Measuring Value in the Commons-Based Ecosystem:
Bridging the Gap Between the Commons and the Market

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Prelude

Maya is a joyful girl that is well-known for her community activities in her small town. She has two clear passions: writing Wikipedia articles and making Creative Commons documentaries… but she struggles to survive, being forced to make stressing and unfulfilling advertising work in order to get some money.

Maya is only amongst many who contribute everyday to projects like Wikipedia, Creative Commons, Free/Open Source software, and many others. But how much value each of these projects have? How much do people value these contributions? How could contributors be rewarded for their hard work while still keeping the voluntary and cooperative dynamics inherent to these projects? Ideally, we would want to figure out:
- A way for this kind of projects to assess their own social value
- A way for people to understand the value they are contributing to these projects.
- A way for people to benefit from the goods and services provided by the market, without necessarily having to play by market logics.

Maya would love to have a way for her and others to see how much she is contributing to the social good. Maya's family doesn't understand why she spends so much time working on things that provide no money in return, whereas Maya is frustrated on why her contributions to the Commons are not recognized as actual work by society. Even better, Maya would love for her contributions to the society to be recognized (and potentially rewarded) by the market, so that she could benefit from goods and services without having to spend so much time on her advertising job.

How could we help Maya?

We present here a system - which we will name Sabir - that can resolve some of the most recurrent problems encountered within CBPP communities. The Sabir system[1] is composed of three layers that will help us:
1. Understanding the social value - as opposed to market value - of different CBPP communities, so as to compare them to one another.
2. Identifying the value generated by individuals contributing to the Commons and evaluating it through a common denominator of value.
3. Creating an interface between the market and the CBPP ecosystem so that the two can interact, and benefit from each other.

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[1] Sabir website: http://sabir.cc - For additional details on the implementation, see the FAQ on such website.

Introduction

Today, the production and dissemination of information is increasingly done outside of the market economy. An alternative model of production is emerging - both on the internet and elsewhere - that does not rely on market transactions but rather on sharing and cooperation among peers. Production is based on voluntary collaboration and resources are released under specific licenses, such as Open Source and Creative Commons licenses, so that they can be freely used and reused by everyone. This new model of production - sometimes referred to as Commons-based Peer Production[2] - constitutes the building block of the sharing economy, which consists, for the most part, of social interactions that do not belong to the market economy. In the realm of information, Wikipedia is perhaps the most popular example, along with Free/Libre Open Source Software (FLOSS) and Creative Commons, but the same applies also in the physical realm, with a growing number of initiatives such as the Open Source Ecology, FabLabs, etc.

Commons-based Peer Production (CBPP) is an emerging and innovative model of production, both online and offline, characterized by peer-to-peer collaboration and contribution oriented towards the production of a collectively-owned resource. CBPP lends itself to a different economic system based on the notions of *abundance* and *sharing*, which does not properly fit within the framework of most conventional economic theories based on the notion of *scarcity* and *exchange* .[3]

To the extent that CBPP operates outside of the market economy, conventional market mechanisms, such as pricing, are unable to estimate the overall social value of CBPP - which is for the most part based on non-market transactions.[4] In the market economy, the key concern is to assess the economic value (or market value) of things through the mechanism of supply and demand. Everything else - such as friendship, solidarity, or even deeper ideological values such as freedom or justice - are regarded as mere externalities which will only be accounted for to the extent that they can be, or have been translated into monetary value.[5] [6]

Without the traditional system of "pricing", one can no longer rely on a universal unit of analysis (value proxy) that can be used to assess and compare the value of different CBPP platforms, as well as the value contributed by various individuals to these platforms.[7] Even when they do have monetary value, given that Commons-based entities operate outside, or at the edges of the market economy, we cannot rely on traditional market mechanisms (such as pricing) to assess the value produced by them. Hence, we need to identify another indicator of "social value" (other than price) capable of understanding and measuring the value generated by CBPP and that will allow us to assess, compare and communicate the value of different entities or projects that operate, only and exclusively, in the sharing economy.

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Maya would like to show her friends and family - who are not themselves part of the
Commons ecosystem - what is the value she is contributing to the world. Everyone knows
about Wikipedia, but still not many people know about Creative Commons, or even
smaller initiatives like Couchsurfing and the like. Moreover, even if they are (either
directly or indirectly) benefiting from them, it is difficult for people to understand
the value that these Commons-based initiatives yield.
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[2] Benkler, Yochai, The wealth of networks. How social production transforms markets and freedom, New Haven: Tale University Press, 2006.

[3] Hess, Charlotte and Ostrom, Elinor. A Framework for Analyzing the Knowledge Commons: a chapter from Understanding Knowledge as a Commons: from Theory to Practice, 2005.

[4] Schiller, Robert. Finance and the Good Society, New Haven; Princeton University Press, 2012.

[5] Lindenberg, Siegwart. Contractual relations and weak solidarity: the behavioral basis of restraints on gain-maximization. Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft, 39-5, 1988.

[6] Cohen, I. Glen. The price of everything, the value of nothing: Reframing the commodification debate. Harvard Law Review, 117(689), 2003.

[7] De Filippi, Primavera. Translating Commons-based Peer Production values into metrics: towards Commons-based Crypto-Currencies, in Lee Kuo Chen D. (ed.), The Handbook of Cryptocurrency. Elsevier, 2014.

Value Metric for Commons-Based Entities

For instance, what's the value of Wikipedia? Does it have a monetary value? - and if so, would it make sense to measure it in monetary terms? We know it has a high social value because of the perceived value others give to it - but how can this value be measured? Ideally, we should have a quantified indicator of the approximate (social) value of Wikipedia... or any Commons-based entities/communities (from now on CBEs[8]).

