens *cannot* make a fundamentally flawed business model viable. As a domain-specific currency, it is a rather specific tool and we see three relevant settings:

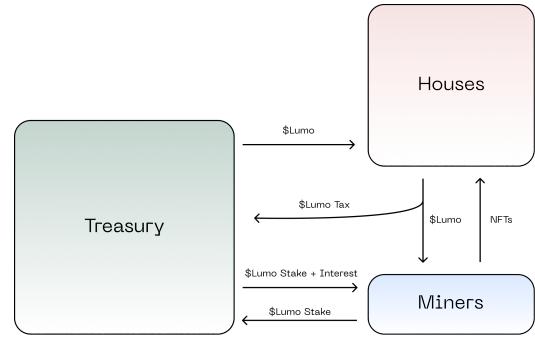


Figure 8

Lumo token lifecycle. The treasury allocate Lumo token to the houses so that they can spend it on creating NFTs. A portion of the spending is taxed and returned to the treasury. Miners who created high quality media are rewarded with Lumo tokens spent by the house. Miners who were not selected are rewarded with staking fees, paid out of the Lumo treasury.

1. bootstraps markets *ex-nihilio*
2. connect disparate markets
3. control the rate of production

To this end, the total supply of Lumo token will be 1B, 15% of which will be reserved for core team members and advisors (with the familiar 1 year cliff, 4 year vesting schedule). 20% will be reserved for investors, appropriately tranches (details available upon request). The remaining 65% (henceforth: community tranche) will be allocated to incentivize the production of candidate brands. In the community tranche, 55% will be either airdropped or sold to house members as payment for the miners, while the

remaining 45% of tokens will be used for ancillary mining subsidies in the system (see figure 5).

Now we give a *qualitative* description of our token allocation schedule. In the interest of sustainable development, the community tranche will be distributed over a 10 year span. The rate of distribution will be a function of rate of production. Note we are working with luxury items here, and even in the digital sphere the notion of scarcity has to be maintained in the interest of overall community health. Thus, we may periodically reduce the rate of community tranche allocation so as to *cool down* the market for luxury IP (see setting 3). However over the next three years, we do expect liberal allocation for mining rewards to jump start the bridge between fashion designers and 3D rendering artists (see setting 2). We may also airdrop Lumo tokens to design students, so that they may launch their fashion houses while in school (see setting 1). We denote policy level effects on token supply "extrinsic" forces.

Next we consider the "intrinsic" forces that affect the total circulation volume of Lumo token at a given point in time. Recall houses must maintain some minimum Lumo token reserve to continue operating, and all house members must hold Lumo tokens to partake in the brand-launching process. Thus as the number of houses grow and their membership grows, the number of Lumo tokens in circulation will decrease. Because the houses spend tokens to subsidize production, the more brands they work to launch, the more token circulation will increase. Naturally, we expect top 3D artists to accumulate significant holdings of Lumo tokens. In order to counter-balance this force, we offer in-system avenues where 3D artists can launch houses of their own (recall 3D artists are not a commodified work force). In this case the Lumo tokens they earned can be spent on production process per their demand, thereby redistributing Lumo tokens back into the system.

Although the total supply of Lumo is fixed, Lumo is not necessarily a deflationary token. That is to say in the Lumo complex, there are no structural sinks whereby tokens will accumulate without bounds. We do not believe excessive "hoarding" is appropriate for our context, because this system is designed to increase collaboration and product launches. Money velocity will contribute significantly to this end.

Conclusion

This paper proposes a vertically integrated shopping experience where the moment of awareness begins not when a person step onto the sale floor, but rather when one steps into the design studio. Thus, the machine scales up the boutique experience with open-sourced brand construction, as opposed to a choice retail presence. Operation leverage and network effect stems from adding more modules of production, while risk and value can be traded and priced on a liquid market for IP. These disparate economies

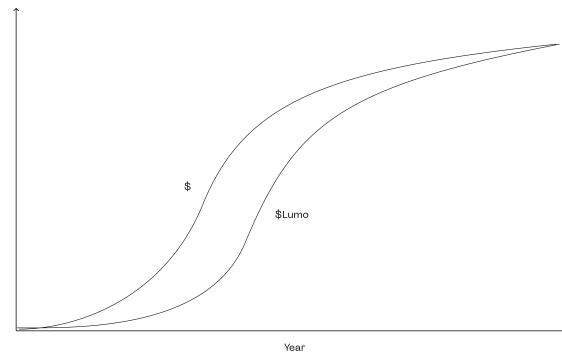


Figure 9

We subsidize the production of high quality IP with a mixture of Lumo tokens and USD. Over time, we aim to gradually shift the subsidy over to mostly Lumo tokens.

are subsidized by the Lumo Token, whose reach will grow as we integrate more modules of production and launch more brands.

