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The Economics of User Generated Content and Peer-to-Peer: The Commons as the Enabler of Commerce

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Much public attention has accompanied the emergence of community-based sharing arrangements in high technology, such as music file sharing, open source software, and unlicensed spectrum applications. Academic attention has followed, though economists seem to have been slower in picking up on these developments than legal scholars. Even though the emergence of behavioral economics as a respectable analytical approach had raised questions on some basic assumption of economic rationality, the notion of sharing as an economic behavior smacked many economists as too close to socialism to be taken seriously as an efficient arrangement.

But why do these activities exist and why are they voluntarily used by millions? Normally, economists are the first to find an inherent efficiency in societal arrangements. But here, they found only inefficiency, whose explanation was often identified as government. The sharing behavior was explained either because of *too much* government – such as inadequate ability to trade spectrum and use it flexibly – or alternatively because of *not enough* government, with inadequate protection enforcement enabling a piracy of intellectual property. Commons-type arrangements, such as Peer-to-Peer file-sharing, are therefore viewed as an activity that disrupts markets. Instead of well-ordered transactions among buyers and sellers, the commons offers piracy that undermines legitimate prices, property, and investments. Thus, for orderly markets to exist, one needs to suppress such illegalities.

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I will show the opposite: that a transactions-based economy is often based on the foundation of earlier sharing arrangements; that the two systems are not so much in conflict as they are phases that follow each other; and that a sharing arrangement is the foundation of transaction-based markets, because it creates the very conditions that enable such transactions.

Commons arrangements are part of a larger family of issues in which "grassroots" activities exist. In the early years of the broadcasting, radio amateurs congregated on the airwaves, with no commercial broadcaster around. David Sarnoff and RCA get the credit for starting broadcasting; but what they did was create a commercial broadcasting model on the base of a growing amateur activity.

In the 1970s, personal computers were built and discussed by a community of microcomputer builders, who succeeded in creating the challenge for IBM where RCA, GE, Siemens, and Bull had failed.

There was also the Citizens Band movement, which created millions of mobile communicators and sped up the development of cellular telephony. The internet was started by the government outside the market, and then given life and structure by a nonprofit university-based community.

And today, the use of wireless local area networks (WiFi) has similarly sprung from the grassroots, swept ahead of the licensing regime of the government, and advanced the provision of commercial broadband and longer-range WiMax.

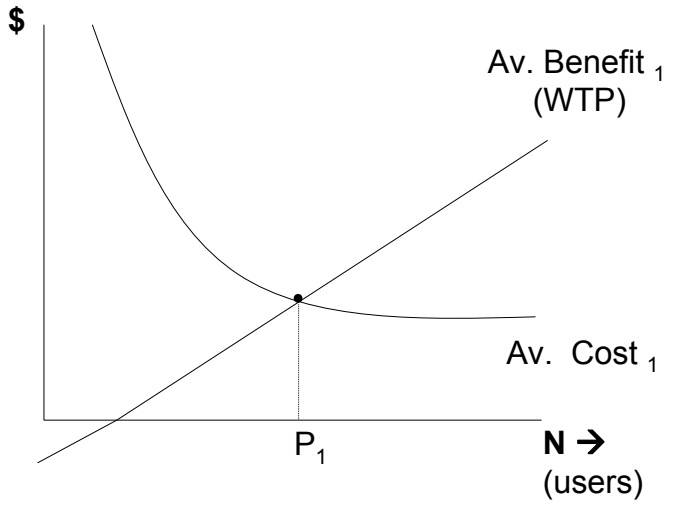
Perhaps the main instance for a user community developing new things is science, where researchers have always shared knowledge and insights. And while there is a strongly developed ethic of recognition through priority credit, awards, and academic advancement, there are few elements of ownership and property, at least until recently. Indeed, basic scientific discoveries are not patentable. But the commercial development based on scientific advancement is encouraged.

Why do all of these arrangements exist? It cannot be said that they are necessarily more efficient in a static sense than a market-based system in which profit-maximizing firms compete with each other for business and customers, thereby pushing costs down and innovation up. There are costs of duplication and diseconomies of scale to an atomistic, non-proprietary system. Citizens' band radio with its babel over the air is an example. And incentives to some investment in innovation may be reduced.

And yet, the sharing movements are too frequent to lack an economic basis. Let us therefore analyze them with a simple model.

What our examples have in common is that the participants in the activity derive a benefit from each other's participation usually referred to as *positive externalities* or as *network effects*.

Assume a collaborative system of homogeneous *n* users, encountering costs and benefits.



Graph 1.1

Total benefits grow with the number of users – the network effects.