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Maya could then communicate to her family and friends more easily, by simply pointing
to the value of the different CBEs she's contributing to, for them to understand,
immediately, the importance of her (unpaid) contribution to the Commons.
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Of course, in order to have an indicator, we need an alternative *value metric*, separate from the market one, that will allow us to understand the value of CBEs.
We believe such a metric of social value of a CBE should be constructed on 2 basic assumptions:
- as an indicator of social value, its value should emerge from the network of involved actors, that is, the CBEs
- as a subjective value, it should be based on the perception of peers, that is, the other CBEs

Thus, based on those premises, we propose a value metric algorithm inspired from:
- *Flattr[9]*, understood as a meter of individual appreciation that translates into donations. That is, the peers may express their appreciation for other peers by clicking on their badge (*flattring* them), and anyone can see the amount of *flattrs* received by someone (or something e.g.: a blog post, a project, etc).
- Google's *PageRank[10]*, as a means to ponderate the importance of a webpage based on its incoming links. That is, the algorithm calculates a quantification of the social relevance of each node based on the network of links.

In our model, we combine the two in order to achieve a more sophisticated system for estimating the social value of CBEs:
1. Inspired from Flattr, any CBE can *vouch* for another CBE that it considers valuable.
2. Inspired from PageRank algorithm, we can then calculate how many incoming vouches, as opposed to incoming links, a CBE has according to a specific algorithm.
3. Inspired from the fractionality of Flattr, a CBE may assign a particular weight to each one of its vouches (where the sum of these weights given must be always equal to 1).
4. Inspired from the transitivity of PageRank, a CBE channels a fraction (a percentage indicated by the vouch weight) of its own social value to the CBEs it is vouching.
5. The more value a CBE accumulates, the more socially valuable it will be considered. That is, quantity matters: how many vouches I have; and quality matters: who is vouching for me.

We can see an example of this indicator (which we will refer to as "the social value indicator" from now on) in Fig. 1, where Wikipedia has plenty of value (1500, and a larger circle) because of receiving plenty of weight. Couchsurfing is small, but still it has 200 because even if it's only receiving a 0.1 of weight, it comes from the large Wikipedia.

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[8] Which are usually named Commons Based Peer Production communities. Here we use CBE for the sake of simplicity.

[9] Flattr is a microdonation web service: http://flattr.com.

[10] Page, Lawrence, Brin, Sergey, Motwani, Rajeev, and Winograd, Terry. The PageRank citation ranking: Bringing order to the web, 1999.
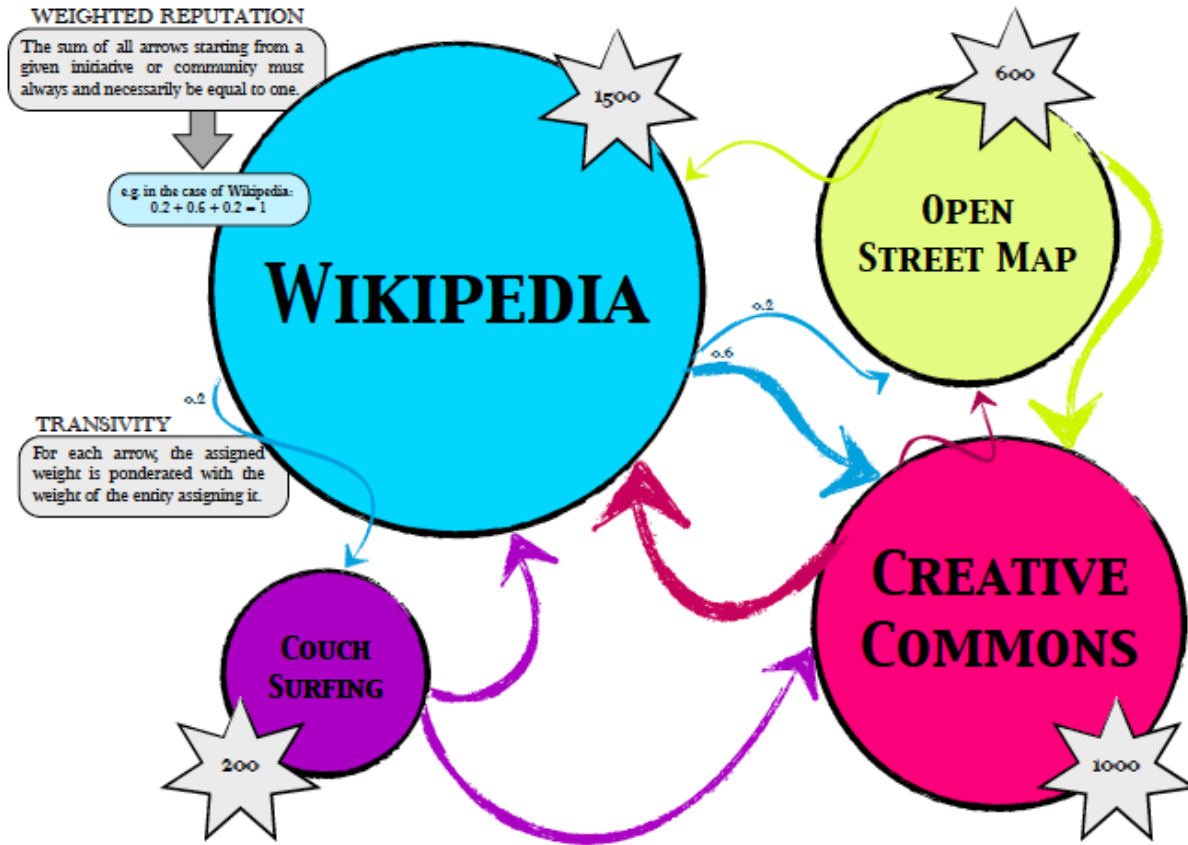
Fig. 1: Example of several CBEs vouching each others with different weights, resulting in a social value number for each.

As an algorithm, in its simplest form[11], we can implement it as follows:

For any given entity X, its social value (SV) at time t is expressed by the function SV(X, t). SV(W,t) indicates the total amount of *weight* (w) received by X from other entities in the system (A, B, C), ponderated by the SV of these entities:

$$SV(X, t+1) = w(A, X) \cdot SV(A, t) + w(B, X) \cdot SV(B, t) + w(C, X) \cdot SV(C, t)$$

Taking into account that every CBE can assign weight to others, but their sum must be equal to 1.

