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Predictions about the Future (of Work)

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It used to be that being self-employed meant that you were unemployed. Now being employed often means you're hardly employed.

In 2010, I was invited to make a prediction about the Internet's use in 10 years.[1] Five years later, it's worthwhile to review the state of my prediction. So let's pause while you re-read that piece.

It's okay; I don't mind waiting.

Done? Okay, now read Paul Mason's "The End of Capitalism Has Begun,"[2] which is an advertisement for the complete book. It won't take you long. I'd like to compare and contrast.

Capitalism and the Freeing of Information

First, I should note that I like Mason's piece very much. Although all economic theories are suspect, I like his suspicion that austerity means that wages for commodity jobs in developed countries fall until they match rising wages for the same jobs in developing countries. Employment just isn't what it was (for a short time).

I especially like Mason's discussion on the inability of economists to value more sophisticated work. In particular, I've noted since the '80s that while I've made a very good living from writing and speaking, I haven't actually engaged in anything economists can value as "production," except to value it by what I'm paid, which means they have no theory at all to account for the work of analysis and synthesis. That kind of work is increasingly prevalent, but I won't linger on that important issue. I want to focus instead on the future of work.

Mason's arguments are largely abstract, although he has some good examples. His thesis is that the freeing of information is at odds with capitalism of the last few centuries. He even points out that his thesis was anticipated by Karl Marx. I don't disagree with much of the article, except that I don't think there's anything we can do to promote the change. Instead, I want to focus on a specific aspect of information and work so that I can avoid economic theories.

Mason discusses the power of information. He mentions (as one of the three ways information is changing capitalism) that, "we're seeing the spontaneous rise of collaborative production: goods, services and organizations are appearing that no longer respond to the dictates of the market and the managerial hierarchy."[2] He, I, and many others have long predicted that people will collaborate in ways that evade hierarchical management and standard economic models.

But then as an example of this, Mason says: "The biggest information product in the world — Wikipedia — is made by volunteers for free, abolishing the encyclopedia."[2] Notice that at first he seems to understand the power of the Internet to support collaboration, but then he gives an example of collaboration that's focused on the content produced: information and its business model.

I think Mason, like many, misses the potential of the Internet to *coordinate* the activities of people so that they can collectively perform tasks not previously feasible.

Reconsidering Collective Work

I've long argued for increased technical support of "collective work,"[3] which sounds nearly as Marxist as Mason, but which I define more narrowly. I can see this phenomena of collective work, and the need for technically supporting it inside of modern enterprises. I've described this in several technical articles and talks, in addition to what I wrote in my column.[3] So I don't see it at odds with modern capitalism, except that large companies aren't likely to so strongly

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revise their operations, despite protestations about "innovation" to the contrary.

I see a place for such support in the open marketplace of the Web, allowing people to coordinate their activities. But I have to conclude that my strong thesis about collective work seems unlikely to succeed in my lifetime. In particular, I'm thinking of sequences, chains, and networks of services and products being assembled in an ad hoc manner to meet immediate goals of value. I don't see any evidence of people thinking like this so far. I'll say a little more on this failed prediction at the end of this article.

Self-Employment and Other Predictions

But let me revisit some predictions I made earlier in my career that I mentioned.[1] They were also wrong, but not as wrong, and they somewhat support the thrust of the 2010 article. I thought back in the '80s that most people would be self-employed by now because we had commoditized most task and job descriptions. Well, I can argue that we're on the way if not there as quickly as I had hoped.

The Mechanical Turk is very disappointing, largely because its tasks are typically so simple.[4] TaskRabbit is hardly more exciting. But there's some evidence that temporary work tasks that can have standard descriptions are becoming more sophisticated.[5]

To be fair, the evidence for the growth of temporary workers within companies is at best weak. Growth in temporary jobs, though not in income for temporary work staffing companies, actually declined between 2013 and 2014.[6] And the non-farm temporary workforce never seems to be much above 2 percent of the total.[7] But these temporary workers are replaceable cogs in the enterprise machinery that's pretty much the same, except that the overhead costs of labor are diminished and labor can be added or subtracted more easily as warranted by the market demand.

More important for my predictions about changes in work outside of firms are the self-employed, who are somewhat more difficult to quantify. Worldwide, about 18 percent of the workforce is self-employed, and 7 percent in North America as of 2013.[8] It's too early to say what the trend really is, and most positions outside of North America are really poor jobs, but increasingly many of the "full employment" jobs inside the US don't pay that well, either. The best I can do now in 2015 is report a prediction that about 40 percent of the labor force in the US will be self-employed by 2020.[9]

The savvy among you know that this last citation is on the mark when it notes all the ways there are to make at least a little money on the Internet today, and perhaps even tax-free if you're willing to use bitcoin or even local currencies springing up in communities (such as Totnes in the UK). Mason says much of this is called the new *sharing economy*, and he notes in passing that this is based upon networking. Implicit in this kind of people networking is support by new ways of using the Internet. And there are many more kinds of self-employment than simply sharing resources, as we can easily see by the growth in co-work facilities in robust cities in the developed world.

