

# The New Industrial Organization: Ecosystem Competition

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**Abstract:** This paper characterizes a new industrial organization framework for analyzing ecosystem formation and competition by recognizing the Schumpeterian force of creative destruction. Economists' framework of profit maximization is replaced by a Welfare Enhancing framework (WEF) as a more pragmatic and realistic characterization of reality. Consumers are not fish in the ocean waiting to be preyed upon; they have free choice and broad lifestyle choices. The supply and demand framework is still relevant even though profit maximization in the theoretical sense that it has been technically crafted by economists may not. Firms as epistemic communities are more fitting as the behavioral assumption that can be more pragmatically applied. By using graphs and examples, three types of ecosystems are discussed, each sharing the commonality of data management as a driver for its respective ecosystem. The first two types of data management, coupled with pricing, bundling, and various industrial organization conducts, help to promote the welfare-enhancing growth of their respective ecosystems in an innocuous manner. The third type has an electrifying component resembling features of "two-sided" markets that may require Antitrust regulation. The key difference between the third and the first two types of competition is that the third type could lock in data with a specific investment of productivity less than the ideal optimal, thus reducing welfare rather than enhancing welfare.

**Keywords:** Creative Destruction, Epistemic Communities, Welfare Enhancement, Data Productivity

## 1. Introduction

There is an ongoing managerial challenge of nurturing the complex business communities of today. Entrepreneurial efforts and innovations have disrupted the underlying assumptions of fixed consumer preference and known production functions, which are the backbones of neoclassical microeconomics. The behavior assumption of the firm in terms of it being a profit-maximizing entity is still accepted by analysts and Wall Street investors alike, but profit maximization in terms of characterizing it as equating marginal revenue with marginal cost has long ceased to be practical as well as analytically relevant, although mathematically, it is still a logical implication. Indeed, the idealized condition that when marginal revenue equals price, perfect competition will be a winning condition for market economics is long gone. The reality is that "competition in today's economy is far more dynamic" (Porter, 1998); access to specialized knowledge, external information, institutions, and public goods, together with the bundling products of complementarities, sharing strategic visions of the future becomes a hallmark of ecosystem competition.

For centuries, there has been a field of "industrial organization" in economics. It emphasized market structure measured by concentration ratios, and it addressed various conduct issues in terms of possible welfare losses various anti-competitive conducts may result in. It is questionable whether the concept of a market is of relevance now (Jacobides, and Lianos, 2021). Competition in terms of market share, likewise, loses its significance if one cannot identify what

a market is. To many, the game to emphasize is predating and preying (Moore, 1993), a Darwinian struggle that results in an Ecosystem. This is in sharp contrast in methodology to that of examining concentration ratios and business conducts in a market of a particular definition. In the world we live in now, entry and exit in the business world are characterized by entrepreneurship and Schumpeter's force of Creative Destruction (Schumpeter, 1942). A framework that can capture the gist of this aspect of capitalistic competition in the field of industrial organization is gravely lacking.

Companies of today are working cooperatively and competitively in defining their ecosystem containing features in industries that are ever-changing. These ecosystems generally consist of a web of suppliers and customers in various "traditional" market segments, dissecting them in many ways. For example, the new reality of a "traditional market" for hotel lodging gets torn into various ecosystems of lifestyle accommodation, e.g., Airbnb. lodge vacations, motels, resorts, all-suites, extended stays, and boutiques that emphasize themes of various kinds. A market for cars or even the broad field of transportation is now evolving to become Transportation as a Service (TaaS), a term that would be "unclassified" in traditional industrial organization studies. A company such as booking.com has no single market easily identifiable that the company is competing in. Markets are now cross webs. Conduct-wise, companies lure buyers to accumulate points, loyalty programs, etc., all being anything but monopolistic or price discrimination related as some conventional economic textbooks may describe them to be.

