

The self-organizing, self-optimizing network enterprise arrives

Most enterprises have traditionally operated as top-down-driven, centrally planned economies. Increasingly, however, a new wave of start-ups are basing their approach more around managed marketplaces that deliver services efficiently and cost effectively, often in a very disruptive manner, by using existing assets.

In this article, we look at how emerging technologies, such as blockchains and machine learning, can be deployed to facilitate self-organizing markets. And how existing enterprises can make use of this technology to blend traditional organizational tools with crowdsourced infrastructure and labor.





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During the 20th century, the business of managing large enterprises gradually turned from art into science. Economists and management theorists, such as Alfred Sloan, Ronald Coase and Frederick Taylor, laid the foundations for the kinds of large-scale, vertically integrated enterprises that emerged in that era, from Ford Motor Company to Standard Oil to United Parcel Service.

Though many things have changed, the traditional multinationals that we have grown up with have remained largely constant for nearly a century. That business model may, for the first time, face some real competition, not from individual companies but from self-organizing, digitally connected business networks.

The fashion for conglomerates comes and goes but, through all this time, the original forces transforming the enterprise have remained strongly at work – process optimization and disciplined operations planning. Increased computing and data collection tools have made ever more sophisticated tools available to business planners.

Annual launches for new products, such as phones and game consoles, are marvels of business operations, as products designed in one country, and manufactured in many others, are assembled in a third location and shipped globally for a simultaneous launch. Dozens of suppliers, tens of thousands of retailers and millions of units are involved – with the final product being delivered nearly simultaneously in multiple countries to millions of customers.



Two disruptive innovations

In the last decade, the rise of the internet and affordable computing at every level has brought along two big new changes to global business models. The first to emerge might be called the “micro-multinational.” Thanks to low-cost internet, direct-to-consumer websites and open markets, it has become possible for even quite small companies to build global brand and distribution networks.

A new generation of technologies and innovators is bringing us closer to a state of superfluid markets, where traditional market frictions are reduced or even eliminated.¹ Software integration through application programming interfaces (APIs) allows even tiny companies to coordinate supply chains with a level of integration and reliability that would have been the province of the world’s top companies only a couple of decades ago. Collaborative software and planning tools are replacing classical ownership as mechanisms for vertical integration across the value chain.

While the business model can operate at much lower scale and with less vertical integration, the fundamental approach – the centralized coordination and management of supply and demand – has remained unchanged.

The second disruptive innovation, however, represents a much bigger departure from the past: the emergence of the network enterprise. The first true network enterprises have arrived in the last decade, with companies such as Airbnb, Lyft, Uber and VRBO at the forefront. These companies took the marketplace-like model of eBay and narrowed it down to a single product: transportation or lodging.

The result is not merely a convenient marketplace, it’s the emergence of a whole new model of a company. Network enterprises are more than just marketplaces or directories because

1. A. Potter, “What makes a company a company when markets are superfluid?,” <https://betterworkingworld.ey.com/digital/what-makes-a-company-a-company-when-markets-are-superfluid>, accessed 14 August 2017.



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they match supply and demand, facilitate payment and, in more or less subtle ways, standardize the product and experience. People don't say: "Joe gave me a lift here," they say: "I Uber'd over from my Airbnb." And that's no accident – it's a branded product experience.

Managing the free-for-all: the new science of market optimization

The staggering speed with which companies such as Airbnb, Lyft and Uber have grown has been well documented. What is less well understood is how much effort goes into managing a digital network enterprise when the parent company doesn't employ any of the staff or own any of the assets. The answer is a great deal. And in that process, a whole new management discipline is emerging. Instead of top-down operations planning, we have the new science of market optimization.

There are three pillars of the emerging discipline of market management for network enterprises. The first is analytics. Just like centralized enterprises, the ability to forecast supply and demand is a critical skill. In the case of decentralized network businesses, it is not possible to order workers or capacity in line with forecasts.

Instead, network enterprises seek to inform both suppliers and customers using analytics and, consequently, shape demand. Drivers for ride-sharing services are given significant information about where demand is expected and when, in the hope they will work at times and in locations that optimize their income. In the case of apartment rental services, many of the networks offer recommended pricing that is comparable with how hotels might adjust based on big events and seasonality.

Where they are unable to get the best results simply from sharing information, network operators use complex incentive packages to shape behavior for both supply and demand that goes far beyond simple surge pricing. Package deals give bonuses for making more capacity available at peak times, working extra hours or getting higher-than-average customer ratings.

Finally, and perhaps most importantly, companies are learning to manage quality control aggressively in a crowdsourced environment. In the case of the taxi business, new entrants were fortunate to face an industry that (with a few notable exceptions, such as London and Tokyo) had a very low standard of service. The same cannot be said for hotels, where crowdsourced competition has been much more variable in quality and facing a much higher bar in terms of consistency and service.

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As with managing supply and demand, the most powerful tool being used by network enterprises is analytics. Instant customer ratings and online reviews make it easy to spot consistently poor performers. As we go forward, we can also expect to see more digital instrumentation of the customer experience as well. Uber has announced plans to use the accelerometers in driver phones to determine if drivers are accelerating, braking or swerving aggressively during rides.²

2. "Uber has started monitoring smartphones to see when drivers are speeding," *Huffington Post* website, http://www.huffingtonpost.com/entry/uber-monitor-drivers_us_56aed04ce4b00b033aafa03f, accessed 14 June 2017.