We follow Metcalfe's Law defining total benefits as growing exponentially, $bn^2–n$, and with average benefits, hence, as $bn–b$. This is depicted in Graph 1.1 by the rising line. This average benefit would be a user's maximum willingness to pay. Total cost consists of fixed and variable costs. Unless marginal costs are rising strongly and/or are highly relative to fixed costs, average costs are declining with scale *n*. That average cost is also the minimum price that would cover costs.

To the right of the point of intersection P_1, average willingness to pay will be higher than average cost. It will be profitable for a firm to offer the service. That point is called the point of critical mass. But on the left of the point of critical mass, cost will be higher than willingness to pay. Therefore, this activity will not take place, unless there is someone to support and subsidize the activity until it reaches the size of a critical mass and becomes self-sustaining. Thus, there will be an under-investment in the activity.

How then does one get to the takeoff point if that is the goal? One way is for the government to step in and subsidize the early stages. One example is the early internet. Another example is the Minitel text terminal system in France.

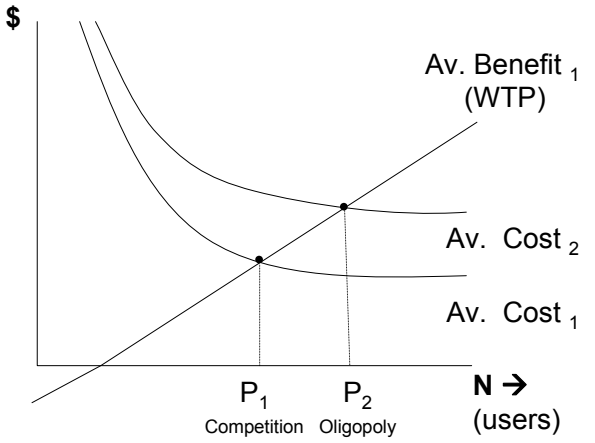
A second way is to set a regulation of the activity, which would force an initial price below cost so that the takeoff point is shifted to the left, i.e., at a lower level. This would then be followed by a sustaining expansion, after which price regulation becomes unnecessary. This priming of the pump describes the traditional policy of universal service and rate setting in telecommunications.

A third way would be for a business firm to underwrite the deficit for a while until the critical mass is reached, and then profit from its earlier investment in that critical mass. The problem with this strategy is that if there is open entry and competition, such a user base would then be accessible by competitors, and thus the benefit would be shared, while the original investment would be borne only by the early provider. Hence, there will be an under-investment in initiating such activity. The incumbent firm will therefore try to preclude rivals from reaching the user base with its network externalities. For that reason, control over interconnection has been such a critical issue in telecommunications for over a century, and in cable TV for half a century. A firm is more likely to make the upfront investment in critical mass if there are substantial first-mover and scale advantages on the supply side so that subsequent rivals will have difficulties entering. In the extreme, a "natural monopoly" firm could be in such a position, and could then use its market power to charge users differentiated prices.

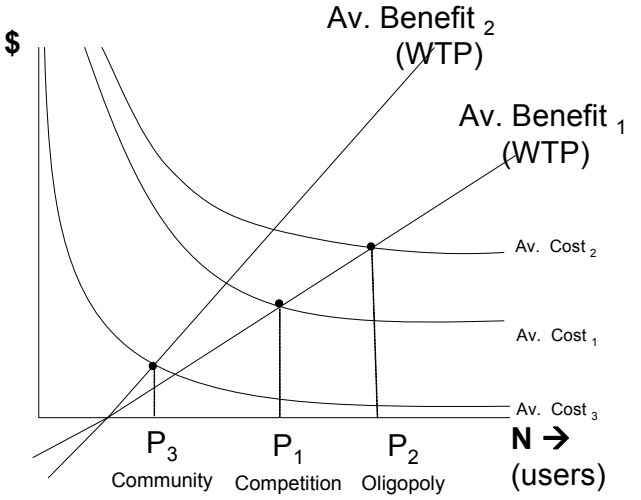
There is another reason for existing firms to under-invest in critical mass: they may already have an arrangement satisfactory to themselves in a related business activity, and which the firms do not want to destabilize. For example, Hollywood historically fought almost any new distribution technology, such as TV, cable TV, and the video cassette recorder. In each case, these new distribution technologies proved eventually to be a huge money maker for Hollywood. Why then the struggle? One should not dismiss this as merely a lack of vision on the part of Hollywood, although that played some role, too. But rather, it interfered with the carefully nurtured structure of distribution and its sequencing over a number of distribution channels. Neither Hollywood nor the music industries compete on price. They maintain above-competitive price levels through an oligopolistic industry structure, by a vertical integration of content production with distribution, and by product differentiation. Therefore, when a new technology of distribution emerges, as now with the broadband internet, the early potential benefits are outweighed by the destabilization to established profitable ways. In that sense, even the takeoff point P_1 might not be large enough if it is accompanied by offsetting losses (costs) in other distribution

platforms. The average cost curve will be higher than before (Graph 1.2). The takeoff point for the oligopolistic industry will be P_2, where the user base has become large enough for its benefits to outweigh the lost business in the established forms of distribution (Graph 1.3).