Indeed, its "competition among business ecosystems, not companies, that's largely fueling today's industrial transformation." (Moore, 1993). However, a fight over "who will direct the future" is meaningless unless a criterion gets stipulated for what that bright future could mean. What we are seeing is that companies are competing to transform their customers' and suppliers' experience via advertising, pricing, bundling with other products and services, recruiting stakeholders, and experimenting with various delivery methods. It's good, bad, ugly, and transformative, all at the same time, all in what a layman will call "the business of aggregation". In actuality, we don't know who is doing right ex-ante, or even ex-post, if an arbitrary time is clocked for an evaluation and comparison.

Viewing the new era of the 4th Industrial Revolution as having a leader emerging is a faulty framework. At any moment, there may appear to be a leader, but the leader will be continuously subject to competition. As long as information discovered or emerging is continuing, the process of Creative Destruction will continue to replace leaders. Numerous examples can be found where traditional production methods are being displaced. Even for emerging fields such as e-commerce, pioneers such as eBay has seen their market share shrinking in light of competition from Amazon and other BtoC e-commerce platforms (See Statista, June 2022), even though as of the end of 2022, e-commerce is still only about 20% of total retail sales worldwide (FedEx CEO interview on CNBC, Dec 31, 2022).

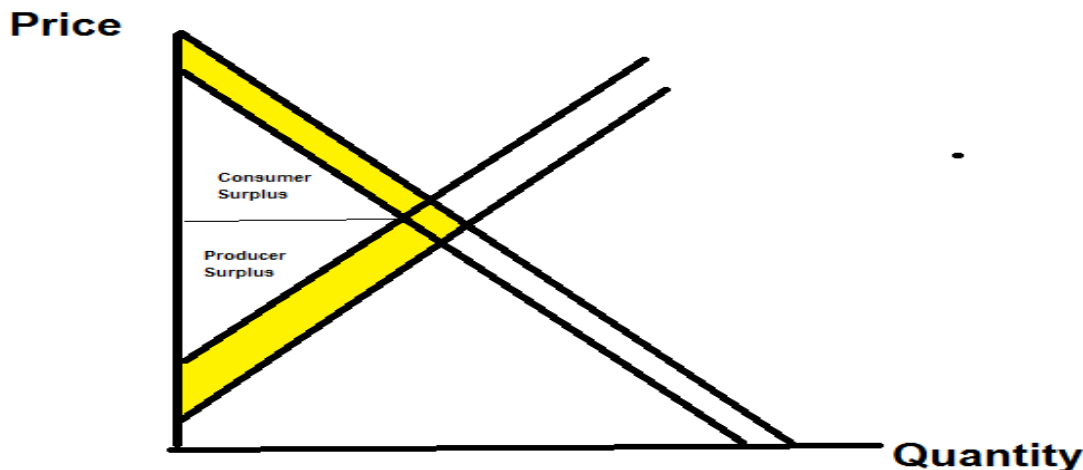
Digitalization is the new reality of what the world is going through as the 4th Industrial Revolution progresses. The way to think about today's companies is that they are epistemic communities (Grant, 1996; Kogut B. and Zander, U., 1996; Galunic and Rodan, 1998; Cowan et al., 2000; Carlile and Rebentisch, 2003; Hakanson, 2010). Data is oil, software embedded in hardware, portable/immobile devices, coding and algorithms, and various social media culture have taken over the power of steam engines in this modern world we are living in. Cell phones, earbuds, headphones, QR codes, public kiosks, and UI/UX on any surfaces (existing or to be built) that are finger-writable have become the ways the consuming public is seeking their new quality of life. One can hardly relieve oneself from any digital independence now. Although all that matters is how we as a person (not a robot) live our lives in a face-to-face reality and that social media is merely a means to get us off social media, many choose not to view the digital means in that way. Indeed, the best some can manage to bring digital life back to real life, maybe, is to put Netflix on their Peleton treadmills. At least there is a bit more humanity in this mode of a lifestyle than one that is dwelling entirely on VR/AR. Communities like Second Life

have yet emerged to be the norm that replaces reality. Regardless, the writing on the wall is clear: "If you don't know how to manage your data, you lose". A digital mindset being a defining characteristic of the new lifestyle is real (Leonardi and Neeley, 2022).

