# "Scienceroot" Whitepaper

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**Abstract**

Technology evolves faster than ever, with the pace picking up with every passing year. Unprecedented in history, we have the greatest and brightest minds driving unparalleled change. Progress isn't a trend that naturally happens on its own - it requires an ever growing number of researchers and experts. Shockingly the scientific community of today doesn't get what it deserves, constantly struggling with obtaining funding and working endless hours with little to no reimbursement. It is our stated mission objective to empower those who empower us all by establishing **Scienceroot** the first scientific ecosystem to sustain a journal which rewards scientists for their efforts.

# Contents

# 1 Introduction

**Scienceroot** aims to revolutionize the scientific and research community using blockchain technology. Our goal is to create an ecosystem where anyone in the scientific community around the globe will have the ability to gather funding, interact, discuss research ideas, collaborate and in the end, publish their work through a more efficient, intuitive and transparent platform. Our scientific ecosystem will be powered by its own unique currency called Science Token (ST), which will used to exchange funds, submit articles in our journal, access content and reward parties involved. **Scienceroot** will integrate all the critical functionalities needed by researchers, scientists and academics, making their day to day lives easier and allowing them to focus on maximizing their impact in the scientific world.

## 1.1 Motivation

Researchers have to publish their work in scientific journals in order to worldwide disseminate their own results and make a name for themselves. To be able to come up with ground breaking research they need a collaboration platform to connect with peers, with whom they can discuss ideas and find solutions. The funding and jobs platform is a necessity for scientists, researchers and academics. They need a place which allows them to have an overview of funding options, a possibility to apply for grants and a way of accessing new opportunities in their field. We decided to create a platform to incorporate all the above features, add blockchain and decentralization, to create **Scienceroot**, the first blockchain-based scientific ecosystem.

# 2 Scienceroot Platforms

## 2.1 Scienceroot Journal

The first piece of our **Scienceroot** ecosystem will be our blockchain-based journal. One of the first core features of our journal platform will be the publishing process. By leveraging blockchain and smart contracts we can guarantee submitters immutability, security, transparency and trust.

The second feature will be the submission process in which we will also implement artificial intelligence for proof reading, content references and overall article format to assist our editors. This will in future speedup the initial editing process and lower editorial cost. By enabling this from the starting point on we can train our artificial intelligence algorithm based on published papers.

The third and most important feature will be our unique **rewarding process** which brings profit to anyone who decides to publish in our Journal. Scientists will obtain profits from their published work and peer-reviewers will receive compensation for their contributions. This will be achieved using blockchain smart contract technology to ensure an automatized process.

## 2.2 Scienceroot Collaboration

The second part of our ecosystem will be the blockchain-based collaboration platform where scientists, researchers and academics will have the opportunity to connect and collaborate with colleagues, peers, co-authors, and specialists in their field.

Furthermore, it will offer the possibility to ask questions, get answers, and find solutions to research problems. By integrating blockchain and IPFS (Interplanetary

File System) [1] as the underlying technology we are creating a decentralized open access collaboration platform with a unique currency which can be used by users worldwide. For example, users will have the possibility to post a research problem or tip a helping colleague and by enforcing them with smart contracts we can guarantee that everyone keeps up their end.

### 2.3 Scienceroot Funding and Jobs

Third will be our blockchain-based funding and jobs platform. Our target is to create a centralized portal that offers a wide list of grants from all around the world. It will be open to our registered users searching for national or international funding, opportunities and organizations looking to recruit or market their grants to an national and international audience. This will allow scientists, researchers and academics to find the most suitable funding option and leave time to focus on the application itself. It will offer funds in fiat currency[2] and our own currency Science Token(ST), the decision will remain with the offering organization.

## 3 Why Blockchain?

We decided to build our platform with the help of blockchain and decentralization because it allows us to integrate the needed functionalities which are desperately required in the current business.

It offers us the possibility to create our own non-inflationary **Unique Currency** which can be exchanged regardless of the users location. Based on this, the global scientific and non-scientific community will have an option to get involved in promoting science, by investing their money to a cause in which they believe in, without the fear of third-parties taking huge percentages of the generated contribution. This can be achieved using the immutable ledger and smart contracts. In the future it will allow us to create transparent grants which can be easily monitored. Scientists, researchers and academics collaborating worldwide will have a common currency that has the same value and functionality in every corner of the world.

**Smart Contracts** serve as foundation in our groundbreaking journal, which rewards all the contributors involved. Without smart contracts we would not be able to create a self governing system and pay such high returns to our contributors. We can only achieve this by removing the intermediaries. Smart contracts would also allow us to protect the intellectual property of our publishers by automatizing the sale of works online and eliminating the risk of file copying and redistribution. They will be the building block of our self governing marketplace for scientific collaboration in which researchers, scientists and academics can offer their assistance in exchange for Science Token (ST).