More generally, the complete formula can be expressed as:

$$SV(X, t+1) = \sum_{i \in Ux} w(i, X) \cdot SV(i,t), \quad where \ \forall i \in Ux, \left(\sum_{k \in Vi} w(i, k) \right) = 1 \quad and \quad 0 \leq w(i, k) \leq 1$$

where
Ux = the universe of all the entities assigning a weight to X
Vx = the universe of all the entities that were assigned weight by X

This specification complies with the definition of *ordered weighted averaging* (OWA)[12] aggregation operator in fuzzy logic, and therefore it has its interesting mathematical properties.

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[11] The following equations are a strong simplification, as there are more complex algorithms available. Still, for preliminary testing in a prototype and for the sake of communicating the concept, we'll stick to those.

Finally, it is also important to note that the community of communities forming within the system is structurally (and necessarily) biased: it should only be made of Commons-based entities (CBEs) forming a web-of-trust. This requires some kind of pre- and post-filtering or discrimination. For instance, how to prevent Skype from joining, if it claims to be part the Commons ecosystem?

- To begin with, in order to join, a new CBE may need to be endorsed by certain number of CBEs (algorithm pre-filtering): e.g., one needs to be invited by at least 5 entities before it may join the system.
- Subsequently, the CBEs participating within the system would self-regulate who belongs to the system (community filtering): e.g., if a large amount of CBEs believe Skype is not a CBE, it may be kicked out.
- In addition, the system may contain rules that would facilitate the rejection process (algorithm post-filtering): e.g. if no one vouches for an entity for a long period, it is a signal it may be kicked out;

Essentially, this would be creating a network-of-trust model, and thus the initial selection of entities might have a significant impact on the subsequent population of the ecosystem.

Rewards for Contributors to the Commons

Thanks to the social value indicator, we now have a clear idea of how much social value each CBE has within the Commons-based ecosystem. However, a CBE can do nothing with such an indicator, except bragging it. We propose here a possible use for such an indicator, which would allow for the value contributed to the CBE to flow back to where it originated: the CBE contributors.

The (macro) value of CBEs is generated only and exclusively by the community of individuals participating in (micro) co-creating content (articles, source code, videos, etc.), discussing, sharing, rating and essentially contributing to the community. Therefore, the long-term sustainability of CBEs depends on a constant flow of (quality) contributions, which can only be achieved if the contributors are spending a sufficient amount of time/effort/resources contributing to the CBE over time. Thus, it would be ideal if contributors to the Commons could be somehow rewarded for their time and effort.

Today, CBEs (and online platforms in general) can employ different mechanisms to gratify their contributors, by means of both immaterial rewards (e.g. reputation, admin rights, privileges) and material rewards (e.g. virtual currencies, donations) as seen in Table 1.

Value Metrics	Immaterial Reward Mechanisms
Reputation in the system based on the trust by other users (Ebay)	Real reputation (real-world volunteer networks)
	Power and status in the community, administrative permissions
Quantitative measures:	Privileges in the community, more space, speed (FTP media sharing)
number of contributions, size (Stackoverflow)	Qualitative rewards, e.g. congratulations from individuals (Wikilove)
popularity of content, visits, likes, shares (Facebook, Youtube)	Token (medals/badges) received from other's appreciation: Wikipedia, P2PUniversity
Online social network service analytics (Klout, Kred)	**Material Reward Mechanisms**
Calculation of "karma" based on "helpfulness" algorithm (Slashdot)	Tokens exchangeable for services within the community (FarmVille)
	Donations from individuals, crowdfunding (Kickstarter)
Token (medals/badges) received from other's appreciation:	Distributed donations from the community (Flattr)
Wikipedia, P2PUniversity	Offers from others to contribute to projects (Free/Open source)

Table 1: A series of examples of existing value metrics and value rewards.

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[12] Yager, Ronald R. and Kacprzyk, Janusz, The Ordered Weighted Averaging Operators: Theory and Applications, Kluwer: Norwell, MA, 1997.

Yet, most of these reward mechanisms are limited by one of two issues. On one hand, rewarding contributors with material rewards - such as money, or anything that can be readily exchanged for money - may lead to undesirable results:
- if some contributors are paid for, others may not want to contribute *for free* anymore.
- as more and more people start contributing *for money,* efforts may shift towards these things that will be the most highly rewarded, as opposed to those that people feel the most passionate about.
- since money is scarce, contributors may start competing against each other, instead of collaborating towards a common goal.

On the other hand, if gratification is limited to immaterial rewards, the situation of contributors is barely improved. That is, contributors need to keep doing *those boring tasks that provide them with a source of income* instead of contributing to their favorite CBE: the one which does not know how to reward them appropriately. Besides, given that most of these rewards are CBE-dependant, contributions do not scale well in multiple CBEs: each reward mechanism is disconnected from the other and contributors cannot aggregate, exchange or compare the value they helped generate in different communities.

We propose here a mechanism for rewarding contributors, which abides to the following principles:
- It should not involve money, nor any scarce and transferable resource that may be exchanged for money - thus avoiding the emergence of competitive/individualistic dynamics among contributors.
- It should support people *in the physical world,* nowadays dominated by market logics.
- It should account for the contributions from all CBEs the contributor may be participating in.

Summing up, what we aim for is an interface between the market and the Commons-based ecosystem, that would provide rewards that are non-transferable (i.e. not currency-based) but that the market may somehow recognize. Let's imagine that we have such system - the so-called *Sabir* system - for a moment, and follow the story...

The Journey Towards Rewarding Maya

Imagine a world with a flourishing Commons-based ecosystem that operates alongside the market economy. In that world, some CBEs would be invited to join a network-based value system, where their value would be established by other CBEs according to their weight in the ecosystem (see the social value indicator in the previous Section).