For a kaleidoscopic perspective suitable for analyzing the 21st-century Schumpeterian process, this paper proposes that the maximization of total welfare, i.e., consumer surplus plus producer surplus, is a more relevant behavior postulate for businesses in the modern world of industries, each competing for lifestyle, product mix, loyalty programs of various types, with pricing being the means and not the ends. Antitrust regulation should not be based on the welfare triangle in the static monopoly model that has traditionally been the focus. Neither is the notion of a two-sided market, as there is no clear market boundary when markets are transforming themselves. Replacing the two mainstream concepts for industrial organization should be a framework that needs to focus on data management for the new industrial organization. In the context of this new framework, monopolization of data could be the aggressive behavior of a firm or an ecosystem that requires regulation. In other words, with WEF, the question is whether overall welfare in the economy is increased or decreased. This essay identifies three types of welfare-enhancing ecosystem competition based on this criterion. They are competition based on transaction cost reduction, competition based on scalability, and competition based on data management for creating a synergy of demanders and suppliers. The third type is a specific version of what the mainstream will call a two-sided market (Rochet and Tirole, 2003). As previous paragraphs argued, labeling the market as a market is no longer appropriate. In our opinion, the proper framework to think of competition is that it is a process, as a transformation of one type of WEF to another.

## **2. Type I WEF: Transaction Costs Reduction**

Below the diagram as well as of all diagrams of the three types of industries, the quantity on the x-axis refers to activities, including producing goods and services. The quantity on the y-axis refers to marginal valuation, or a willingness to pay price. Figure 1 depicts transaction cost reduction on the demand side of an industry will increase the willingness to pay (WTP),



**Figure 1:** Type I of WEF

causing a shift in the demand curve. Conversely, transaction cost reduction on the supply will decrease the willingness to sell (WTS) or a reduction in the marginal cost of producing and delivering goods and services. The yellow shaded area depicts the total net gain.

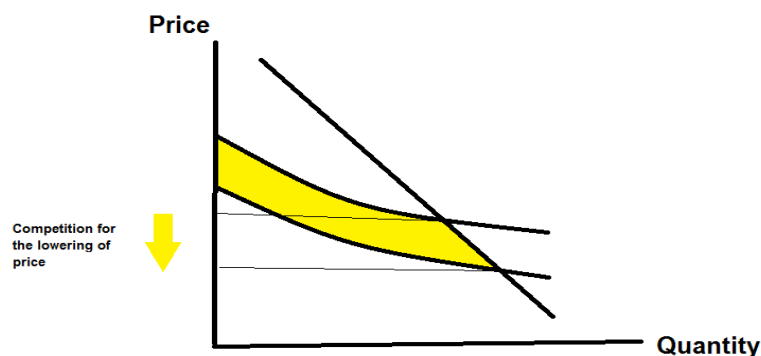
Many examples are applicable to illustrate transaction costs reduction on the demand, supply, or both for Type I. The ecosystem of mobility and food delivery is most interesting because it affects most of our daily lives. DoorDash, one of the largest food delivery companies in the USA, has a 60% market share in certain delivery categories. The idea of food delivery as a method

of lowering restaurant patronage's transaction costs has long existed before the 2020 pandemic. Originally designed as a macaroon mobile app delivery and feedback collection service, it overtook UberEats to become a second-place delivery service behind GrubHub in 2018. The pandemic has boosted the company's business as it launched its "Reopen for Delivery" program to many brick-and-mortar restaurants closed due to the city lockdown. It expanded its ecosystem by adding grocery delivery in 2020. On the supply side of the delivery business, DoorDash has an algorithm that plans routes digitally, such as Google Maps, and chooses the fastest route. Its delivery system can learn on its own and change based on things like the number of delivery workers available, the time of day (thus traffic), and how much food gets ordered. Therefore, the app reduces the marginal cost of food delivery immensely.

The success of DoorDash undoubtedly was triggered by the pandemic lockdown, but it also may reflect an intrinsic change in preference for lifestyle changes, including delivered food. On the supply side, although the algorithm mentioned above can provide a competitive advantage, it is unclear how effective its usage is in sparsely populated low-density areas. In other words, once outside the city core area, it is unclear whether it can substantially reduce transaction costs beyond traditional delivery methods by phone-call ordering and non-specialized delivery methods. In that sense, there is an equivalence of diminishing returns typically represented by rising marginal costs, i.e., an upward-sloping supply curve. The same comment can be made to its international expansion plan, challenging its scalability potential.

