

P2P as a Market Catalyst

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Peer to peer file-sharing is often viewed as an activity that disrupts markets. Instead of well-ordered transactions among buyers and sellers, P2P offers piracy that undermines legitimate prices, property, and investments. Thus, for orderly markets to exist, it is said by industries and property-rights economists, one needs to suppress such illegalities.

I'd like to advance as another perspective, however, that P2P is emerging precisely because markets did not yet function well, that it is an enabler of commercial markets, not its disrupter.

P2P is part of a larger family of issues in which "grassroots" activities exist. In the early years of the radio, radio amateurs congregated on the airwaves, with no commercial broadcaster around. David Sarnoff gets the credit for starting broadcasting; but what he did was create a commercial broadcasting model.

In the '70s, personal computers were built and discussed by a community of microcomputer builders, who succeeded in creating the challenge for IBM where the giant RCA and GE, and the government subsidized giants Siemens and Bull had failed.

There was also the Citizens Band movement, which preceded mobile cellular telephony. And today, the WiFi use has similarly sprung out of the grassroots, and swept ahead of the licensing regime of the government.

Other examples: the Internet, of course, started by the government outside the market, and then given life and structure by a nonprofit university-based community. Or, the Open Software movement, where a community of programmers develops the Linux operating system.

Why do all of these arrangements exist?

It cannot be said that they are necessarily more efficient 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.

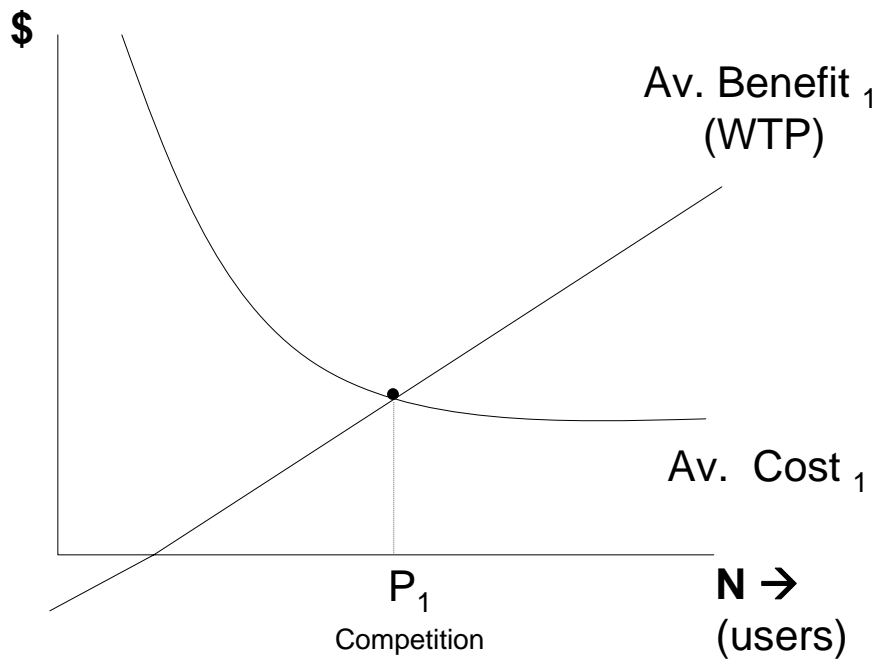
Conceptually, most of the arrangements listed above could be reached more cheaply by such a market-based firms managed professionally, with know-how, financing, and marketing channels.

The cost of a network architecture and hence of distribution will be higher for a matrix model of a community, with no central node and control, over that of a network architecture of a star, the architecture of commercially provided service such as P2P.

Other inefficiencies of the community approach are lack of allocation mechanisms of a scarce resource. Citizens band radio with its Babel over the air is an example.

And yet, the frequency of these grassroots movements must have an economic basis, not just an ideological one. So let's analyze this with a simple model.

We assume a collaborative system of n users. There are costs and benefits for users.