The fourth alternative, and the one most overlooked, is the community approach. This means that the early users form a community with the aim of increasing benefits and externalities, and reducing costs.



Graph 1.2



Graph 1.3

The benefit side is increased by an intense spirit of community and communication, such that each member adds more benefits to the others, and receives more from them, than would be the case without that spirit. It draws on various sources of utility such as being on the leading edge, sharing a new culture, or joining in breaking the stranglehold of powerful establishment. Hence, community building often is accompanied by a vilification of dominant firms and figures such as Hollywood, The Phone Company, IBM, or Bill Gates.

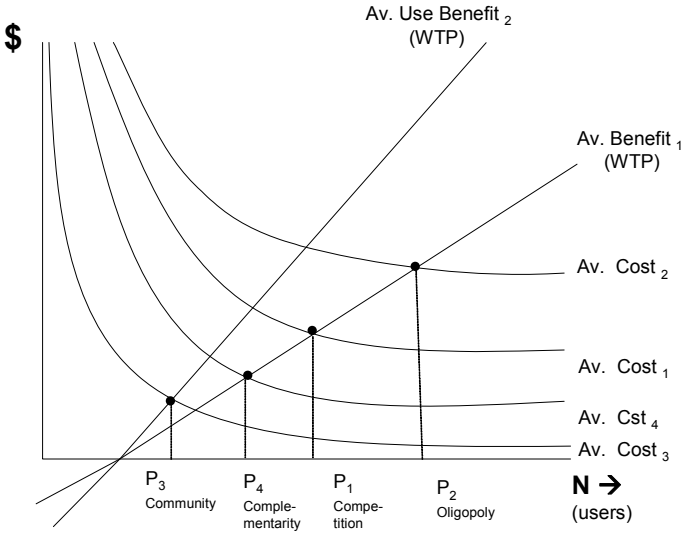
On the cost side, the community activity lowers costs by contributing voluntarist resources to the common endeavor – for example, a huge number of high-skilled program hours – and by sharing content and programs.

Together, these efforts push the critical mass point to the left, at P_3, to a smaller number of necessary participants. This point is the community takeoff point, in contrast with the market takeoff point P_1, or the oligopoly takeoff point P_2.

In some cases, the community takeoff will not lead to a self-sustained growth that will reach the commercially viable point P_1. The activity will remain community-based rather than commercial. Those situations are those, for example, of hobbyists clubs whose user benefits, user externalities, and user base are small.

But in other cases, the externalities and cost structure are such that the community takeoff leads to a community size that reaches the commercial takeoff point. At that point, business firms will enter.

Examples are, as mentioned, the commercial radio in the early 1920s, the commercial internet providers in the 1990s, Apple in downloading music and files, etc. The first to enter will tend to have no established business to lose, and hence it is likely to be firms from outside the established players. It is rarely clear when the takeoff point has been reached, so there will be trial and error entries. In providing video over the internet, the early commercial efforts went down in flames, mostly because of an insufficient base of broadband users at the time. Eventually, the number of users is large enough to sustain a commercial entrant, as the example of Apple's iTunes shows. Apple's entry demonstrates the existence of a fourth takeoff point P_4. We'll call P_4 the "complementarity takeoff point." Apple need not profit from its content download service iTunes as long as it enhances its hardware iPod sales, which it does. The music is the razor to the razorblade of the iPod. The same approach has led to the early dominance in radio by RCA (whose NBC network's function was to help sell RCA radios) and of the original BBC which was a joint venture of the British radio set manufacturers whose motivation was to sell radios (and keep cheap American receivers out of Britain) (Graph 1.4).