In other words, I think we're well on our way to the Internet supporting people working outside the firm.

For example, just look at ground transport. Even if technically Uber drivers do work for the firm, really they're exactly the kind of "free agent" that I and others have been predicting. When they and Lyft get constrained by regulation, others less-constrained spring up, such as Bandwagon, Ridewith, Gett, Tripda, and Via. Many of these use cash paid directly to the driver — totally out of view of any government, unless the government starts surveilling apps.

Do you have a truck that can haul a good-sized trailer? Then you can look on the boards for "hot shot" loads and make some money with your equipment and time.

Beyond this fundamental task of moving people and goods, the Internet is enabling self-employment in the sex industry: such as "under-the-radar" webcamming. There are now any number of other ways people can and do use the Internet for self-employment, often beyond the purview of any taxation agency.

I bet the savvy readers of this column know of these ways and would like to share them. Unfortunately, the institution sponsoring this column has barriers to creating a blog for this column. So, I have opened up a Facebook page (see www.facebook.com/InternetComputingPeering). Please share with me, and each other, the ways in which you think the Internet is supporting and promoting self-employment, and changing "normal" work.

Now, let me return to my failed prediction. I imagined virtual companies where someone wakes up in the morning, looks at needs posted on the board, and figures out jobs for the day. At least one start-up is making an app for that.[10] And I'm not the only one predicting such a radical change in the nature of work.[11]

But I am the only one who has predicted that someone could do this recursively: picking up a complex task from a board, breaking it down into subtasks, and reposting the subtasks, earning a bit along the way; or actually performing one of the subtasks and earning a bit more, with software managing the resulting virtual workflow.

I imagined a future of enterprises with extremely flexible supply chains, able to infinitely customize their product by fast-sourcing and managing the resulting ephemeral

chain of supplier obligations. And I imagined large construction projects where instead of following a task schedule that becomes virtually worthless after the first contingency, contractors could easily and automatically revise their plans as conditions change.

None of this seems close to happening.

I've described these examples in some detail. Why hasn't this happened? Do people not think this way? It seems they don't. Inside enterprises, complex tasks are performed according to prescribed processes managed by workflows. This is probably unnecessary, but no one feels they can escape doing things this way. I've found this way of thinking to be a pervasive barrier to doing things a new way.

This, in itself, is interesting. Why do some new methods succeed and others never get started? Is it just that the new methods are sufficiently analogous to the old methods that they can be easily adopted? Is there a way someone could predict this?

I invite your speculation on this point as well. Thanks in advance.

References

1. C. Petrie, "Plenty of Room Outside the Firm," *IEEE Internet Computing*, vol. 14, no. 1, 2010, pp. 92–96; http://tinyurl.com/oqtf5nn.
2. P. Mason, "The End of Capitalism Has Begun," *The Guardian*, 17 July 2015; www.theguardian.com/books/2015/jul/17/postcapitalism-end-of-capitalism-begun.
3. C. Petrie, "Collective Work," *IEEE Internet Computing*, vol. 12, no. 2, 2008, pp. 80–82; http://tinyurl.com/p4eayk7.
4. E. Limer, "My Brief and Curious Life as a Mechanical Turk," *Gizmodo*, 28 Oct. 2014; http://gizmodo.com/my-brief-and-curious-life-as-a-mechanical-turk-1587864671.
5. M. Wood, "No Longer Just a 'Temp': The Rise of the Contingent Worker," *SkilledUp*, 27 Mar. 2015; www.skilledup.com/insights/longer-just-temp-rise-contingent-worker.
6. M. Mihelich, "Special Report: Staffing Still Soaring," *Workforce*, 1 Oct. 2014; www.workforce.com/articles/20792-record-high-staffing.
7. S. Greenhouse, "The Changing Face of Temporary Employment," *The New York Times*, 31 Aug. 2014; www.nytimes.com/2014/09/01/upshot/the-changing-face-of-temporary-employment.html?_r=0&tabt=0002&tabg=1.
8. B. Ryan, "Nearly Three in 10 Workers Worldwide Are Self-Employed," *Gallup*, 22 Aug. 2014; www.gallup.com/poll/175292/nearly-three-workers-worldwide-self-employed.aspx.
9. B. Lunn, "The Creative Economy, Micropayments and Bitcoin," *Bank Innovation*, 28 Jan. 2015; http://bankinnovation.net/2015/01/creative-economy-micropayments-and-bitcoin.
10. T. Clark, "One Man's Quest to Meld Adam Smith and Marx – by Creating an Uber for Jobs," *The Guardian*, 16 Apr. 2015; www.theguardian.com/money/2015/apr/16/one-mans-quest-to-meld-adam-smith-and-marx-by-creating-an-uber-for-jobs.
11. T. Milbourn, "In the Future, Employees Won't Exist," *Tech Crunch*, 13 June 2015; http://techcrunch.com/2015/06/13/in-the-future-employees-wont-exist/#.elcrnw:1Utd".

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