Notes

- 1 A las on the day of this publication, Facebook just officially changed their name to Meta. The canaries, it seems, are roaring.
- 2 It is striking how much of Lyndon B Johnson's original speech is still relevant today, perhaps because of how little of it has been attained.
- 3 Here we are referring to the crypto-purist conception of the Metaverse, not the Facebook revision.
- 4 TV execs have certainly raked on this very impulse. The proliferation of shows such as Mad Men, Billions, Succession and even Game of Thrones demonstrates that there is an insatiable demand amongst yuppies to imagine their role in capitalism-proper, all the while dutifully observing the daily rites of the neo-feudal reality.
- 5 One visit to any FAANG office with its Foosball table and Kombucha on tap, and you will immediately conclude the line between work and consumer culture has been blurring for decades now. I leave it to your imagination as to who is doing the consuming, and what is actually being consumed.
- 6 VR companies sans headset is everywhere if you know where to look. Blue Apron helps you reenact the rituals of living a suburban home life without the hassle of going to the grocery store or gasp - living in the suburbs. Peloton recreates the YMCA in your living room. This is a secular trend whereby every boomer institution gives way to a post-boomer reinterpretation. From the kitchen to the gym, from the town square to: the Mall.
- 7 A clumsy sentence that nonetheless states what it intends. This is a quote from the TV show Foundation, financed by Apple to compete with other

streaming services. The source material is a seminal work of Science Fiction, while the Apple-financed adaption is derivative at best.

- 8 Production resources is one reason why studios can offer the Faustian bargain, and yet more creatives come.
- 9 This topic deserve its own paper or ten, so we really cannot do justice to it here. Suffice it to say, fashion is natively composable and the intrinsic content-network effect is far stronger than i.e., selfies.

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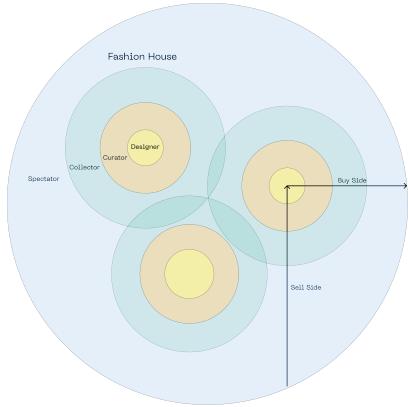


Figure 10

Community archetypes and their hierarchy. As the user journeys inward from spectator to designer, they are moving from the buy side to the sell side. This is the native social ladder of Lumo, where those who can create original work subordinate those who can curate a cohesive set, who in turn subordinate those who buy or window-shop. Miners lie outside of this hierarchy until they ascend to the role of a designer, thereby bypassing all the middle rungs.

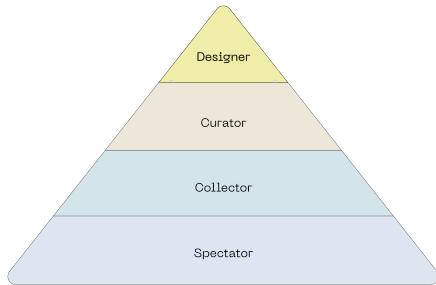


Figure 11

Community archetypes and their relative frequency. As we move from designers out to spectator, we expect at least an order of magnitude increase in population size at each level. This power law decay is frequently observed in social platforms.

Addendum Introduction

In the Addendum section, we outline the market fundamentals of Lumo, pen down milestones and discuss our go to market strategy.

Lumo as a managed marketplace		
concept	Lumo	Uber
Experience	Creating a Brand	A complete Ride
Domain	Style	City
Subdomain	Collection	Routes
Buyer	Collectors/Curators	Riders
Seller	Designer/Community	Drivers
Capital	Mining Complex	Cars

Addendum A. Community Archetypes

All games have a native social ladder, and Lumo is no exception. Figure 10 and 11 shows the rungs and their population size, respectively. In particular, house members are stratified by three archetypes:

1. Designers: bring vision, design skills, and design files
2. Curators: create story boards filled with NFTs, possibly sourced from multiple designers
3. Collectors: purchasers of individual NFTs created by one of Lumo's designers
4. Spectators: casual users who like to browse the brand creation process or the various community NFTs