**Storage and Content**. Lastly it gives us the means to create a decentralized archive for the entire scientific, technical and medical content to which anyone, at anytime will have access. By distributing data throughout the network we are protecting files from getting hacked or lost, which will allow us to create a lasting database for generations to come.

[1] IPFS - Interplanetary File System, a peer-to-peer hypermedia protocol to make the web faster, safer, and more open. More info https://ipfs.io/

[2] Fiat money is currency that a government has declared to be legal tender, but it is not backed by a physical commodity.

# 4 State of the Art

## 4.1 Publishing

Regardless of the small audience, scientific publishing is a remarkably large industry. The total size of the global scientific, technical and medical (STM) market was estimated by Outsell at 25.2 billion USD in 2013 and is predicted to grow at about 4% annually as seen in Figure 1.

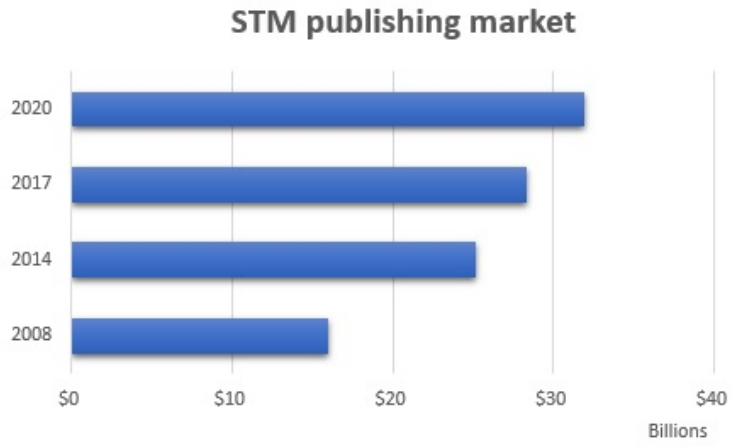



Figure 1: Scientific publishing market cap analysis according to STM.[1],[2]

In order to create profit, a **normal publisher** has to cover several costs like: paying writers for the articles, editing, proof editing, design, shape and distribution. After all this is successfully completed, a good publisher makes a profit of around 15%. The same way goes for **publishing a scientific article**, except that the publisher avoids most of the costs. Researchers write articles about their own work - mostly funded by governments and research institutions - **then send them to the publishers for free**. The publishers hire scientific editors, who verify whether the manuscript is or not within the scope of the journal. Then, the greatest burden falls on the shoulders of other researchers who have to evaluate the validity and legitimacy of the work in a process called **peer-review, again for free on a volunteer basis**. After that, the publishers sell rights to their journals, so that fellow scientists can access the articles. There were about 28,100 active scholarly peer-reviewed English-language journals in 2014 and most of them lack to compensate their contributors and reviewers.

We decided to change that. Peer-review and collaboration is fundamental to the scholarly communication. According to the STM report[2] a typical reviewer spends 5 hours per research paper and reviews about 8 articles per year. These numbers are so small because contributors are not rewarded for their time. By offering well deserved rewards to our contributors we believe to drive the scholarly community to new heights. Despite the transformation of journals over the years, the researchers core motivations for publishing still remain unchanged, focused on securing funding and furthering the authors career.

The advantage of current science journals is based on the necessity for researchers to publish their work in order to be acknowledged. Our goal is to create an ecosystem using blockchain, to benefit all the parties involved in the research process and in the future to be the connection point for the global science community.

## 4.2 Funding

Research funding covers any financing for scientific research, in both areas of science and social science. This is obtained through a competitive process, in which potential research projects are evaluated and only the most promising receive funding.[3] This process is normally run by government, corporations and foundations in which the first two are the major contributors. To put everything into perspective here is a list (Table 1) of how much is being spent on research and development (R&D).

| Rank | Country/Region | Expenditures on R&D (billions of US$) | Year |
|---|---|---|---|
| 1 | United States of America | 473.4 | 2013 |
| 2 | China | 409 | 2015 |
| 3 | European Union | 388.3 | 2014 |
| 4 | Japan | 179.8 | 2014 |
| 5 | Germany | 109.4 | 2014 |
| 6 | South Korea | 91.6 | 2014 |
| 7 | India | 66.5 | 2015 |
| 8 | France | 60.0 | 2013 |
| 9 | United Kingdom | 44.8 | 2013 |
| 10 | Russia | 42.6 | 2013 |
| 11 | Canada | 25.7 | 2013 |

Table 1: Top list of countries/regions by research and development spending[4]

Granting agencies inquire about the researchers background, facilities used, the equipment needed, time involved and the purpose of the scientific outcome. This process is time consuming due to the widespread funding opportunities which are available to researchers. In order to be able to apply for funding a scientist has to find the grant which suits his needs best. One can easily lose sight through all that is offered when searching for funding. A quick search will reveal a lot of grant-related scams, confusing ads and a lot of subscription-based directories. The need for a go-to transparent and centralized platform which connects applicant with funding organizations is now bigger than ever.