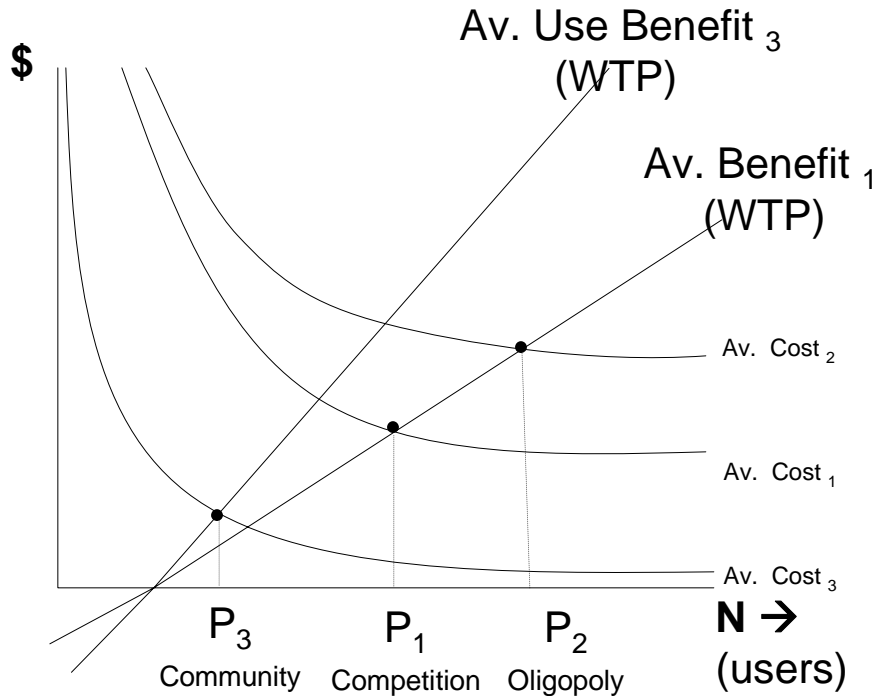
Total benefits grow with the number of users—the network effect.
 Metcalfe's Law defines these benefits as: $b(n^2 - n)$.
 Average benefits are then: $(b/n)(n^2 - n) = bn - b$.
 This average benefit would also be the maximum willingness to pay by a user.

Total cost consists of fixed and variable costs.

Total cost: $FC + nMC = F + nM$

Average cost is then: $F/n + M$.

That average cost is also the minimum price that would cover costs.



To the right of the point of intersection P1, average willingness to pay will be higher than average cost (and cost-covering price). It will be profitable for a firm to offer the service. That point can be called the *take-off*. But on the left of the point, 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.

How then does one get to the take-off point? One first way is for government to step in and subsidize the early stages. An example is the early internet. Similarly, think France and Minitel, or Singapore and the digital island.

A second traditional way is for regulation to force a price below cost so that demand is higher than otherwise, leading to expansion, and for increased network benefits and lower average prices to reach the takeoff point, after which price regulation becomes unnecessary. This priming of the pump describes the policy of universal service and rate-averaging 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 that strategy is that if

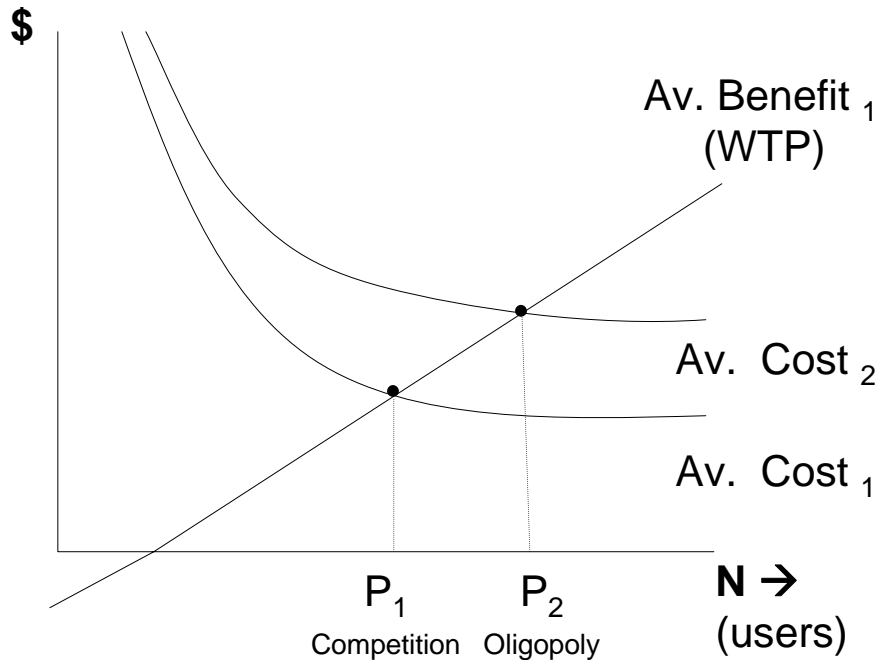
there is open entry and competition, such a user base would then be accessible by competitors, and thus the benefit would be shared, while the original investment would be borne only by the early provider. Hence, there will be an under-investment in such activity. The incumbent firm will therefore try its best to preclude entrants to reach the user base with its relatively large 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.