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Now, let's assume for a moment that, in such an imaginary world, Wikipedia (WP) has a
social value of 1500, and Creative Commons (CC) has a social value of 1000. Maya is a
CC video artist and WP contributor; she only has a part time job, because she wants to
spend more time on doing what she loves, that is, making CC documentaries and WP
articles.
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Whoever contributes to the Commons is rewarded with a particular set of non-transferrable tokens issued by a specific CBE. Each CBE is free to decide on the number of tokens to produce, and on the manner in which these tokens will be redistributed to its contributors, according to an internal reward mechanism based on gratitude and appreciation. Each CBE has its own token type, that is, its tokens are different from those other CBEs may issue.

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WP has lots of contributors, so it has issued 12,500 tokens. CC has only issued 5,000
tokens so far. As Maya participates actively in both of these communities, she has
received 125 WP-tokens and 200 CC-Tokens, which she collects in her portfolio.
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In order for people to compare the value of their contributions between different CBEs, the value of each token must be translated into a common denominator of value, Sabir, calculated with the following formula:

$$Value\_of\_1\_token\,(CBE) \;=\; \frac{Social\_Value\,(CBE)}{Total\_number\_of\_tokens\_issued\_by\_the\_CBE} \;\; sabir(s)$$

<div align="right">(Eq. 1)</div>

and thus, the number of sabirs for one person *P* would be expressed by the following:

$$Sabirs\,(P) \;=\; \sum_{every\ CBE\ of\ P} tokens\_earned(CBE,\,P) \,*\, Value\_of\_1\_token\,(CBE) \;=\;$$

$$=\; \sum_{every\ CBE\ of\ P} tokens\_earned\,(CBE,\,P) \,*\, \frac{Social\_Value\,(CBE)}{Total\_number\_of\_tokens\_issued\_by\_the\_CBE}$$

<div align="right">(Eq. 2)</div>

Thus, in the case of CC:

$$Value\_of\_1\_token\,(CC) \;=\; \frac{Social\_Value\,(CC)}{Total\_number\_of\_tokens\_issued\_by\_CC} \;=\; \frac{1{,}000}{5{,}000} = 0{,}2 \;\; sabir(s)$$

Hence, Maya's 200 CC-Tokens are equal to 40 sabirs, and Maya's overall contribution to the Commons is equal to:

$$\text{Total number of Sabirs (Maya)} \;=\; 125 * \frac{\Box\Box(\Box\Box)}{12{,}500} \;+\; 200 * \frac{\Box\Box(\Box\Box)}{5{,}000} \;=\; 15 + 40 = 55 \text{ Sabirs}$$

Maya is really proud of herself, not only can she understand the value that she has contributed to the Commons over the past year, but she can also easily express it to her friends.
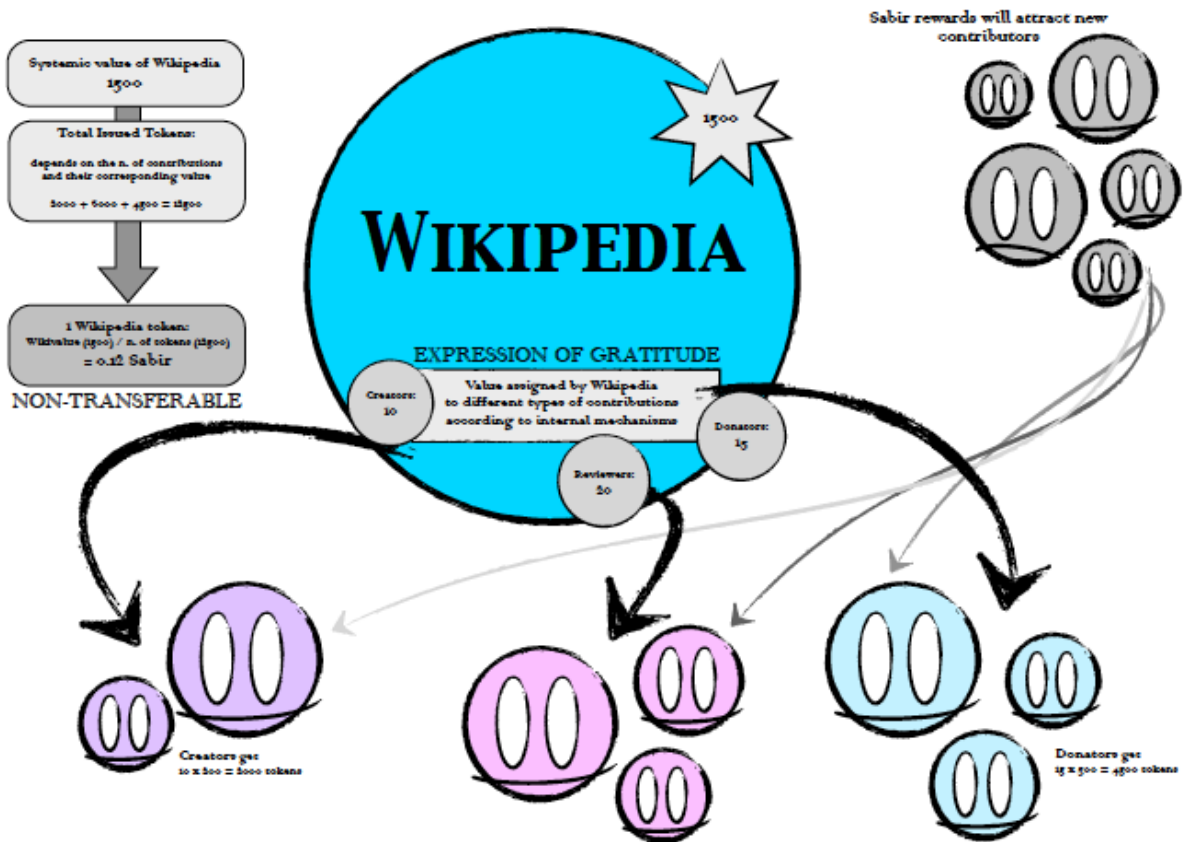
Gratification

Fig. 2: One CBE (Wikipedia), with its own social value, generates and distributes its own tokens (WP-tokens) to different contributors based on their task.