# 5 Benefits of using Scienceroot

| Problem | Solution |
|---|---|
| Researchers don't receive any money from their published work | *Scienceroot* profits will be shared with them |
| Old and outdated submission and editorial technology | Blockchain & Artificial Intelligence |
| Long waiting times until articles get reviewed and not enough reviewers | Process will be sped up since reviewers will get paid |
| Divided platforms for different purposes | One ecosystem containing all the platforms a scientist needs |
| Dispersed funding organizations | Centralized platform containing all necessary informations |

# 6 Team

**Vlad Günther** is a Consultant, Engineer and Project Manager with over 6 years experience in Enterprise IT, Finance and Management. He has worked for major companies like Microsoft and Bosch and is experienced in Cloud platforms, VoIP systems, enterprise architecture and Data Security. Passionate about Blockchain, Cryptocurrencies and inspired by decentralization.

**Alexandru Chirita** is a physicist currently working on finishing his Master studies at the University of Vienna, where he will soon be starting as a Ph.D student, doing molecular dynamics simulations. Having to work with researchers and being inspired by them, he came up with the concept of *Scienceroot*.

**Frederik Huschebeck** is an experienced Backend Developer with extensive knowledge of Blockchain configuration, Mining and Smart Contract Development. He studied Computer Science at the University of Dresden, Germany. His main Programming languages are C#,Java, Python and C++.

**Michael Schönbeck** studied International Affairs at the Rhine-Waal University of Applied Sciences in Kleve, Germany. Over the years he gathered a lot of inter-cultural experience abroad in Jordan, China, Russia and Romania. He is also knowledgeable in SQL Server and Azure technologies from working at Microsoft. His first contact with cryptocurrencies was in 2013 when he first found out about Bitcoin, intrigued by the potential he began research the potential of Blockchain. He has strong belief that Blockchain can solve real world problems.

**Marius Balaj** is an experienced fullstack developer with many successful web development projects under his belt. His main programming languages are CSS, HTML, Java, JavaScript and Python. After his first contact with blockchain he realized its world changing potential and started to dig deeper into it.

**Luca Tisu** is experienced in Organizational Development and Human Resources. Having a degree in Psychology he decided to pursue Organizational and Occupational Health Psychology to provide companies with assistance in growth and value creation. Being a Human Resources Scientist-Practitioner, he is driven by the change needed in the scientific community experiencing first hand the downsides of the current business.

# 7 Token

Within the *Scienceroot* ecosystem, Science Token (ST) will be used by our scientific members to gather funding, exchange work for tokens, publish, buy articles and pay subscriptions. Furthermore, the payout of revenue generated by our members will be in science tokens. There will be limited supply of tokens. No further tokens will ever be created after the initial token offering to avoid inflation.

The Science Token (ST) will be based on Ethereum[3], a blockchain-based distributed computing platform. We choose this platform because Ethereum allows smart contracts which are essentially distributed computer programs that run on a distributed public ledger, ensuring that their result is always consistent, available to anyone and cannot be manipulated.

This will offer a collective unique currency which has the same value all around the world. Our users will not need to worry about cross-currency transactions anymore. You will be able to send science tokens to anyone with an electronic wallet no matter where he is. Our future plans are to collaborate with direct payment platforms to integrate our token so that our users will be able to pay directly at their local merchant using Science Token (ST).

[3]Ethereum is an open-source platform and is currently being adopted by companies like Microsoft, JP Morgan, IBM. For more information review https://entethalliance.org/members/

# 8 Technology

## 8.1 Accounts

The starting point, to access everything Scienceroot has to offer, is one account with blockchain integration. This will allow users to exchange tokens, gather funding, submit articles, access content and much more. The accounts are separated into 4 major groups, based on user needs:

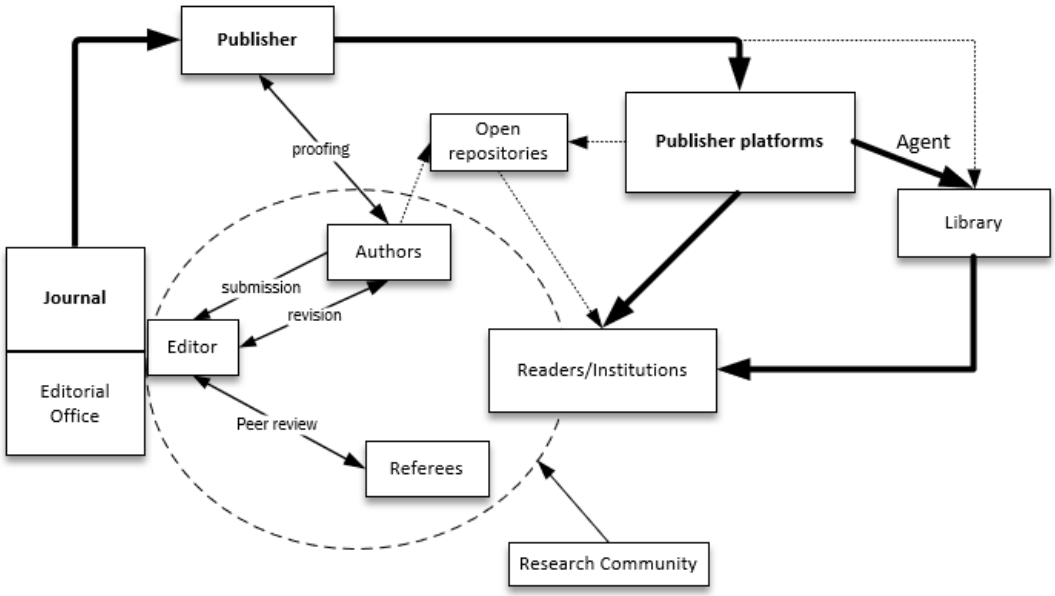
- Investor: Account for sending and receiving Science Tokens(ST) only
  - Name - mandatory
  - E-Mail Address - optional (if provided will offer increased security and access to Scienceroot content.)
- Reader: Sending and receving tokens, reading access to Scienceroot collaboration platform and journal
  - Name - mandatory
  - E-Mail Address - mandatory
  - Organizational Details: Title, Field, Experience - optional
- Researcher,Scientist and Academic: Sending and receiving tokens, reading and writing access to Scienceroot collaboration platform and journal, access to search and apply for funding and jobs.
  - Name - mandatory
  - E-Mail Address - mandatory
  - Organizational Details - mandatory
- Organizational Account and Libraries: Sending and receiving tokens, reading access to Scienceroot collaboration platform and journal, access to post funding and job possibilities, Delegation of access rights.
  - Organization Name - mandatory
  - E-Mail Address - mandatory
  - Organizational Details - mandatory

For the account wallet we are combining Ethereum blockchain with our own database. So, we can create an improved Ethereum wallet with ERC20 view for our Science Token(ST) and integration to our Scienceroot database. The connection is done via the users e-mail address and encrypted private key. We do not store the users Private Key. By linking the e-mail address with a normal Ethereum wallet we can increase account security, by blocking access from suspicious locations and extra mail verification.

## 8.2 Scienceroot Journal Technology

### 8.2.1 Traditional publishing process

In a standard science journal, the publishing process is as follows:




- 1. Author submits their manuscript to a Journal of their choice
- 2. Editor[4] reviews the manuscript. Chooses if it's going to be submitted to peer review or sent back to author for revision
- 3. If the article passes editorial review the editor sends it out to peer review[5]
- 4. After passing peer review the editor submits it further to publishing
- 5. Last minute proofing and layout review will be done together with the author
- 6. In the end it will be available to Readers via the Publishers Platform or library in print format

[4]Expert in the field

[5]Peer review is a methodological check on the soundness of the arguments made by the author, the authorities cited in the research and the strength of originality of the conclusions. It is mostly done by fellow researchers in the same field.