One alternative would be for all firms to form an oligopoly and to share the benefits of their investments in a critical mass. That works best when the firms are small in number and about equal in the user base that they bring to the table.

But if government prevents oligopoly and monopoly, there will be an underinvestment in the critical mass, and the user base might never be large enough; or, it will reach the necessary size with a costly delay in terms of forgone network externalities. An example is mobile communications, where the early American policy of fragmented spectrum allocations reduced the network externalities and slowed down the takeoff of cellular telephony in comparison to Japan and Europe.

There is another reason for the existing firms to eschew the investment in the critical mass. And that is that they already have an arrangement that is satisfactory to themselves in a related segment, and which it does not want to de-stabilize. Hollywood has forever fought almost any new distribution technology. It tried to suppress and slow down TV in the late 40s and early 50s; it tried to stop home VCRs. It fought pay-TV. In each case, these new distribution technologies proved eventually to be a huge money maker for Hollywood, Why then the struggle? It would be too easy to dismiss this as lack of vision on the part of Hollywood, although this 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 industry competes on price. They maintain above-competitive price levels by an oligopolistic industry structure, by a vertical integration of content production with distribution, and by product differentiation by investment in artists whose minute distinctions are being magnified by PR so as to create a brand differentiation. Therefore, when a new technology of distribution emerges, as now with the broadband internet, the early potential benefits are most likely outweighed by the destabilization

to profitable established ways. In that sense, even the take-off point P1 might not be large enough if it accompanied by offsetting losses (costs) in other distribution forms. The take-off point for the oligopolistic and vertically integrated industry will be P2.



And these costs rise with the number of users, until a point where the user base has become large enough for its benefits to outweigh the lost business in the established forms of distribution.

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 reduce costs.

The benefit side is increased by an intense spirit of community and communication within that community, such that each member adds more benefits to the others, and receives more from them, than would be the case without that spirit. For it to exist it helps to draw on various mechanisms, such as pushing the leading edge; of sharing a new technology, culture, or form of interaction; a romanticization of “we the people”; and a battlecry of

breaking the stranglehold of powerful establishment. Hence, community building often is accompanied by an intense vilification of commercial firms such as Hollywood, The Phone Company, the music firms, or Bill Gates. Beating that system becomes its own reward.