The system of gratification can be explained through the example shown in Fig. 2. Wikipedia, with a Social Value of 1500 as we saw in Fig. 1, issues 12,500 wikipedia-tokens (WP-tokens). In this specific moment, Wikipedia is adopting a strategy of prioritizing the quality rather than the quantity of its articles, so it decides to reward article reviews the most, followed by donations and then the creation of new articles. In the particular example we illustrated, Wikipedia rewards with 20 WP-tokens all those providing an in-depth review of existing articles, 15 WP-tokens for each donation over $200, and 10 WP-tokens for each article created longer than a stub that is accepted by the community. This way, it is providing some kind of reward to its contributors. Even though this might distort the nature of contributions, if properly used, this can be employed as a tool for the CBE to slightly direct the flow of contributions towards the tasks that are most needed at the moment. E.g. if a contributor hesitates on whether to create a new article, or review an existing one, she might favor the review based on the higher value it has for the community, as expressed by the internal mechanism of rewards.

The system should make sure that:
- Users know what kind of rewards can be earned by which tasks. Thus, each CBE should provide a standard table where these task+gratification are indicated. The more transparent it is, the more the CBE could encourage its contributors to focus on the most needed tasks.
- Each CBE keeps track of how many tokens are earned by each contributor. Thus, it should provide a standard way of accessing such information, either by querying the CBE contributor's profile (if any), or via an API for people to use their own personal *wallet* - i.e. a software that can keep a record of all the tokens they have earned and what is the sabirs value of each one of these tokens.

Even though the tokens are a quantified expression of gratitude, we are not aiming to *quantify everything*. These rewards can be earned according to *internal rules* decided by each CBE, and such rules can be either quantitative or qualitative, and can refer to, for instance:

- Project / Task for which people can earn a particular number of tokens. Reward may be based on both quantity (e.g. number of words) and quality (e.g. 3 OK's from librarians).
- Role / Function providing some sort of salary-like remuneration. This may be common for maintenance and caring-related roles., e.g. Wikipedia administrators might earn 5 WP-token / month.
- Others, unpredictable rewards. Tokens can be distributed as prizes to really productive or skilled users that did remarkable contributions. We can also think of some users/administrators with the right to distribute a certain amount of tokens as they wish.

WP-tokens are generated on demand: Wikipedia can issue as many as they want, that is, no *a priori* artificial limitation is imposed. This means that these tokens are not scarce, as it happens with real money or typically to virtual currencies (such as Bitcoin). Besides, these WP-tokens are non-transferable: a contributor cannot *sell* its tokens to someone else, neither exchange them for anything. Finally, the value of each WP-token is different than the value of each CC-token: the value depends on the actual social value of the CBE issuing them, and on the amount issued.

We propose here a simple way to normalize the value of all those CBE tokens, through our common denominator of value, *Sabir*: a quantified indicator that approximates the value of all contributions that someone has made to the Commons. Such indicator is easy to understand not just by the contributor herself but also by others, who might not be acquainted with the particular CBEs to which the contribution was made.

Interaction with Market Players

Sabir can essentially be regarded as a proxy for value in the Commons-based ecosystem. Just like the price does in the market economy, Sabir allows for individual contributions to be assessed and compared according to a common denominator of value (which remains distinct from market-value). While price is linked to a particular service or product of exchange, Sabir is an expression of the value that a particular individual contributed to the Commons over a lifetime, and should therefore remain linked to that individual over the whole lifetime (i.e. it is not transferrable).

As a common denominator of value, Sabir establishes a common language (lingua franca), an interface acting as a bridge between the Commons and the market economy, so that the two can benefit from each others, without one actually taking over the other. Indeed, by introducing a quantitative denominator of value for Commons-based contributions (similar to price in the market economy), Sabir makes it easier for market entities to understand the value generated by CBE contributors to the common good, and reward them accordingly, if they so wish. Hence, people who highly contributed to the Commons but who remained outside of the market economy might eventually be able to interact with the market economy, insofar as some commercial player recognizes the value of their contribution to the Commons. These market players can - if they so wish - provide free/discounted goods or services to anyone who contributed to the Commons, as a form of appreciation to their work.[13]

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Maya's part-time job doesn't provide her with plenty of income. Fortunately, there are
several market entities, popular among CBE contributors, which recognize the value of
her work. Once a week, Maya can have free lunch in a local restaurant whose owner is
also a CC artist, and she can benefit from a free license for Adobe Photoshop.
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From a commercial perspective, Sabir enables market players to price-discriminate between standard customers and CBE contributors, potentially restricting their offers only to those people who contributed at least x Sabir to the Commons.

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[13] This is already happening, albeit in a very limited way: e.g. Github provides free (*as in beer*) services to FLOSS accounts, Bambuser provides premium accounts to journalists and activists, and SafeCreative provides a restricted amount of "all rights reserved" registrations while an unrestricted amount for CreativeCommons works.

Maya loves to record her songs with a commercial recording software, but the license
is expensive; fortunately the software company provides free licenses to anyone who
contributed over 10 Sabirs to the Free/Libre Open Source Software community.

Besides, being Sabir an open value system, anyone could assign value to CBEs according to their own value metrics,
e.g. schools or universities could apply the "education" matrix, giving more importance to Wikipedia and Creative
Commons, whereas a local restaurant might apply the "slow food" matrix, giving more weight to local farmers and
producers. Thus, the previous Equation #2 could be customized by a third-party M as follows:

$$Sabirs\,(P\,,\,M) == \sum_{every\,CBE\,of\,P} tokens\_earned\,(CBE,\,P) * \frac{Value\_Matrix\_M(Social\_Value\,(CBE))}{Total\_number\_of\_tokens\_issued\_by\_the\_CBE}$$

(Eq. 3)

that is, the third party may apply its customized *value matrix* to the already given social value of the CBEs, valuing
more those that may be more related to it. Still, not every third-party needs to build a matrix: they may use the
standard social value (Eq. 2), use their own customized matrix, or use a matrix deployed by others. E.g. Github may
use the standard social value, a customized Value_Matrix_Github, or the Value_Matrix_FOSS, a common matrix
used by many within the Free/Open Source Software realm.