So much speed, so much scale, so few examples

The impact of the network enterprise – often referred to as the “gig economy” – has, for the last few years, dominated much of the global economic discussion around questions of fairness. Yet, despite the incredible growth of a few examples, the emergence of the network enterprise seems stalled. Go ahead: name a sector that has been transformed outside of lodging and car services. Most people can’t. And while traditional taxi companies may be declaring bankruptcy left and right, even Airbnb has had only a modest impact on the global hotel industry.

There are three factors that appear to be holding back further acceleration of this business model, all of which are likely to be solved in the near future. First and foremost, not everything is shareable. To understand what is and isn’t a candidate for transformation into a digital network enterprise, EY has developed a four-point test to understand if an asset-based market is ready for transformation:

1. **Is the asset easily shared across multiple users?** Cars and homes are easily shareable, and the changes we need to make to them (e.g., keeping them clean) are manageable.

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- 2. **Is utilization for the asset relatively low?** If you drove your car all day and all night, it might be possible to share, but when would you do so? In fact, both cars and vacation homes have very low levels of asset utilization, making them ideal candidates for sharing.
 - 3. **Is asset ownership widely distributed?** Imagine if all the world's cars were owned by just three companies. The probability is low that they would, in such a concentrated market, make a decision to unleash a mountain of excess capacity on each other. Markets with low ownership concentrations, however, are highly competitive and have no chance for collusion. Again, no surprise that consumer-owned assets have led the way.
 - 4. **Are there any legal or regulatory barriers to sharing?** In certain markets, even where capacity is available, regulators may prevent sharing for many reasons. Often, these reasons are thinly disguised symptoms of regulatory capture by incumbents (e.g., big hotels funding anti-Airbnb ads in San Francisco³) but, in some cases, there may be legitimate reasons at work as well.

The second challenge has been to drive down the transaction cost for sharing the asset. If you rent your home for US\$300 per night, it's worth your time to bring the keys to a guest at the airport. Similarly, driving for Uber or Lyft pays enough that there are plenty of takers. But what if you could make US\$5 for loaning your lawnmower to someone on a Saturday? Is packing it up, taking it over or being present in the garage to allow pick up on your Saturday worth it? Would you interrupt your family dinner for that? Even though many assets are idle much of the time, the cost and complexity of renting them for a reasonable rate may not be worth the hassle in mature economies.

Fortunately, technology is at hand to solve this problem. With smart, connected devices, it will be possible to find, rent, use and return assets all without actually bothering the owner at all. The "transaction cost" in human terms will go down dramatically and, as a result, the number of addressable markets will increase significantly.

The final challenge is the limited range of buyers and sellers in these markets today: mostly consumers. It's no accident that homes and cars are the two biggest assets consumers own in the industrial world and that's where all the action has been to date. Trillions of dollars in enterprise assets, from offices to warehouses to construction equipment, remain poorly utilized and locked out of these digital markets.

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Many enterprises are, most likely, holding back from putting their assets into digital markets for three big reasons. The first and obvious one is that many do not wish to disrupt their own brand and market positions any sooner than they have to. However, one company's product is another company's costly input, so this problem is likely to solve itself once enterprises face viable competition from digital markets.

The other two obstacles are the pace at which companies are able to change their longstanding procurement processes and the fear many have of creating a powerful new entity in their industry. Both of these challenges may slow the rate change, but are unlikely to prevent it altogether.

3. "The US hotel industry is going after Airbnb for its 'arrogance,'" *Quartz* website, <https://qz.com/798890/the-us-hotel-industry-is-going-after-airbnb-for-its-arrogance/>, accessed 14 June 2017.

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The future of digital competition

Imagine a competitive battle that may not be so far in the future: a large warehousing company, with a management team and experience of developing property, facing off against a decentralized network of “available spaces” operated by other companies – making unused internal capacity available externally.

With significant overheads and fixed costs, the traditional vertically integrated incumbents will find themselves facing significant price competition and a flood of capacity that has previously been hidden offline. The result is likely to be a significant drop in market pricing. Depending on how much excess capacity moves from offline to online, the result in the market could be dramatic.



Compared with centrally managed enterprises, networks have many shortcomings. They cannot guarantee capacity. They cannot make special arrangements, nor can they guarantee quality in the case of capacity that is crowdsourced. Even with powerful incentives and sophisticated analytics, some customers will always prefer the certainty of a centrally owned and managed corporate asset over the promise of a highly rated but crowdsourced competitor.

Even where self-organizing networks do not come to dominate an industry, their mere presence could reshape pricing and industry economics. The hotel industry is a good example: while room-sharing services represent a small share of total capacity and most business travelers enjoy the predictability of hotels, the availability of an alternative has hit peak pricing hard and limited the ability of hotels to raise prices in key markets.⁴



The toughest choice facing incumbents, as these new competitors emerge, will not be how to apply the tools of managing self-organizing networks and markets, but whether to disrupt themselves first or wait to face a disruptive competitor.

A winning strategy for incumbents is to embrace network business models for a portion of their operations, applying the strategies of network economics to both captive internal operations and in crowdsourcing incremental capacity. Applied internally, these models have the potential to empower employees and improve job satisfaction, giving people more flexibility in their day-to-day

work. Applied externally, it allows vertically integrated enterprises to supplement centralized infrastructure with low cost additional capacity.

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4. G. Zervas, D. Proserpio and J. W. Byers, *The rise of the sharing economy: estimating the impact of Airbnb on the hotel industry*, <http://people.bu.edu/zg/publications/airbnb.pdf>, accessed 14 June 2017.