

# The Emergence of Benefit-driven Production

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**Abstract.** The free software and free culture movements have radically changed the ways of producing software and knowledge goods. In many cases, participation in such project is benefit-driven rather than profit-driven. Participants get involved in order to realize some practical or social benefit, not because of monetary gains. Another difference from market- and firm-based production is that peer production is non-hierarchical: people voluntarily cooperate as peers; there are no fixed employer/employee or client/contractor relationships. And peer production is based on commons: goods which are jointly developed and maintained by a community and which are shared according to community-defined rules.

Peer production is not just about producing knowledge: Hackerspaces and Fab Labs are the first forerunners of a commons-based production infrastructure. While commons-based peer production reaches beyond capitalism, the preconditions of its development are created by capitalism itself. The paradoxical relationship of capitalism to human labor leads to developments that might make the concept of labor (as we know it today) obsolete, and with it capitalism itself.

**Keywords:** peer production, benefit-driven production, commons, commonism, stigmergy, capitalism

## 1 Benefit-driven Production

The *free software* and *free culture movements* have radically changed the ways of producing software and knowledge goods. These changes have caused some markets—such as those for Internet software, programming tools and encyclopedias—to shrink considerably or disappear altogether. These areas have become dominated by free programs such as Apache, Firefox, WordPress, non-proprietary programming languages such as Python, open development environments such as Eclipse, and by the free Internet encyclopedia Wikipedia. They have largely driven out competing offers which (as usual in capitalism) are only available for sale.

Sometimes, free software is produced by companies that use it to indirectly make money, e.g. by selling support, documentation, or suitable hardware. But many projects are driven by communities of people that contribute voluntarily and without pay. Participants may be motivated by the desire to use the software they help creating or they may simply enjoy doing what they do. Others participate in order to improve their knowledge, to demonstrate their skills, or to give

something back to the community (Lakhani and Wolf 2005). Free software and free culture projects are thus frequently *benefit-driven* rather than *profit-driven*: Participants get involved in order to realize some practical or social benefit (getting useful software, learning, getting community recognition, doing something pleasurable), not because of monetary gains.

Modern, neoclassical economy theory sees companies as a means of reducing so-called transaction costs (Coase 1937). As a company owner, I can assign tasks to my staff instead of having to buy and negotiate each small service individually. The employees benefit by knowing in advance how much they will earn, instead of having to sell themselves day by day in the market, with uncertain results. But they have to accept subordinate positions in a hierarchy and must follow the orders of the management. Market relations, on the other hand, take part between actors who are formally (though often not actually) equal, but they are always merely functional: I'm not interested in the others as human beings, I merely see them as potential trading partners, potential buyers and sellers.

Standard neoclassical theory doesn't know ways of interaction beyond the market and the firm, but the communities of people who produce on the basis of voluntary cooperation indicate that it missed something. Since everybody participates voluntarily, nobody can order the others around. The term *peer production* has been coined by Yochai Benkler (2006) to express this stark contrast to the hierarchical nature of firms: participants work together on an equal footing, as peers.

And in contrast to the market, others aren't merely potential trading partners, but people cooperating with me in order to reach a common goal. Peer production is based on contributions, not on exchange. And while trade (exchange) tends to be a zero-sum game, contributing isn't. If I make a "good deal," it quite often means that my trading partner made a bad one. But if somebody contributes something useful, everybody wins.

A world where producers have to sell what they produce and users have to buy what they want to use, inevitably creates antagonisms. One person's income is another person's cost. And an increased market share for one producer means that the others producing the same goods will earn less, hence producers are forced to compete with each other. The same conflict of interest as between sellers and buyers in general exists between employees and employers: the former want to sell their labor power as dearly as possible, while the latter strive for a maximum of labor at minimal cost. Benefit-driven production doesn't know these antagonisms, since fulfilling my needs doesn't have to come at the cost of your needs. On the contrary, peer production works so well because the participants help each other to reach their goals and fulfill their needs. Everybody benefits.

## 2 Voluntary Production for Others

Benefit-driven production shouldn't be misunderstood as production merely for oneself. It is true that peer producers often begin by "scratching a [...] personal itch," as Eric Raymond (2001) put it; but at the same time, what they do is also

useful for others. And people frequently engage not because of their consumption needs, but because of their productive needs: They contribute because they enjoy the tasks they are doing, because they learn something, or because they want to give something back to the other contributors.