### 8.2.2 Scienceroot publishing process

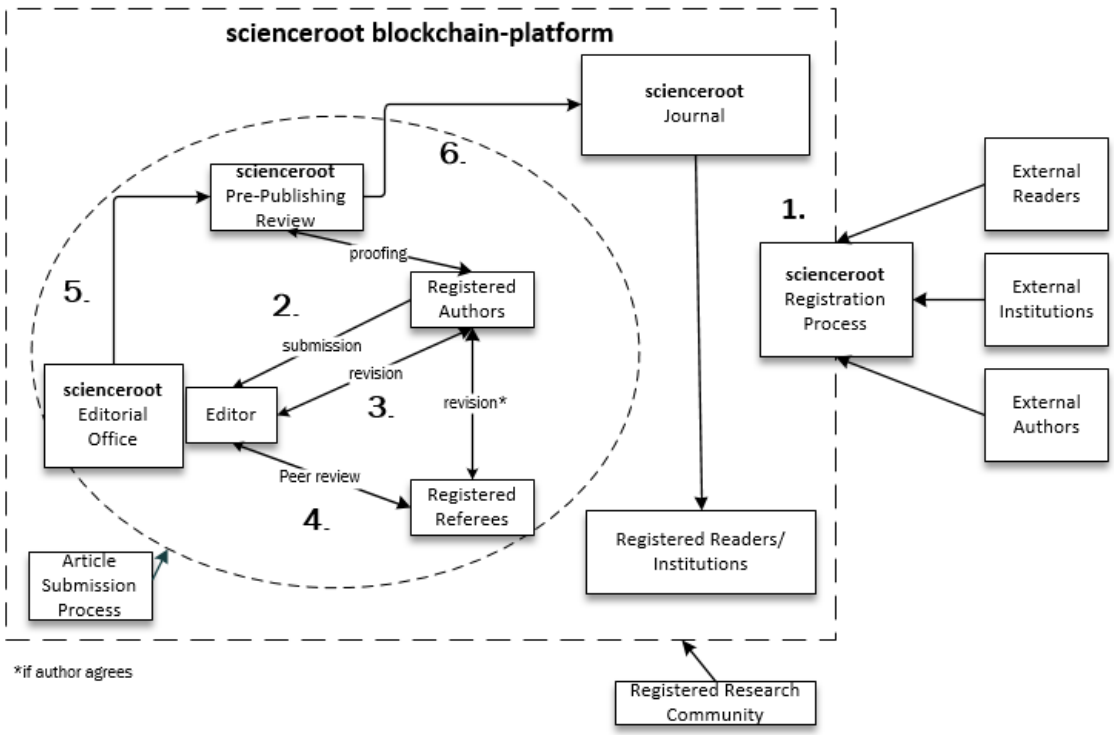



Figure 2: Scienceroot publication process

- 1. Author registers to *Scienceroot*, receives his wallet and access to our journal
- 2. Author submits manuscript to our editors and chooses from one of our 3 publishing options (see subsubsection 8.2.3)
- 3. Editor reviews and selects if the article will be submitted to peer review
- 4. Based on the advice of peer reviewers the editor has the final decision to publish the article or not
- 5. Article is sent to Pre-Publishing for final proofing and typesetting
- 6. Article is published in one of our Journals where it will be available for our registered readers.

### 8.2.3 Publishing Options

At *Scienceroot* we want everybody to have the chance to share their work and get rewarded. We offer three types of publishing options, scalable to everybody's needs:

- **Free**: will cost the researchers 0 USD to publish in our journal and will guarantee him 1% of the revenue[6] his paper generates.
- **Pay for revenue (PFR)**, this method will let researchers choose their returns based on publishing investment. These will range from 1-50% for unique article sales and up to 100% from the subscription reward pool. (see subsubsection 8.2.5 for the details)

[6]All rewards will be based on the citation count of the article

- **Open access** where researchers will cover all publishing costs and articles will be available to everyone

### 8.2.4 Reward process

*Scienceroot* will share profits with its contributing user base. The possible revenue streams of *Scienceroot* from which our users will benefit are: per article sales and subscriptions. There will be two categories of people eligible for the rewards, the authors and the reviewers. A visual description of the revenue and rewarding system is depicted in Figure 3.

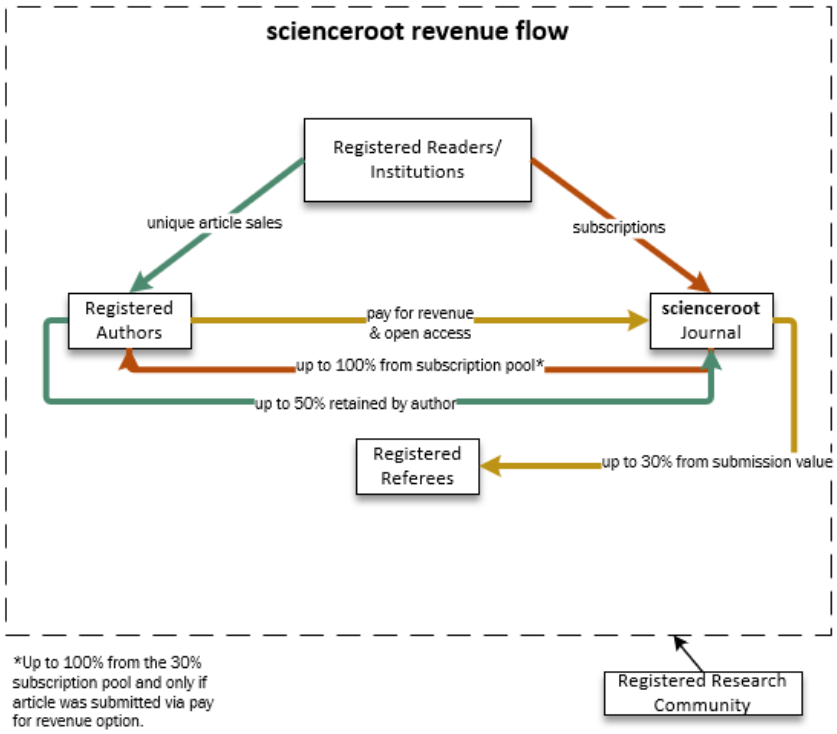



Figure 3: Revenue and rewarding system

**Reward for the author:** the author's reward will range between 1 and 100% depending on the article submission option.

- Free - 1% from the direct payments the article generates
- Pay for revenue (**PFR**) - up to 100%[7] from **subscriptions** and 1-50% from **unique article sales**
- Open access - will not generate any revenue but we will create a yearly bonus for the most cited articles

The PFR reward system from subscriptions (**PFRS**) is described by Equation 1, where $R(x)$ gives the amount of possible revenue in % depending on how much USD (x) the author is willing to pay. For example, if the author wants to publish his article for free (x=0), he will only get 1% of the revenue his article generates. The publication price will range from 500 USD up to 2000 USD.