Maya is a good student, she's smart and very interested in the topics she loves. She
spends a lot of time on Wikipedia, researching and reporting her findings together
with a community of other passionate users. The school recognizes the value she's
contributing to the "Commons" and gives her better grades for that, although the
university only looks at the Commons from an "education lense" which assigns greater
value to academic institutions such as Wikipedia or the P2PUniversity, and does not
care too much about other CBEs such as Couchsurfing or other non-academic CBE
platforms.

Individuals can choose whether to work for the market (earning money) or for the Commons (earning sabirs),
without necessarily having to give up for the other. By providing an interface between the Commons and the market
economy, Sabir might ultimately encourage people to contribute to the Commons in order to benefit from the
advantageous deals provided by certain market entities to CBE contributors.

Eventually, as more and more market entities recognize the value of Sabir, and CBE
contributors accordingly, Maya will be able to spend more time doing what she loves,
contributing to the Commons while benefiting from the goods/service offered by the
market without necessarily having to interact (directly) with the market economy.

Over time, a positive feedback loop is established, as the market entities that support (or sponsor) the Commons will
gain reputation within the Commons-based ecosystem. Ultimately, this would lead to more and more people to
purchase their goods or services.

Everytime she discovers a new entity that supports the Commons, Maya gives them a good
rank, and tells all her friends about it. Whether or not they are themselves CBEs
contributors, they will nonetheless be happy to purchase the services offered by that
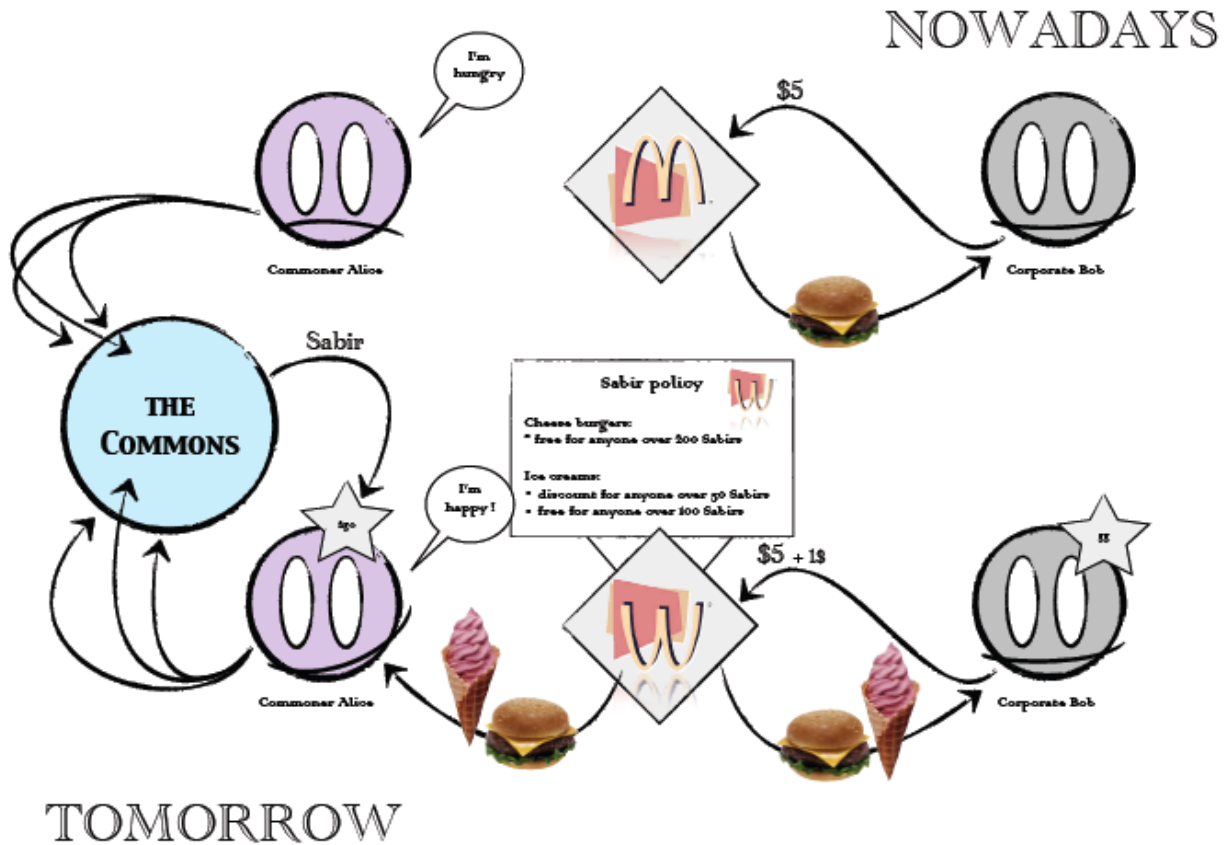entity, knowing they are ultimately also helping the Commons.

Fig. 3: Example illustrating the current state of affairs for contributors to the Commons and how Sabir may help changing it.

In Fig. 3, we illustrate the benefits of the Sabir system, as an interface between the market and the Commons-based ecosystem. Nowadays, Maya is contributing to various CBEs but, since she's not earning any money from this effort, she cannot benefit from the products provided by the market system (i.e. burgers and ice cream from McDonald's in this case) unless she actually decides to play the market game by getting a remunerated job. Tomorrow, thanks to Sabir, Maya will be able to express the value that she has been contributing to the Commons through a common denominator (the amount of sabir she has accumulated in her wallet), which can be easily understood by market actors. In this example, WcDonald's recognizes the value of the Commons and has implemented a specific policy to reward CBE contributors with free burgers and free or discounted ice creams, depending on the amount of value contributed to the Commons. Hence, Alice is happy since she can keep contributing to the Commons, knowing that the time she spends doing so will counts towards obtaining free burgers and ice cream from WcDonald's. Bob also contributed to the Commons, but to a lesser extent, and he's therefore only entitled to a discount on the ice cream.