The fact that peer production is always production for others refutes the popular conception that without a market system, people would have to fall back into some kind of Robinson mode: Everybody would only produce for themselves or their family and large-scale cooperation would cease to exist. It's pretty clear that such a solitary way of production wouldn't get one very far. Another well-known alternative are centralized planned economies—the former “real socialism.” In such economies, society as a whole functions like a big company. Management (the planners) decides what should be done, assigns the required tasks, and monitors that they are executed correctly. This alternative hasn't worked well in the past and doesn't sound very attractive: You are still a dependent employee (though now of the state) and must follow the orders of your superiors.

Peer production, on the other hand, is production for others which is neither based on coercion nor motivated by monetary gain. Peers produce for others because they can, and because it is a way for them to find further contributors. The more people use the results of a project, the more potential contributors exist, since people who decide to join forces as occasional or regular contributors are typically already users of the project they choose to support. If a project doesn't share with others by coproducing for them, it endangers its opportunity to win new members.

To distribute tasks, peer producers use an open process that has become known as “stigmergy” (cf. Heylighen 2007). Participants leave hints (Greek *stigmata*) on started or desired activities, encouraging others to follow these hints and take care of the desired tasks. Such hints, e.g. to-do lists and bug reports in software projects and “red links” pointing to missing articles in the Wikipedia, constitute an important part of the communication.

All participants follow the hints that interest them most. This leads to an automatic prioritization of tasks (the more people care for a task, the more likely it is to be picked up by somebody). It also ensures that the different talents and skills of contributors are applied in a more or less optimal way (since people tend to pick up those tasks they think they are good at). And since everybody is free in choosing the tasks they want to do, participants will generally be more motivated than in a market-based system or a planned economy, where they have to follow the orders of their supervisor or client.

### 3 The Emergence of a Commons-based Production Infrastructure

Peer production is thus radically different from the “normal,” market- and firm-based mode of production that dominates our society. Production is mainly for

benefit instead of profit; and people voluntarily cooperate as peers rather than being part of hierarchical employer/employee or client/contractor relationships.

Another thing that's different is the way in which people relate to nature and to the products of their activities. Under capitalism, ideas, products, and natural resources are usually treated as *property*. Property means the legal right to exclude or include others from using a good, allowing the owner to use, sell, or monetize their property at will.

Peer production is primarily based on *commons*, therefore Benkler (2006) talks about *commons-based peer production*. Commons are goods which are jointly developed and maintained by a community and which are shared according to community-defined rules (cf. Ostrom 1990). Water, air, forests, and land were managed as commons in many societies. Free software and open content are a kind of commons that everybody is allowed to use, improve and share. But the relation between peer production and commons is not one-sided: Peer production is not only based on commons, it also creates new ones and maintains the existing ones, as the examples of free software, open content, and *open hardware* (blueprints and descriptions of physical items that everyone can use to produce, utilize, and maintain these items) show. All these projects contribute to a knowledge commons that can be used, shared, and improved by everybody.

Peer production cannot just produce knowledge, it can also produce infrastructure and physical goods. For example, *community wireless networks* have formed in many cities; they allow everyone in their neighborhood free network access. Many of these projects are organized as *mesh networks*: all participating computers will actively transfer data, removing the need for privileged servers. Such self-organized, decentralized networks can create a shared infrastructure for Internet and telephony (cf. Rowe 2010, 2011); similar networks might supply people with energy or water. Community projects organizing access to water as a commons exist in South America (cf. De Angelis 2010).

Open facilities for the production of material goods are emerging as well. *Hackerspaces* and *Fab Labs* are typically run by volunteers; they often have computer-controlled machines—including milling machines and fabbers (“3D printers”)—which allow the largely automatized production of individual items or small series. If possible, the utilized machines are open hardware, meaning that their blueprints can be freely used and improved by everyone. Another goal is the creation of machines that can produce machines that are at least as powerful as the original ones, thus allowing Fab Labs to produce the equipment for further Fab Labs. In this way, commons-based peer production is starting to create the tools that will allow it to spread even further, at the same time starting to supply people with what they need to live.