The restaurant food delivery business is wide open (Hirschberg et al., 2016; Bandolm, 2021), most likely to develop differently across different regions favoring certain types of food. For example, Chinese food delivery in N. America has been a long practice long before the recent technological changes. So was pizza. The delivery services seem to be getting institutionalized by intermediaries' operations. It has room to transform, with new technical means for transporting food evolving as well as TaaS innovations, including changes with Uber, Lyft, Didi, Ola Cabs, etc. (Business Strategy Hub, 2021). Uber's tactic of advertising Uber Eats is well known. Likewise, the conduct of pricing in this area of the competition is anything but a price-taker, even though competition in this space is particularly forceful. (Gurly, 2014; Schwartz, 2017). Neither is the once popular Chamberlain model of monopolistic competition of particular relevance. What may be more instructive is to perceive that every competing firm in this space will look for means to increase total welfare by shifting demand, supply, or both. There is no assurance that this is a winner-take-all game. Indeed, that's unlikely to be the case, to see ONE gigantic retail delivery service dominating the restaurant food business in the entire world.

### **3. Type II WEF: Scalability via Efficient Supply Chain Logistics**



**Figure 2: Type II WEF**

Figure 2 depicts the gist of the Type II competition. Type II generates welfare gain through scalability. Traditional economics emphasizes diminishing returns, i.e., rising marginal costs, because it is a condition that satisfies perfect competition. However, many businesses think about technology and logistics management for scalable operations today, in hope of conquering diminishing returns. Those who cannot think of scaling via management. Various franchising opportunities for standardized products and services offer cost savings to the buying public. Many Type I companies would strive to become Type II, but not all will be successful.

The granddaddy of scalability today is Costco. Competing against well-known discount stores such as Walmart, Target, etc., the Costco delivery system spans six countries with over 100,000 employees. It has 24 logistics centers around the world. By having manufacturers transport 70% of the goods to the central warehouse (the remaining 30% delivered to the store), they practice a "cross-docking mode" that takes a short time delivery to the store. The products they include in their stores are all varied, including groceries: They intentionally did not want to succeed as a retailer. The key in this industry is price competition. Their gross markups do not exceed 15%. Because they are always able to be one step ahead of their competitors in terms of pricing, the membership of Costco grows, particularly for corporate accounts. Their commitment to price reduction results in over 90% renewable rate for membership. Aside from that, they constantly expand their ecosystem by expanding their product lines, including luxury items.

A 2022 Netflix film *White Noise* depicts an American family lifestyle revolving around things that can or cannot be found on the shelves of supermarkets. Lifestyle benefits are all captured by consumer surplus. Costco understands bundling of products, to increase that, to meet a meaning for a shopping-based quality of life for many families—finding big bargains and pursuing substantial discounts. It's a hobby. Costco patrons like to talk about the great deals they get from the store. Typically, their stores are located outside downtown. People need to drive their cars to shop, as part of a family outing. Costco, therefore also cleverly sells gasoline below other gasoline retailers. They can afford to do so, as cheap gasoline can attract shoppers with cars to make a one-stop purchase. The membership fee allegedly can serve to pay for the discounts, and so are the one-dollar hot-dogs. It is hardly appropriate to call all these "two-sided" markets, however, even though clearly, there is a gasoline "market", and a hot-dog "market". Buyers in related "markets" have their synergies, and one can call Costco a platform too, as it is a gathering place for people. Yet, while all of these exhibit some features requiring data management, none alone defines the unique characteristics of a data-managed platform. There are other examples of scalability competition. Tata Motor of India had the vision of mass-producing economy cars for India's vastly growing population, possibly for the world. The country also simultaneously serves the supply chains of various other international brand names. In some public conference interviews, Elon Musk unabashedly boasted that he was the first to figure out how robotic-mechanical production of automobiles can get produced properly. Whether his vision will be successful remains to be seen. Still, competition in this direction will ultimately validate the wisdom of renewable energies in automobiles, while scalability for electric cars is not an easily achievable goal.