Implications & Benefits

In a nutshell, the proposed system can help (1) measure CBEs social value, (2) distribute non-transferable tokens to relevant contributors, and (3) facilitate the process of rewarding these contributors by market entities. The system presents a variety of benefits for the various actors involved, as follows.

For Commons-Based Entities

Understand CBEs' Perceived Systemic Value
From the perspective of CBEs, the most clear benefit of Sabir is that it allows for each CBE *to understand its own value within the CBPP ecosystem* thanks to the social value metric (explained in Section 2) - or at least, an approximation of how it is perceived by others, and its evolution over time. For instance, a decrease in the social value of a CBE may be regarded as a signal for a variety of things, e.g. poor relationships, bad communication, or perhaps just a lack of focus on what really matters. Without the social value metric, CBEs would remain ignorant of how they are perceived by other CBEs.

Encouraging Participation and Growth by Means of a Reward System for Contributors
Another benefit of Sabir is that it *facilitates the elaboration of a system of internal rewards for estimating the value of contributions*. This is a typical issue for many CBEs, they are interested in reward systems in order to promote participation, but still there are problems: reputation systems can be risky, as they may trigger unexpected changes within communities; and current reward mechanisms have many issues, as seen in Section 3: Gratification. With Sabir, the introduction of non-transferable CBE-dependant tokens can be done in a gradual and systematic manner. This would minimize the risks and, if the experimentation fails, it is easy to revert back to the initial state of affairs.

Attract Contributors and Direct Their Contributions Where they are the most Needed
A third benefit of such a gratification system is that it would likely *increase the participation and growth of the community of contributors*, while also providing a means to *direct the contributions to where they are most needed*. CBEs might not only be concerned in increasing participation, but also in promoting a certain type of contribution (e.g. donations, maintenance, technical tasks, filtering, etc) that it is urgently needed but lacking.

For Commons-Based Contributors

Understand the Value Contributed to the CBEs and to the Whole Ecosystem
Similarly to CBEs, a direct benefit for contributors is to understand the value they are providing both to the whole Commons-based ecosystem (expressed in Sabirs) and to each individual CBE (expressed in their own gratification-tokens). This is particularly useful to the extent that individual contributors can compare the value they contribute to different CBEs and understand where their contributions are the most needed, and even switch to another community where their contribution is more appreciated. While it might seem like a loss to the community, it is better that the contributor acknowledges the fact that her contributions are not being appreciated, so as to reduce the possible frustration which might lead to the contributor leaving the community anyway.

Communicate the Value of One's Contribution to the Commons
By providing a common denominator of value, which applies equally to all CBEs , Sabir makes it easier for "commoners" to communicate the value they have contributed to society, and maybe even encourage others to join and contribute to the Commons as well (so as to get their own sabirs!).

Receive Direct Benefits from the Market Entities Recognizing Sabir
The main benefit for contributors is obviously those coming from market players, which recognize Sabir as a reliable indicator of the value that has been contributed by each individual to the Commons-based ecosystem. With a

growing community of commoners and market entities joining the system, Sabir may engender profound changes on commoners' lives, who might end up reducing their dependence on traditional market mechanisms (ruled by money) to spend more time contributing to the Commons, while nonetheless being able to benefit from some of the goods and services provided by the market.

For Market Players[14]

Direct Economic Benefits Through Price Discrimination

Market players can engage into fine-grained price discrimination, by means of customized pricing policies which allow them to allocate some of their resources - otherwise wasted - to the Commons, without (excessively) affecting the market price. For instance, a software company could offer particular benefits to open source contributors by means of specific licenses (akin to the "educational" licensing schemes for students or universities). The advantage of such particular kind of price discrimination is that it does not (theoretically) affect the market price, because only Commons-based contributors will be able to benefit from it.[15]

Indirect Economic Benefits as a Result of Greater Visibility and Reputation

Although they do not receive immediate economic returns, it is common practice for many market players to support Commons-based initiatives, such as social, cultural, or educational programs, in order to gain greater visibility and reputation. With Sabir, market players can support the Commons-based ecosystem without having to distinguish between different initiatives in order to select the ones that they would rather donate their resources to. They can, instead, indirectly contribute to the Commons-based ecosystem as a whole, simply by showing appreciation to anyone who contributes to the Commons and rewarding them accordingly - although they maintain the right to assign more value to certain initiatives than others (see Equation 3). Market players participating to the system might benefit not only from greater visibility or reputation, but also from collateral economic returns, as people who shares the same values will be more likely to purchase from them (similarly to environment-friendly companies). Besides, those who benefit from discounted/free goods or services will also be more likely to purchase other goods or services provided by these same players.

Self-Realization

Although, in most economic theories, market players are described as rational beings acting according to their own self-interest, in practice, behind market players there are also human beings with principles and ideological values that might go counter traditional economic rationality. Hence, certain market players might be tempted to participate into the system in order to feel better about themselves, by supporting the projects that reflect their own values and, more generally, by contributing to making the world a better place.

Systemic

Interface Between the Market and the Commons-Based Ecosystem

From a systemic approach, the main advantage of Sabir is that it acts as a bridge between the Commons-based ecosystem and the market economy, without necessarily favoring one over the other. Today, the market can take from the Commons, *i.e.* it can benefit from the outcome of CBPP, without ever giving back to the Commons-based ecosystem. Thus, it is to some extent free-riding over the Commons (which are thus subsidizing the market economy). Conversely, the Commons-based ecosystem cannot benefit from any of the goods or services that the market provides, unless it actually adopts a market logic, which necessarily entails the commodification of Commons-based resources to be turned into an object of trade.

Cooperation Without Contamination

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[14] We refer here to market players as any entity that subsists within the market economy and operates mostly according to market logics.

[15] Of course, as more people contribute to the Commons, the system might lead to a progressive drop in market price. Yet, this is only a marginal problem since market players maintain the right to update their Commons policy at any time, in order preserve the ability to price discriminate.