Addendum B. Lumo as Managed Marketplace

In a very reductionist comparison to a firm of the prior cycle, Lumo is a managed marketplace where the houses are vendors. A gross comparison is made to Uber in the table above. However from a market dynamic perspective, there are profound differences to Uber:

1. In Uber, an experience (a ride) seldom last for more than an hour. In Lumo, a brand-building experience may unfold over many months
2. In Uber, riders cannot own the output of this experience. In Lumo, community owned-brands are owned by the house members.
3. In Uber, buyers passively accept the service. In Lumo, buyers actively partake in the service itself.
4. In Uber, the drivers are commodities, and the riders' preference over drivers is uniform. In Lumo, the designers are specialized and people have strong preferences over designs
5. In Uber, most drivers own their cars. In Lumo, the designers do not own the mining complex, but instead "rent" it using community pooled funds

Overall, this comparison is valuable in-so-far as to highlight how we are different from a marketplace for *commodity* services. We choose Uber because most readers have some first-hand experience with it, thus it is a fair point of

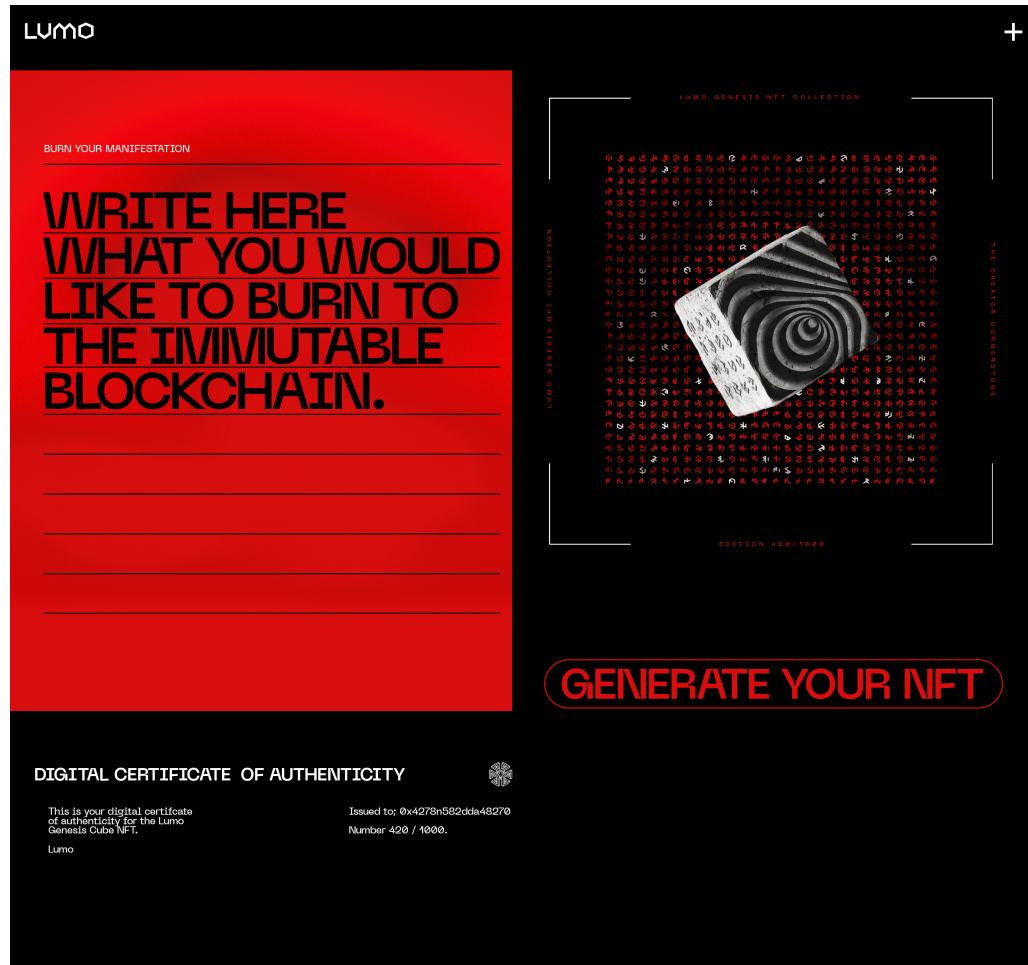


Figure 12

The burn page where users can generate Lumo-genesis-NFTs dynamically. As prospective Lumo users write down their manifesto, it is encoded in real time into a set of incomplete cubes. The generated NFT is then minted and airdropped to the new Lumo member. The burn event is open weekly for a few hours at a time, and functions a-la priests' confession cabinet.

departure to start understanding how the various capital classes of Lumo relate to each other.