The scalability of the Costco type can come about in terms of location clustering too. Various outlet malls in N. America specializes in this type of clustering. As Porter (1998) has noted, "a cluster allows each member to benefit as if it had the greater scale or as if it had joined with others formally—without requiring it to sacrifice its flexibility. " The study of traditional malls versus outlet malls by Reynolds et al. (2002) can be insightful from a consumer perspective, as demand for products can often be an intermingling of various types of consumer quality-of-life seeking behavior. Certainly, economies of scope affect economies of scale in that a larger variety of products can share common fixed costs also. (Panzar and Willig. 1981)

Again, the welfare-enhancing ability of scalability in WEF, if passed along to consumers via dynamic pricing rather than monopoly pricing, poses no concerns for a static monopoly model.

Bigness, by itself alone, is not a threat unless it has the predatory intent of a dinosaur. That is not the case for Type II companies. The perceived gain in competitive advantage arises from dynamic competition being a reduction in costs, in totality, and their willingness in giving a share of the increased welfare gain to the consumer. Contrary to the static natural monopoly model in textbooks, the price is expected to be lowered, not higher, due to this type of competition. This mode of competition is compatible with producer surplus increases if the reduction in average costs of production is always one step ahead of pricing.

#### **4. Type III WEF: Data Management for Two-Sided Markets With Scalability**



**Figure 3: Type III WEF**

Although the term "two-sided" markets has long been used, referring to certain cross elasticities of complementary products, the significance of a two-sided market in its implication on network effects as well as data management is quite recent (GetSmarter, 2022). You and Ulukok (2021), and Lorne and Gogireddy (2021) examined the power of data management in the context of Google and Amazon. Metaphorically, it's the electrifying effects and not mere complementarities as in Type II that make the Type III welfare-increasing feature special. The notion of DTC (Direct-to-Consumer) is very much the result of the electrifying effects. A graphical illustration of this being different from Type II is illustrated in Figure 3.

Amazon, suspected by some as a company requiring regulation (Khan, 2017), is a good example to elaborate further in terms of an "electrifying effect" of Type III. Amazon adopts a consumer-centric approach to the expansion of its business. With 400 million global consumers monthly, it has developed its own Demand-Side Platform (DSP), becoming an eCommerce data leader. Consumers get influenced by advertising. Amazon's DSP allows marketing strategies formulated with insights, measure results with performance reporting, and build programmatic campaigns for advertisers. DSP generally is a web server-based software system that allows brands, agencies, and app developers to buy advertising inventory from publishers to manage multiple ad exchange and data exchange accounts (Subramanian, 2022). It also uses Probability Level Demand Forecast, providing glance views, sales history, and projected demand for planned promotions for vendors and advertisers.