[7]To unlock a maximum of 100% payback certain criteria need to be fulfilled. See subsubsection 8.2.5

$$R_{subscriptions}(x) = 0.0495 * x + 1 \tag{1}$$

Here is an example of possible revenues:

| USD paid | Revenue from the sales |
|---|---|
| 700 | 36.65 % |
| 1000 | 50.5 % |
| 1500 | 75.25 % |
| 2000 | 100 % |

Table 2: Reward system from subscriptions

Only articles which will be cited are eligible to join the **PFRS** rewarding program. The amount of citations the articles generate will be the ONLY decisive factor to distinguish between other eligible articles. Articles with more citations will share a bigger part of the reward pool generated by subscriptions.

An analogous rewarding system for the unique article sales (**PFRU**) is depicted by Equation 2.

$$R_{unique-sales}(x) = 0.0245 * x + 1 \tag{2}$$

| USD paid | Revenue from the sales |
|---|---|
| 700 | 18.5 % |
| 1000 | 25.5 % |
| 1500 | 37.75 % |
| 2000 | 50 % |

Table 3: Reward system for unique article sales

**Reward for reviewing:** For each submitted article a pool of tokens will be set aside for peer reviewing. This will be based on the publishing options:

- Free - from 0-20$ equivalent in tokens
- Pay for revenue - from 5-30% of submission tax in tokens
- Open source - from 5-30% of submission tax in tokens

We believe that by using this format of reward we can speed up the review process and generate higher quality articles by getting more fellow researchers to contribute in peer review.

### 8.2.5 Subscription rewarding system

As stated above, only articles which will be cited are eligible for the subscription based reward system. *Scienceroot* will set aside 30% of the subscription sales to reward the authors of the articles. This reward pool will be equally split between the eligible publications. Some articles will be more cited than others, so we had to come up with the following criteria to distinguish between them and have a fair payback distribution. Depending on the number of citations (see Table 4), your article will unlock up to 100% from the share it is entitled to.

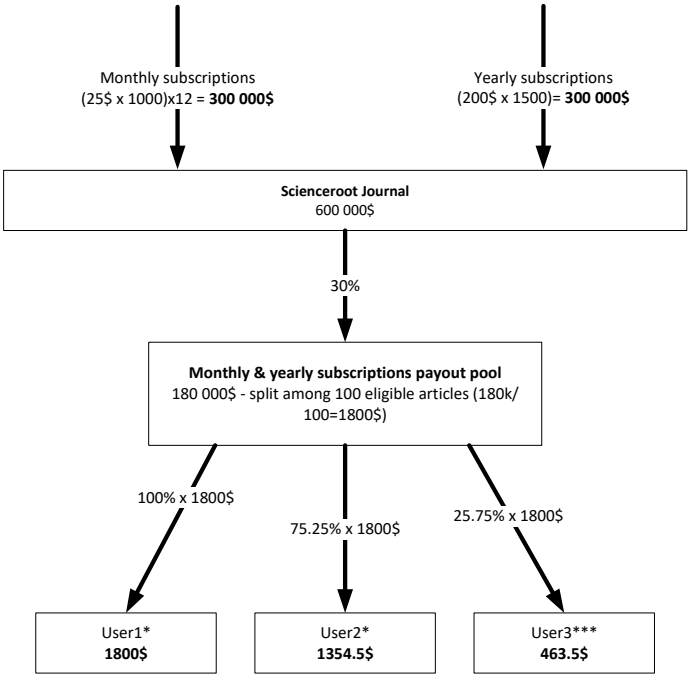



Figure 4: Scienceroot rewarding example for a one-year period

The above example is based on the following estimation, for a one year duration:

- 1000 monthly subscriptions of 25$ - 300 000$
- 1500 yearly subscriptions of 200$ - 300 000$
- From the 600 000$ 30% enter the payout pool
- 100 eligible articles - 180 000$ divided by 100 - 1800$ per user
- Depicted are 3 users: User1, User2 and User3. Which paid following publishing fees: 2000$, 1500$,500$
- The yearly estimate revenues will be: User1 1800$, User2 1354.5$ and User3 463.5$

And if we take into account the unique article sales, let‘s say each user sells 50 articles in a year that would mean based on a estimate article price of 10$ a total

available pool of 500$. After we subtract the journal commission we then have total revenue for each user of: User1 + - 2050$, User2 - 1543.25$ and User3 - 529.75$.

| Citation count | Revenue from the yearly subscription pool |
|---|---|
| 1 | 10 % |
| 2 | 20 % |
| 6 | 60 % |
| 10 | 100 % |

Table 4: Reward unlocking based on the number of citations

One citation per month is enough to be eligible for the full 100% from the monthly subscription payout pool.