## 4 A Commonist Future?

Nick Dyer-Witheford (2007) has proposed the term *commonism* for a society where the basic social form of production are the *commons* (while in capitalism, *commodities* are the basic social form). As the success of commons-based

peer production shows, commons and peer production go together very well. We can therefore expect peer production to be the typical form of production in a commons-based society. Commonism would be a society where production is organized by people who cooperate voluntarily and on an equal footing for the benefit of all.

Some people may claim that such a society must be impossible because it never existed or because it is against human nature. But that something didn't happen in the past doesn't mean it won't become real in the future, and arguments about "human nature" miss the fact that people are formed by society just as well as they are forming society. Changing social structures also changes people's behavior.

Nevertheless, commonism would have to remain an abstract idea if it didn't have the potential to develop out of the current social system, capitalism. New ways of production can only emerge when "the material conditions for their existence have matured within the framework of the old society," as Karl Marx (1859, Preface) expressed it.

There are two preconditions which I consider most relevant for the development of commonism: (1) Human labor disappears from the production processes, being replaced by automation and joyful doing. (2) Everyone has access to resources and means of production. Developments within capitalism favor the partial emergence of these conditions, though their full realization would make capitalism impossible.

How these conditions change the processes of production becomes already visible in the digital realm, where commons-based peer production flourishes. But as argued above, it's unlikely to stop there. Peer production reaches beyond capitalism, by being benefit-driven and non-hierarchical rather than profit-driven and hierarchical and by obsoleting and destroying markets formerly dominated by commodity production (such as programming tools and encyclopedias). And yet, the preconditions of this development are created by capitalism itself.

A paradox of capitalism is that human labor is its very foundation but also a cost factor which every company has to reduce as much as possible. Labor creates surplus value and thus profit, but at the same time, each company can increase its profit (at least temporarily) by cutting down the amount of labor required, thus achieving a cost advantage compared to its competitors. One way of reducing labor costs is outsourcing to low-cost countries, but in many cases, capitalists can achieve even higher cost savings by replacing human labor by machines, or by getting customers to voluntarily take over activities that formerly had to be paid.

Until some decades ago, machine usage and human labor was usually tightly coupled, e.g. in assembly lines. But increasing levels of automation mean that more and more routine activities can be performed without any human labor. The remaining activities tend to be difficult to automate because they require creativity, intuition, or empathy. Hence modern capitalism is often referred to as a "service economy" or "information society," since most non-automatable tasks are from these areas.

A related trend is the delegation of tasks to the customers themselves, thus further reducing the required labor power. Thanks to self service, supermarkets need fewer salespeople; online shopping and online banking avoid the need for salespeople and tellers altogether; firms like Ikea leave the final assembly of the furniture to their customers, thus reducing labor and transportation costs.

But these developments also change the relationship between people and their actions. As an employee I work in order to earn money. But if I assemble my own furniture or if I browse the Internet for products I want to have, I'm interested in the *result* of my actions. And thanks to higher levels of automation, boring routine activities (which you wouldn't do unless "bribed" by money) are increasingly replaced by more creative and more interesting tasks.

For such tasks, payment is a nice plus (provided you live in a money-based society), but not a necessary condition, as became apparent during the last decades to the surprise of many economists, when voluntary, benefit-driven peer projects started to spring up in all corners of the Internet. These developments are only possible because the participants have access to the necessary means of production (such as computers and Internet access). This precondition may seem to be a serious limitation of the free, commons-based mode of production, since capitalism is characterized by the fact that most means of production are concentrated in a few hands. It's possible to jointly produce software and knowledge where the necessary means of production are relatively small and already available to large numbers of people; but what about things that require huge factories?

Once more, the productive forces of capitalism come to the rescue. The PCs and laptops of today are the progeny of the room-filling mainframes of 50 years ago. Similarly, other productive machines have started to become more and more accessible and affordable for individuals and small groups. Inexpensive, but flexible CNC (= computer-controlled) machines increasingly replace the huge and cumbersome large-scale industrial facilities of the past. The emergence of a commons-based production infrastructure is a consequence of these developments, which originate in capitalism but allow people to go beyond it.

## 5 Challenges to Commonism

But will commonism really be able to replace capitalism at some point? Aren't there areas where it necessarily falls short? Two frequently raised objections are the problem of unpleasant tasks (which nobody wants to do) and the question of how to handle allocation and deal with the limitedness of natural resources, if private property and money cease to matter.