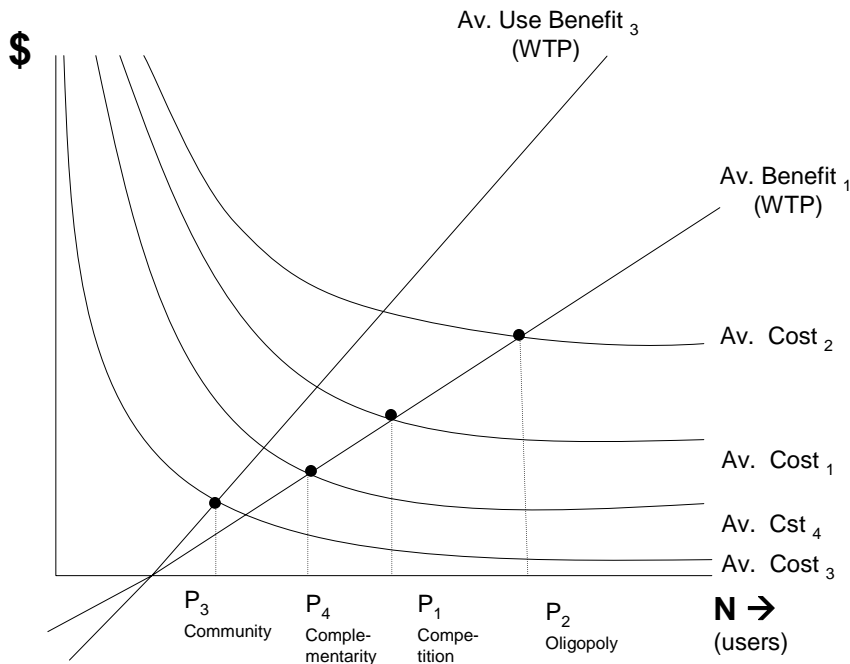
Moving to the cost side, the community activity tries to lower costs by contributing free labor to the common endeavor—which can be in the aggregate a huge number of high-skilled programming hours-- and by sharing content and programs on a piracy basis.

Together, these efforts push the critical mass point to the left, at P3, to a smaller number of necessary participants. We can call this point the community take-off point, in contrast with the market take-off point P1, or the oligopoly takeoff point P2.

In some cases, the community take-off will not lead to a size that will reach a commercially viable point. They 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 not large enough to get to a user base that becomes commercially viable.

But in other cases, the externalities and cost structure are such that the community take-off leads to a community size that reaches the commercial take-off point. At that point, business firms will enter. Examples are the commercial radio in the early 20s; commercial internet providers in the 90s; Apple downloading MP3 music. 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, of course, not always clear when the next take-off point has been reached, so there will be trial and error entries. In video over the internet, a number of early commercial efforts came and 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. In fact, Apple's entry shows the existence of a 4th take-off point P4. We'll call P4 the "complementarity take-off point". Apple need not make any money on iTunes the content download service as long as it enhances its iPod hardware sales, which it did. The music is the razor to the razorblades of the iPod. The same approach led for the early dominance in radio, of RCA (whose NBC network's function was to help sell RCA radios) and of the original BBC in

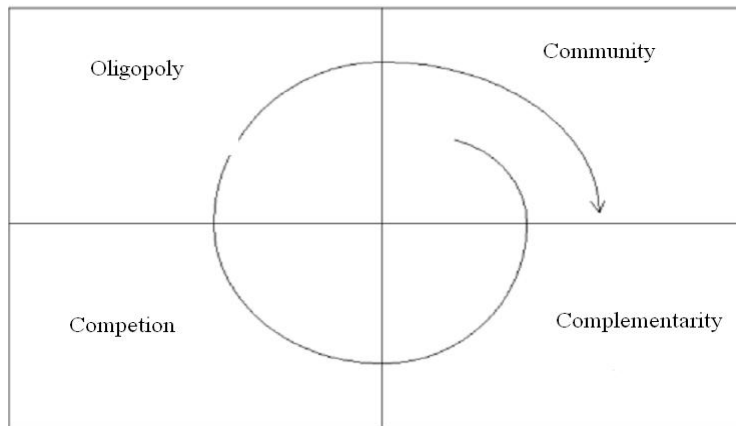
Britain, which was a joint venture of the radio set manufacturers who wanted to sell their radio and keep cheap American receivers out of Britain.



When the commercial entry takes place, it quickly and unavoidably and un sentimentally pushes aside the community that made it all possible in the first place. The electronic kibbutz becomes the electronic big city. The community becomes marginalized. Some of its leaders cash in and commercialize their expertise. Mitch Kapor and Marc Andreessen are early examples. the big firms are able to provide the investments to create organized innovation and user-friendly and reliable products that appeal to users beyond the original savvy community. Their familiar brands reassure users who value their time. Their decision mechanism is speedier than that of a self-governing community of volunteers. And their persistence is much longer-lived than that of voluntarism whose flame burns brighter in the beginning than when gray daily routine sets in. And their political influence is such that they are able to gain protective policies from government. Just look at what happened to radio amateurs, and is now happening to the self-governing Internet community. The “new paradigm” does not endure. In the end, markets reassert themselves. Grassroots have created markets, network economies, scale. But then they are dismissed, like pioneer stakeholders who settled the frontier ahead of the surveyors, title registries, and land speculators.