The rest of the unlocked amount will go to our funding pool, which will be used for our monthly/yearly bonus payouts and to fund projects.

The reward process will use Ethereum smart contracts to guarantee that the revenue process will be automatized. Smart contracts not only define the rules and penalties around an agreement in the same way that a traditional contract does, but also automatically enforces those obligations[5].

## 8.3 Scienceroot Collaboration

This will be our decentralized social network platform for scientists, researchers and academics where they can showcase their work, connect with peers, seek new collaborations, find solutions, create and manage projects. Everything will be governed by blockchain smart contracts so there is no need for middle men to guarantee delivery. We will incorporate some of the known elements from social media platforms like LinkedIn, Twitter and Facebook:

- Creating profiles
- Liking and following researchers and their publications
- Implementing a ranking system based on the contribution in a certain field
- Endorsing skills
- Bookmarking favorites
- Commenting and sending feedback
- Sharing news items and updates

Yet the most important feature will be the underlying cryptocurrency on which the whole platform will rely. It will offer the possibility for users to reward peers themselves for their contributions, delegate work in projects and get a quick payout for their knowledge. Similar to a already known freelancing platform but without the middleman. This can be achieved with the help of smart contracts.

## 8.4 Scienceroot Funding and Jobs

Our target is to create a centralized portal which offers an entire list of government, corporate and private grants, funds and jobs from all over the world. So that we can make applying for funds a lot easier, more transparent and intuitive. It will be accessible only to our registered researchers, academics, scientists and organization searching or offering funding and job opportunities.

Funding will be offered in fiat currency[8] and our own Ethereum ERC20 currency called Science Token(ST), the decision will remain with the offering organization.

Only funds offered in Science Token (ST) will be governed by smart contracts. Yet all offered funds and jobs will be stored in IPFS and saved on the Ethereum blockchain for increased security.

### 8.5 Storage

The open access content will be kept in a peer-to-peer storage system called IPFS. You can address large amounts of data with IPFS and place the immutable, permanent IPFS links into a blockchain transaction which timestamps and secures your content, without the need to write the data on the chain itself. IPFS will be also the backbone of our content archive, as it provides decentralized archiving, high performance, resilient access to data, removes duplications and offers version history for every file. This will allow us to create the worlds most advanced and resilient archive of scientific content to which anyone, at anytime, will have access.

### 8.6 Scienceroot Fund

*Scienceroot* Fund is a pool of tokens used by *Scienceroot* organization to sell to researchers and readers at the moment of their registration and usage of the platform, therefore giving them easy access to Science Token (ST). This pool will be replenished if researchers/reviewers want to cash out their Science Tokens (ST) to a fiat currency. Unlocked amounts from revenue streams will enter this pool. Hereby we will be able to fund new projects and reward our top contributors.

### 8.7 Copyright

In the case of subscription-access journals, authors grant the publisher a license to exploit a set of defined rights, this will allow Scienceroot journals to exploit commercially the rights in return for services provided to the author (peer review, copy-editing, marketing etc.).

In the case of open access journals, authors retain copyright and release the work under a Creative Commons license or similar, which allows use and reuse, but imposes conditions, such as attribution of the author, which will depend on copyright.

## 9 Vision and Roadmap

*Scienceroot* is not only aiming to disrupt the current scientific publishing model but also revolutionize and improve the Scientific community in all aspects possible. We are creating a scientific publishing model which will reward and sustain researchers instead of maximizing our profits. We believe that this model will not just bring benefits to scientists and researchers, but also improve the quality of their work and motivate them to push science to new boundaries. By interconnecting it with our own collaboration and funding platform we can create a unique scientific ecosystem where science will prosper.

First, we will start off as a collaboration and funding platform for scientists, researchers and academicians. Having divided platforms for different purposes, makes one lose sight over all the possibilities. This will serve as a go-to ecosystem for

[8]Fiat money is currency that a government has declared to be legal tender, but it is not backed by a physical commodity.

scientists to find peers, discuss ideas and gather funding for their research. By centralizing all global funding opportunities into one platform, we are making it easier for scientists, researchers and academics to find and apply for grants. And by adding blockchain and decentralization we are getting rid of scams and creating a transparent, intuitive and user friendly platform.

Second, we will focus on building a journal with which we want to change and improve some of the traditional academic publishing aspects. The process of publishing a scientific paper can take up to several months. Using AI, we will assist the editors with content review to establish whether the article is worth sending for peer-reviewing or not. Once it goes through the editorial process, the article will be further sent to peer-review. A traditional journal does not compensate the reviewers for taking their time to review articles and this process can be long and frustrating for both the submitter and the reviewer. At *Scienceroot Journal* we will provide the reviewers with a monetary incentive for their time. This will not only ensure speeding up the process, but will also solve the problem of not having enough reviewers.