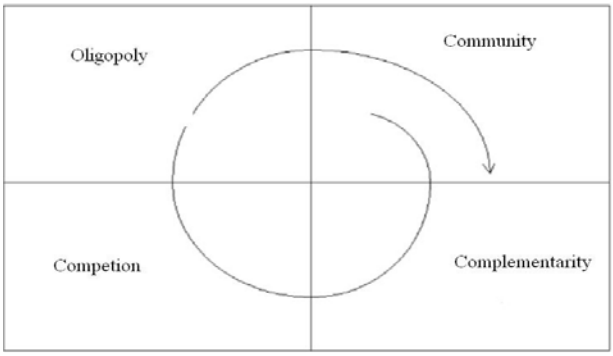


Graph 1.4

When the commercial entry takes place, it quickly, unavoidably, and unsentimentally pushes aside the community that made it all possible in the first place. The electronic common becomes the electronic metropolis. The community becomes marginalized. Some of its leaders cash in and commercialize. The commercial firms provide the investments to create user-friendly products that appeal to users beyond the original savvy community. Their often familiar brands reassure users. Their persistence is longer-lived than that of a voluntarism whose flame burns brighter in the beginning than when routine sets in. And their political influence is such that they are able to gain protective policies from government. In the end, markets assert themselves. Grassroots have created markets and network economies to scale, but then they are dismissed like pioneer stakeholders who settled the frontier ahead of the surveyors, land speculators, and developers.

Within the commercial model of operations, the center of gravity moves from P_4, the takeoff point of complementarity, to P_1, the takeoff point of competition, and then to P_2, the takeoff point oligopoly. The reason for the move to oligopoly is that competition will drive prices down to levels that will often be unsustainably low, given the high fixed costs and low marginal costs of content and its distribution. The solution, evident in most media industries, is to an oligopolistic market structure that maintains prices above marginal costs.

We can mourn this evolution from community to market and then to oligopoly as a commercial takeover. Or, we can celebrate it as part of a constant process of innovation, in which communal entrepreneurship and innovation play an important role, much more important than given credit for by the orthodox honoring of the individual entrepreneur and innovator (Graph 1.5).



Graph 1.5

There is hence a logical flow from community to complementarity to competition to oligopoly. Nor is it likely to stop there, because the oligopoly will be challenged by innovators. When Joseph Schumpeter coined his ying-and-yang term of the "creative destruction of capitalism" he had mostly in mind the undermining of oligopoly by competitive innovators, P_1 or maybe P_4 challenging P_2. Not included was the challenge from community, P_3, which might provide the ingredients for the competitive challenge in the first place. Society lionizes the business-based disrupters as creative entrepreneurs, but ignores or even vilifies the community-based disrupters as pirates and squatters, taking a cue from those of the oligopolistic stage who want to protect themselves from challenge.

Once we recognize that there is a legitimate and useful role for community as an entrepreneurial element in the process of innovation, the question is what the business and policy implications are. By our analysis, even established media business firms should, if they take the long view, greatly value the community efforts that create the user base for their own subsequent expansion. Therefore, instead of fighting file sharing with all the tools at their disposal, they might actually embrace and support them in their formative stages, and let them lead to new business opportunities. In

the media industry this was understood by Thomas Middelhoff, CEO of Bertelsmann, when he invested in Napster before being ousted. Similarly, Google acquired YouTube despite its content being often in violation of copyrights. And earlier, for home VCR – also facilitated by copyright violations – the overall gain to the content industry became in time much larger. But most media firms take a different view. For now, they see only short-term losses, not long term gains, or at least only long term gains that they must share with competitors.

But public policies need not be guided only by the same short term considerations. The gains go beyond entertainment media. Around the world, broadband internet is emerging. The United States does not have the same leadership role in broadband in that trend that it did for the narrowband internet. The problem is partly on the supply side, but also on the demand side. There is no clear killer app to entice people to sign up for broadband. Yet broadbanding all households would have enormous secondary benefits to the economy and to innovation, just as the internet did a few years ago. What might such a "killer app" be for broadband? It's pretty clear that entertainment content will be in that category. Thus, a sturdy, fair use rule that protects non-commercial applications would benefit not only users but also media firms, and the information economy as a whole. One must not suppress the community stage of innovation that can serve as the nutrient for the next link in the food chain.

And where is the next frontier for the community? Future Internet TV (IPTV) will not be to share movies one can get pretty cheaply in multiple other ways. Rather, it will be to create new forms and genres of communications based on a community's core strengths – creativity, energy, interactivity, and peership. This means new genres of interactive expression that we are only beginning to explore. While the one-way edited content will be dominant, the most interesting creative work will be that of shared and interactive content. We see the beginning in interactive games and in quirky user-generated content. The development of next generation content, and therefore of IPTV generally, are based on the initial ingredients of voluntarism to reduce costs and raise network externalities. It leads television media to evolve from the traditional system of "they TV" of the three dominant networks to the "me TV" of multichannel TV to the "we-TV" of next-generation interactive video. And as "we TV" grows and reaches more and more people, it will be embraced by commercial media firms. Another cycle begins. Another cycle from community to complementarity to competition to oligopoly. Another cycle from commons to commerce.[1]

Notes

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