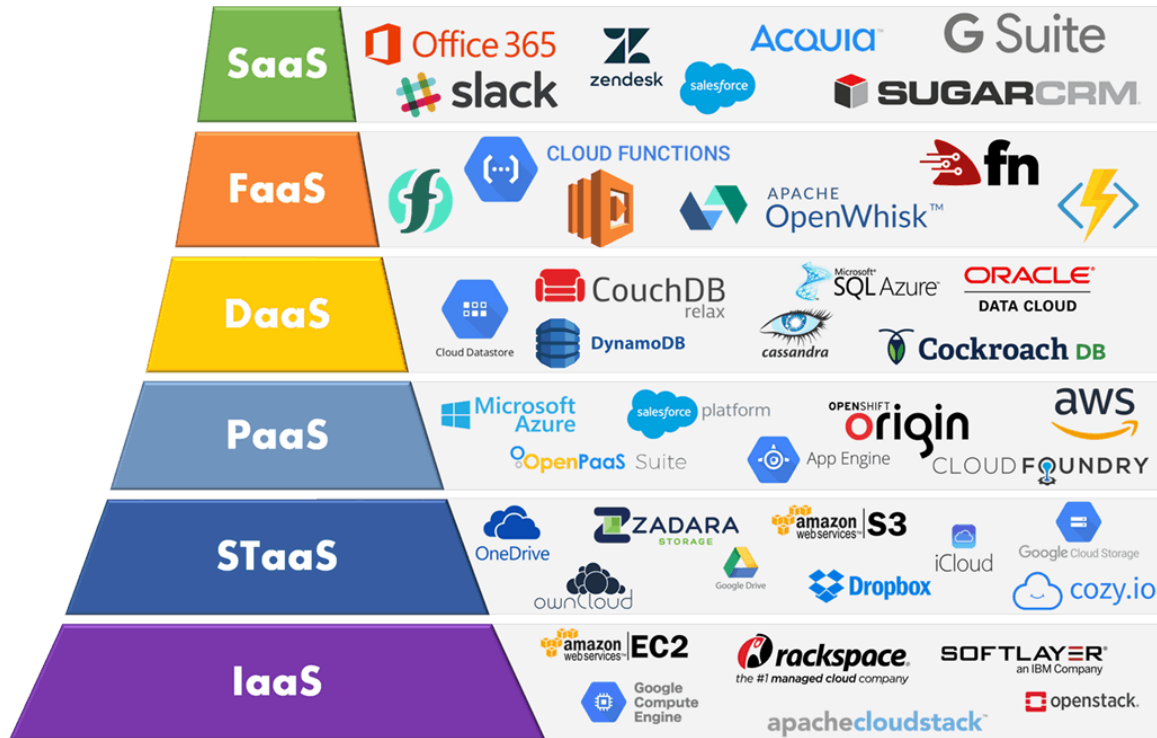
On the supply side, Amazon had 6.2 million total sellers and 1.5 million active sellers in 2021. It has 185 fulfillment centers worldwide to provide scalability. Amazon third-party sellers make up about 44% of Amazon's total sales. Surely, Amazon Web Services (AWS) is subject to competition too. Alternatives to AWS compete to reduce costs with cheap file storage and free

MySQL database services. Performance perks, dev tools, and uptime at a lower price are all new conducts used to compete with Type III welfare-enhancing companies. (Bernheim, 2021) The key to competing for Type III companies is utilizing data, driving analytics, and letting analytics provide further guidance on collecting more data (Iansiti and Lakhani, 2020). To be sure, Type I and Type II companies also employ data management, but a condition for Type III places data management at the heart of seeking dominance. In other words, for platforms already acquiring the status of scalability, this can be potentially dangerous, not only because of intrusion of personal privacy but also because it can lead to total welfare reduction. Why? The marginal productivity of data, or sets of data, is specific to the algorithm designed by a platform. The success in the scalability of a particular platform does not guarantee that the marginal product of data owned and gathered will be to its highest use. Mistakes, short-sightedness, and inputting disinformation could all constitute a lowering of the marginal product of data. The insightful distinction of Data as Capital (DaC) versus Data as Labor (DaL) is useful in providing the basis to formulate an argument (Arrieta-Ibarra et al., 2018). Scalability attained by capital investment is dangerous, not because it becomes a natural monopoly, but because it has a captive audience where the marginal product of data to that audience might not be the highest among the alternatives. In terms of the 2018 paper cited, it is suggested as a monopsony. Regardless, if data usage is not the highest-use option, total welfare is less than an idealized maximum. No bidding process on data can ensure its efficient allocation.

## **5. Discussion**

Transformation of information into digital data (Lorne and Zubashev, 2020) and using that for business analytics (Soldić-Aleksić, Chronos-Krasavac, and Karamata, 2020; Razzaque, 2021), in making decisions as well as a collection of more data (Pratt, 2019; Martin and Moore, 2020) are the new conduct for the industrial organization we are studying. In the earlier formulation of this problem, we had postulated the behavior postulate as a matter of evolutionary survival (Lorne, 2016, Al-Sartawi et al., 2021). Formulating the problem as a "market adoption" problem as how players perceive information in terms of optimum distributions can be another way if a game theoretical approach is to be used. That direction of inquiry asks whether the "market" of smart construction objects will be a single product or a bundle of products, i.e. the business of aggregation. We have progressed to this stage of our inquiry of addressing ecosystems, thus going beyond the analysis done earlier. Moreover, companies' objectives, in reality, are not to play games, even though economic theorists would like to use that as a behavioral assumption. Business people like to say their mission is to help people, and of course, that's just rhetoric. We interpret that rhetoric as saying how total welfare can be increased, as the belief is that decisions taken to increase total welfare will find their way into the bottom line of a business. It will not be a fair question to press on having clear boundaries between the three types of welfare-enhancing competition outlined in this paper, much like pressing for a distinction between individual, household, and community. Indeed, ecosystem classifications from a technical perspective could be very different than one classified as Figure 4 shows.