And within the commercial alternatives, the center of gravity moves from P4, the take-off point of complementarity, to P1, the take-off point of competition, and then P2, the takeoff point in an oligopoly industry structure. The reason is that the other two points would in time include competition; and such competition would drive prices down to levels that are unsustainability low, given the high fixed costs and low marginal costs of content and its distribution. The solution, evident in most media industries, is to a market structure that maintains prices above marginal costs.

We can mourn this evolution from community to market and then to oligopoly as a commercial take-over. Or, we can celebrate it as part of a constant process of innovation, in which communal entrepreneurship and innovation plays an important role, much more important than given credit for by the orthodox celebration of the individual entrepreneur and innovator. One can recognize individual entrepreneurs without ignoring the community entrepreneurship that sometimes precedes it, that prepares the ground, and enables the more organized efforts.



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. Yet 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, P1 or maybe P4 challenging P2. Not included was the challenge from community, P3, which might provide the ingredients for the competitive challenge in the first place. As a society we tend to lionize the business-based disrupters as creative entrepreneurs, but and ignore or even vilify the community-based disrupters as a bunch of pirates, squatters, and thieves, taking the cue from those of the oligopolistic stage who want to protect themselves from challenge.

Thus, 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 tools at their disposal, they should actually embrace and support them. For a while at least. This was understood by Thomas Middelhoff of Bertelsmann, when he invested in Napster, before he was ousted in a palace coup. It is not understood, or opposed for the reasons discussed earlier, by many other media leaders. For now, they see only short-term losses, not long term gains, or at least only long term gains they must share with competitors.

But this short term perspective does not mean that public policy needs to be guided only by the same short term considerations. Suppressing sharing arrangements because they facilitate piracy is short-term thinking. Once the user base is large enough, it will provide the foundation for a market-based transaction mechanism. And once transaction technology is in place, there might be some piracy at the margin, but just as for home VCR, the overall gain to the content industry will be much larger. And on top of that, the gains go much further than video and audio. Around the world, broadband internet is merging. The United States does not have the same leadership role in that trend than it did for the narrowband internet. The problem is less on the supply side, and more on the demand side. There is no clear killer-app to entice people to sign up for broadband. Yet broadbanding all household 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 such a killer app. Just look at Japan, where yahoo BB and Softbank have unleashed

consumer frenzy, perhaps because they have much less of a content industry to protect. Thus, a sturdy fair use rule would benefit not only users but also media firms, not to mention the digital economy as a whole. We must not suppress the community stage of innovation that can serve as the nutrient for the next link in the food chain. For the digital economy, it is a marsh, not a swamp.

And where will be the next frontier for the community? It will not be transmitting movies available in video stores, over satellites, cable, and broadcasting, in the mail, or from hard drives. That trend to more and more distribution channels has led from broadcasting to narrowcasting, to the “me-TV” of hundreds of channels watched by very few. The fragmentation of the mass audience will continue but slow down. If one can get a Turkish-language sports channel in Manhattan, how many people would possibly watch it?

The point for future P2P video 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 P2p’S own core strengths—community, creativity, energy, interactivity, and peership. This means that 2-way communication will enable new genres of interactive expression that we are only beginning to explore. Of course, the one-way edited content will be dominant. But the most interesting creative work will be that of shared and interactive content. We see the beginning in interactive games. There will be no doubt expansion into other thrill-seeking activities, (which I will leave to your imagination) but thereafter there will be emerging creative communities and new forms of expression. They, too, will supply the ingredients of voluntarism for cost reduction, and of shared enthusiasm for raising network externalities. From “they TV” of the 3-network system to the “me TV” of multichannel TV” to the “we-TV” of next-generation P2P 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.