Thanks to Sabir, the two systems can keep operating according to their own logics: *abundance, collaboration, and sharing* for the former, *scarcity, competition* and *exchange* for the latter. Nonetheless they are able to interact with one another without incurring the risk of contaminating, or being contaminated by the other. Individuals can choose whether to work for the market (earning money) or for the Commons (earning Sabirs), without having to give up one for the other. As Sabir gets more widely adopted, people will be able to spend more time doing what they love - contributing to the Commons while also benefiting from the market economy.

Positive Feedback Loop Between the Commons and the Market System
As a result, Sabir might encourage people to contribute to the Commons in order to benefit from the deals provided to CBE contributors by certain market entities. Over time, a positive feedback loop will therefore be established, as market entities that support (or sponsor) the Commons will gain reputation within the Commons-ecosystem. This might, ultimately, bring more and more people to purchase their goods or services on the market, knowing that, by doing so, they are also helping the Commons.

Concluding Remarks

The value of CBPP has been widely acknowledged over the past few years[16] [17] [18] [19]. Accounting for the value produced by different CBEs and determining the relative value of each contribution is a worthy endeavor, which is however difficult to achieve insofar as there are - to date - no proper tools capable of understanding the value of CBEs or estimating the value generated by their community members.

The Sabir system combines some (but not all) characteristics of a credit score, a cryptocurrency, and a reputation system in order to provide an indicator which constitutes a proxy for *social value* (as opposed to *market value*) in the Commons-based ecosystem.

As individuals contribute to the Commons, they receive "gratitude" from the CBE they have contributed to (expressed in their own gratification-system, i.e. the CBE tokens). As a common denominator of value, Sabir represents the *lingua franca* between these different systems. It translates the gratitude generated by individual contributions into a numeric value according to an algorithm (standard or customized through a value matrix, as seen in Equations 2 and 3) ponderating every contribution with the overall social value of the Commons to which they contributed (see Equation 1). As such, Sabir makes it easy for anyone to assess the value produced within a particular CBE, as well as to compare the values of different CBEs among each other.

Through Sabir, it becomes therefore possible to benefit from the advantages provided by a universal indicator of value, without falling within the scope of conventional economic theories. Indeed, just like the price does in the market economy, Sabir allows for individual contributions to be compared according to a common denominator of value. Yet, the value expressed by Sabir is not the actual *market value* (or exchange-value) but rather the *value that emerges from every contribution to the Commons*. In other words, Sabir acts as a proxy for the value of an individual actions within the Commons-based ecosystem. Hence, as opposed to price - which is linked to the product or service of exchange - Sabir is ultimately linked to the individuals contributing to the Commons. It is, therefore, important not to confuse Sabir with an actual currency (or cryptocurrency). As opposed to conventional currencies which can be transferred from one individual to another, the Sabir indicator should stick to the same individual during a whole lifetime, i.e. it cannot be transferrable... although, just like price, its value may fluctuate over time.

And yet, measuring the value of CBPP within a non-market economy nonetheless raises an important question. It is unclear, at the moment, whether the introduction of a system like Sabir, offering a formalized, personal (albeit non-transferable) indicator of value is likely to increase or reinforce the motivations for people to contribute to the CBPP

[16] Cheal, David. *The Gift Economy*. New York: Routledge. pp. 1–19, 1988.

[17] Gold, Lorna. *The sharing economy: Solidarity networks transforming globalisation*. Ashgate Publishing, Ltd, 2014.

[18] Bauwens, Michel. *The political economy of peer production*. CTheory, vol. 1, 2005.

[19] Benkler, Yochai, *The wealth of networks. How social production transforms markets and freedom*, New Haven: Tale University Press, 2006.

ecosystem, or whether it might, on the contrary, disrupt that particular set of motivations which have been established thus far.[20] Hence, could CBPP values (such as freedom, sharing, or cooperation) actually be translated into quantifiable terms, without incurring a loss?

Acknowledgements

License

References

Bauwens, Michel. *The political economy of peer production*. CTheory, vol. 1, 2005.

Benkler, Yochai, *The wealth of networks. How social production transforms markets and freedom*, New Haven: Tale University Press, 2006.

Benkler, Yochai, Peer Production and Cooperation, forthcoming in JM Bauer & M. Latzer (eds.), *Handbook on the Economics of the Internet*, Cheltenham and Northampton: Edward Elgar, 2014.

Buterin, Vitalik. *A next-generation smart contract and decentralized application platform*. White Paper. 2014. Available at: https://github.com/ethereum/wiki/wiki/White-Paper .

Cheal, David. *The Gift Economy*. New York: Routledge. pp. 1–19, 1988.

Cohen, I. Glen. *The price of everything, the value of nothing: Reframing the commodification debate*. Harvard Law Review, 117(689), 2003.

De Filippi, Primavera. Translating Commons-based Peer Production values into metrics: towards Commons-based Crypto-Currencies, in Lee Kuo Chen D. (ed.), *The Handbook of Cryptocurrency*. Elsevier, 2014.

Gold, Lorna. *The sharing economy: Solidarity networks transforming globalisation*. Ashgate Publishing, Ltd, 2014.

Hess, Charlotte and Ostrom, Elinor. A Framework for Analyzing the Knowledge Commons: a chapter from Understanding Knowledge as a Commons: from Theory to Practice, 2005.

Lindenberg, Siegwart. Contractual relations and weak solidarity: the behavioral basis of restraints on gain-maximization. *Journal of Institutional and Theoretical Economics* (JITE)/Zeitschrift für die gesamte Staatswissenschaft, 39-5, 1988.

Schiller, Robert. *Finance and the Good Society*, New Haven; Princeton University Press, 2012.

Page, Lawrence, Brin, Sergey, Motwani, Rajeev, and Winograd, Terry. *The PageRank citation ranking: Bringing order to the web*, 1999.

Yager, Ronald R. and Kacprzyk, Janusz, *The Ordered Weighted Averaging Operators: Theory and Applications*, Kluwer: Norwell, MA, 1997.

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[20] Benkler, Yochai, Peer Production and Cooperation, forthcoming in JM Bauer & M. Latzer (eds.), *Handbook on the Economics of the Internet*, Cheltenham and Northampton: Edward Elgar, 2014.