The greatest benefit of using *Scienceroot Journal* will be its unique feature to share the profits with the article submitters. A normal publisher would only cling to them for personal gains, without giving anything in return. This way, we will ensure that fellow researchers are able to reap the benefits of their work.

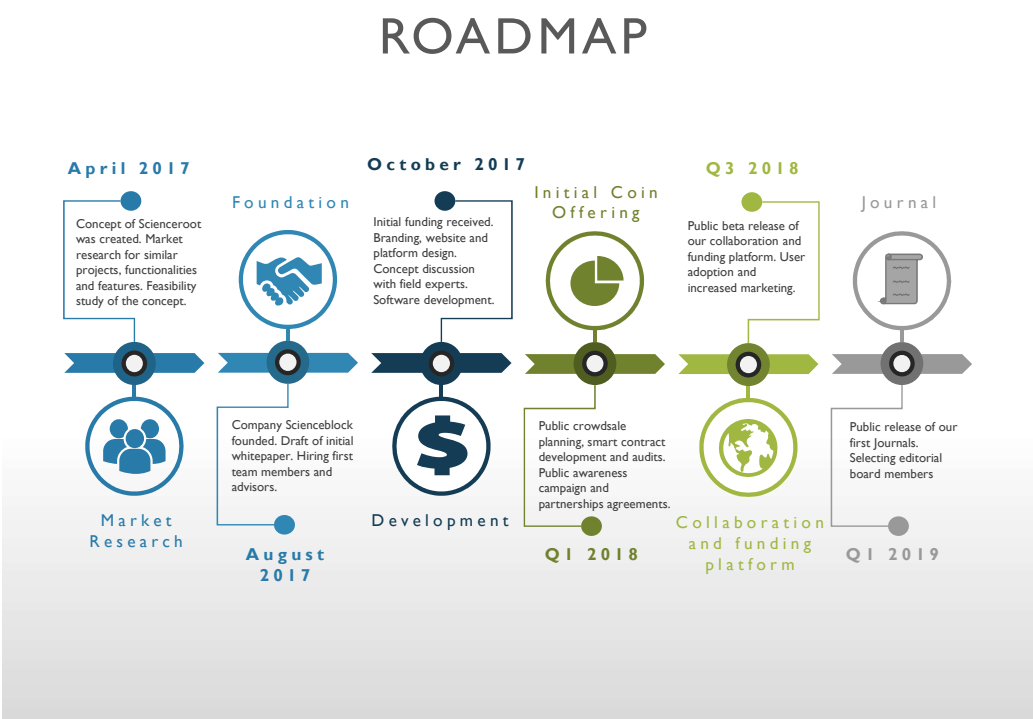



Figure 5: Scienceroot Roadmap

The dates are an approximate estimate of our planned releases. This may vary based on the results of our public crowdsale.

# References


[1] M. Mabe and M. Ware, "*The STM report: An overview of scientific and scholarly journals publishing*," 2009.

[2] M. Ware and M. Mabe, "*The STM Report: An overview of scientific and scholarly journal publishing*," 2015.

[3] Wikipedia, "*Funding of science*." https://en.wikipedia.org/wiki/Funding_of_science.

[4] Wikipedia, "*Funding of science*." https://en.wikipedia.org/wiki/List_of_countries_by_research_and_development_spending.

[5] Blockgeeks, "*A Beginner's Guide to Smart Contracts*." https://blockgeeks.com/guides/smart-contracts/.

[6] J. Schmitt, "*Can't Disrupt This: Elsevier and the 25.2 Billion Dollar A Year Academic Publishing Business*." https://medium.com/@jasonschmitt/can-t-disrupt-this-elsevier-and-the-25-2-billion-dollar-a-year-academic-publis

[7] M. Taylor, "*The obscene profits of commercially scholarly publishers*." https://svpow.com/2012/01/13/the-obscene-profits-of-commercial-scholarly-publishers/.

[8] Wiley, "*Are scientific collaboration networks advancing research?*." https://hub.wiley.com/community/exchanges/discover/blog/2015/05/22/are-scientific-collaboration-networks-advancing-research.

[9] T. Economist, "*Of goats and headaches*." http://www.economist.com/node/18744177.

[10] T. Reller, "*Elsevier publishing – a look at the numbers, and more*." https://www.elsevier.com/connect/elsevier-publishing-a-look-at-the-numbers-and-more.

[11] /u/rhiever, "*Top 40 countries by the number of scientific papers published*." https://www.reddit.com/r/dataisbeautiful/comments/20k5dk/top_40_countries_by_the_number_of_scientific/.

[12] M. Panter, "*Understanding Submission and Publication Fees*." http://www.aje.com/en/arc/understanding-submission-and-publication-fees/.

[13] IPFS, "*IPFS is the Distributed Web*." https://ipfs.io/.

[14] Ethereum, "*Ethereum Whitepaper*." https://github.com/ethereum/wiki/wiki/White-Paper.