Addendum C. Milestones

Lumo is a multi-sided industrial complex where many parties must coordinate to produce a service. Our product timeline reflect the need to ensure sufficient liquidity on all aspects of the marketplace. In the steady state destination, Lumo will provide the tools (software and Token) to organize all aspects of the production-consumption process, while allowing the houses to make most of the governance decisions regarding the choice of products and

how of consumption. To this end, we have the following goals:

1. 10 years: give houses full control over the parameters of production pipeline
2. 5 years: all modules of production are online with sufficient liquidity upheld by the Lumo token. In particular:
 - 3D render complex
 - Partner factories
 - Ancillary services that produce media associated with brand launch.

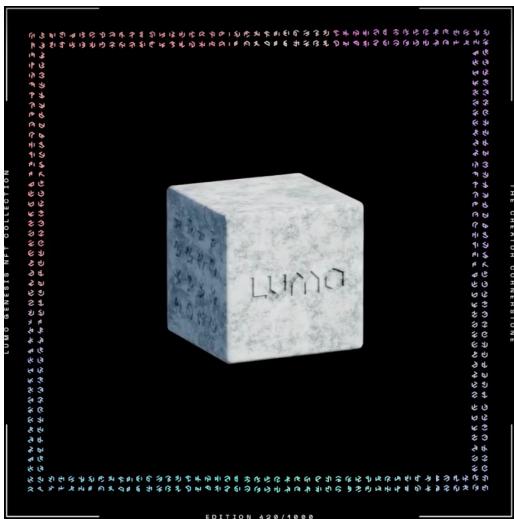


Figure 13
An example of Lumo genesis NFTs that is made in collaboration with a community member, to be air-dropped at our burn event. The stone motif reinforces the communal concept of one cornerstone in a complete fashion house.



Figure 14
An extra rare variation on the original cube made of stone. This material evokes Lapis Lazuli, a precious stone found in the mines of Afghanistan. When ground up, Lapis powder is the basis of ultramarine, the finest of all blue pigments favored by artists such as Vermeer. Cultural awareness and story telling is an important component of our go-to-market strategy. The goal is to present Lumo not just as a commercial endeavor, but also an artistic exploration.

3. 2 years: launch 10 viable brands with meaningful revenue. Revenue could be from digital or physical merchandise sales.
4. 1 year: launch 10 viable *brand-candidates*, with high quality NFT and physical merchandise in limited release.

Year One Target Metrics. The theme of first year is:

1. Sustain creative momentum in all fashion houses
2. Creating renewable opportunity for virality
3. End of season one creator retreat and fashion show

On point (3), at the end of season one (target Spring 2023), we will host creator retreat in Bali (tentative location). This will be a week-long retreat that include fashion-show as one program. There will be slots for 10 fashion lines created by the various houses of Lumo. Based on this target, we have this back-of-the-envelope calculations for the requisite production capacity of mining complex

1. 10 items per fashion line implies 100 NFTs
2. 5 rendering candidate per NFT, implies 500 renderings
3. 20 rendering per 3D artist team, this implies 25 3D artist teams
4. Each team with at most 5 people, this implies 125 artists with various skills.

Next, if we assume a 100x in population size as we descend down the archetype levels, then 10 designers implies:

1. 10 fashion lines, 10 designers
2. 1000 curators
3. 100,000 collectors
4. 10,000,000 spectators

In other words, the minimum viable community size required to launch 10 brands requires 10 million unique spectators. Note spectators do not need to have a Lumo account, they simply need to have *seen* a digital mechanize produced by one of the Lumo fashion houses. This implies the need for a viral marketing campaign.

Year One Community Development. This section breaks down the community into its respective archetypes and describe the pipeline for conversion.

1. Spectators: Monthly burn event where people exchange email for genesis Lumo NFT with unique signature encoded from their manifesto. This event will be open for 3 days a week, for 5 hours a day, and function as an online "confession booth".

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2. Collectors: convert from base of spectators.
Spectators holding genesis NFT can vote on which 3D renderings should be minted (note this action is free). Each vote is a subtle buy-prompt for the spectator.
 3. Curators: converted form the base of collectors.
Curators are prompted to convert their NFT holdings as anchor items in prospective collections/brands.
 4. Designers: curated from a separate high-touch B2B sales process. In the beginning, we will rely on team members who have industry contracts to convert their prior work relationship to fashion houses on Lumo. Designers will be brought in on a rolling basis.

In addition, we will be "doing things that don't scale": working closely with designers and collectors to create candidate brands, and ensuring the designers' files are translated faithfully into 3D NFTs that would anchor the brands.