### 5.1 Unpleasant Activities

Lets assume a society based wholly on peer production, where all tasks are distributed among volunteers by stigmergic self-selection. What happens if there are no volunteers for certain tasks, because everyone considers them unpleasant,

dangerous or otherwise unattractive? A monetary system forces the weakest members of society to handle these tasks—those who have no other options for earning money. Only cynics would say that’s a good solution—but what is the alternative?

Some of these tasks would probably turn out to be dispensable. If that’s not the case, automation, reorganization, and fair sharing remain as solutions.

Automation has had an enormous impact since the start of the “industrial revolution”—increasing parts of production have become automated in part or in total. But in capitalism, the potential of automation is limited by the height of wages. The less well paid a job is, the more difficult it becomes to automatize without extra cost. Therefore, the automation of many unpleasant tasks (such as cleaning) isn’t worthwhile under capitalist logic. With peer production, the situation is different: If there are tasks that all or most people want to have done, but nobody wants to do, then the incentive to wholly or partially automatize them is very high. And since the automation of activities tends to be an exciting and challenging task, the chances of finding volunteers for doing so are much higher.

If automation is impossible, it’s often possible to reorganize activities in a way that makes them more agreeable. In capitalism, the working conditions for some jobs are very bad—for example, office cleaners typically have to work very early in the morning, long before other people get up. People cooperating voluntarily as peers would find different arrangements.

Automation and reorganization can also be combined. For example, some Spanish cities employ garbage trucks with automated forks that can be remote-controlled from the driver’s cab to automatically pick up and dump the rubbish bins. Hence nobody has to handle the garbage directly and waste collection becomes almost like a video game, making it easier to find volunteers.

Activities that cannot be automated away or reorganized may become candidates for a pool of unpleasant tasks, out of which everybody picks a few now and then. If everybody (or everybody who cares) does a small part of such tasks, they can be dealt with without causing much trouble to anybody.

## 5.2 Allocation and the Limited Availability of Resources

The fear that allocation without money is an unsolvable problem mainly stems from a confusion between production for profit and production for usage, or benefit. I can *sell* a practically unlimited amount of edibles, but I can only *eat* so many of them before I’m full. The same is true for all other goods: every desire to actually use them is limited. The only thing that’s potentially infinite is the possibility to turn them into money (as long as there are buyers). But that possibility vanishes in a world where production is benefit-, rather than profit-driven, and where nobody is forced to buy and sell anymore.

Organizing production in such a way that everybody earns enough money is indeed an unsolvable problem, since there is never a clear end point where it would be enough. In a money-based society, money cannot only be turned in any other good (commodity), it can also be employed for making more of it, turning

the money one already has into even more money one might potentially be able to use in the future. And money is a form of power, it allows influencing others, buying their labor power, and making them do as one wishes.

The outcomes of benefit-driven production are instead specific benefits for the people involved—software, knowledge, food, energy, connectivity, mobility, care, shelter, clothing, etc. But it’s not an unsolvable problem to produce enough food for all—current society is doing that already, it is only incapable of distributing it adequately, since those who would need it most are unable to buy it. Realizing other benefits—producing energy, mobility, care, shelter etc. for all—should be equally solvable once production focuses on these benefits rather than on profit.

And peer production only works if you really treat the others as your peers, as equally relevant. Nobody can self-actualize at the cost of others, because the others aren’t stupid and won’t help them doing so—but without the support of others, nobody will get very far. This means that everybody’s needs and desires matter. It’s not a viable option for a handful of peer producers to build giant houses for themselves and then let the others worry about how to produce enough food in the remaining areas that may no longer be sufficiently large. Peer production is about finding solutions that work for all.

In commonism, as in any society, decisions on how to use the available resources will be necessary. Is it preferable to produce food for all or rather biofuel, allowing some to continue driving cars after oil reserves have been exhausted? Should the energy supply be based on decentralized renewable sources or rather on nuclear power, whose waste will be difficult and dangerous to deal with for centuries to come? How to reconcile the interests of the users of a good, who want new production facilities, with the potential neighbors of these facilities, who might be annoyed by the noise? Anyone who understands how and why peer production works, will be able to imagine possible answers to these questions. But the most important thing is that they can be raised and answered by the people concerned—all of us.

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