The development of a company's Schumpeterian process is likely to start from the first type, and as bundling and partnership continue, it gradually evolves into the other two types. For all three types, consumer choice is the ultimate and deciding criterion. They are the final judges. Furthermore, there will be changes in demand as well as demand elasticities as consumer choice is widened. However, when the status of a company has reached the condition of the third type, it is irreversible, and from that point onward, further development will be path dependent, as it will become a marriage between scalability in usage and a technological ecosystem as described in the above diagram.



**Figure 4:** Alternative ways to classify ecosystems. Source: Jones (2022)

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The past and present of Microsoft can be used as an example for this illustration. The birth of Windows was just a book-keeping software that make things easier to do, i.e. lower costs. It was limited in use because it was not the only bookkeeping protocol available at the time. It was only a Type I kind of company. Through marketing and bundling with browsers and various software, Microsoft over time was able to achieve scalability domestically and internationally. It came under the scrutiny of Antitrust, which investigated the company under a static monopoly model that this essay rejects in the introduction. In actuality, during that era, Microsoft was a Type II kind of company, aiming to provide price decreases rather than price increases for users. Fast forwarding to the situation now, we see Microsoft's intended acquisition of Activision to be a possible data monopolization of Type III described, even though in terms of the conventional framework of evaluating market structure via concentration ratio, Microsoft only ranks third, behind Chinese company Tencent and the Japanese company Sony. Indeed, in Dec. 2022, US Federal Trade Commission sought to block the acquisition, alleging that the acquisition would suppress competitors to its Xbox gaming consoles and the growing subscription content and cloud-gaming business. In other words, a harmless Microsoft Type II (from a dynamic monopoly perspective) can be turned into a harmful Microsoft Type III via data merging with Activision. To be sure, Microsoft is not an unchallengeable leader in a predator-preying game. The space for the competition is still wide open, as diagram Figure 5 shows:



**Figure 5:** Magic Quadrant for Cloud Infrastructure and Platform Services.  
Source: Jones (2022)

Want-to-be leaders who are visionary (x-axis) must be matched with an ability to execute (y-axis) to win. Microsoft is not as effective as Amazon in its ranking. That this is forever a horse race is implicit in this exposition. There is no final winner. The only threatening force to this process of competition is an irrational dictator, which will seek to gain its leadership ultimately by military force and an opaque data management principle. That, indeed, will be an apocalypse, but hopefully, not now.

## 6. Conclusion

Lifestyle can influence as well as being influenced by the digital world of the 21st century. An obsolete framework pursuing static economic efficiency is unfit to analyze and regulate modern-day business practices. This paper proposes an alternative framework; based on three types of welfare enhancement. Type I is based on transaction cost reduction. Type II is based on achieving scalability. Type III is utilizing scale economies to create an electrifying data management protocol for possibly achieving a monopoly. Coaching a business to be a leader in its ecosystem is not a realistic way to characterize the current Schumpeterian process of innovation. Thinking in terms of welfare maximization, rather than profit maximization, is a more pragmatic "good business" practical framework.

Using this framework, while all three types entail data management, the paper identifies a certain type of data management for Type III that can lead to reduced welfare rather than enhanced welfare, since the productivity of data has the danger of not being efficiently utilized when scalability on goods and services are being electrified by AI and network growths specific to a particular platform. The evolution in WEF points to the same direction of setting a limit of liberty, as the 1986 Nobel Prize Laureate, James Buchanan, enlightened us many years ago. The examples in the paper, cumulatively and hopefully, can lead toward a formulation of such constitutional principles for the new industrial organization.

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